



# SHSA 2019

Symposium on Hidradenitis  
Suppurativa Advances

## Final Program



Photo Credit: Vito Palmisano

### November 1 - 3, 2019

Westin Book Cadillac Hotel, Detroit, MI

[www.hs-symposium.org](http://www.hs-symposium.org)

ORGANIZED BY



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## Welcome from Co-Chairs

Dear Colleagues,

We are pleased to welcome you to Detroit for the 4<sup>th</sup> Annual **Symposium on Hidradenitis Suppurativa Advances** (SHSA). We have prepared an exciting program that show-cases the most recent innovations, practical challenges encountered, and solutions in the field of HS.

The Program Committee, led by Dr. Michelle Lowes and Dr. Afsaneh Alavi, have ensured the program features the most highly-regarded speakers in the field of HS, in addition to rising stars and HS researchers. SHSA is a unique conference, where you will be immersed in all aspects of HS, from epidemiology, clinical features, pathogenesis, as well as the latest medical and surgical treatments. We have brought together excellent national and international speakers who are leading efforts to treat HS in the best possible way, and spearheading HS research.

We hope you will find SHSA a place to network with your colleagues. The number of publications and research on HS have risen significantly, but there is still a long way to go before we fully understand the complete story of this disease. We hope you find that SHSA is an important step in this journey.

Sincerely,



*Dr. Iltefat Hamzavi*  
President, HSF



*Dr. Raed Alhusayen*  
President, CHSF



*Dr. Michelle Lowes*  
Co-Chair, SHSA 2019



*Dr. Afsaneh Alavi*  
Co-Chair, SHSA 2019

# Planning Committee

## Conference Co-Chairs

Afsaneh Alavi, MD, MSc, FRCPC, Co-Chair SHSA 2019, Professor, Div. of Dermatology, University of Toronto, Women's College Hospital, Toronto, ON, Canada

Michelle Lowes, MB.BS, PhD, Co-Chair SHSA 2019, Physician, The Rockefeller University, New York, NY, USA

## Committee Members

Steven Daveluy, MD, FAAD, Associate Professor and Program Director, Dept of Dermatology, Wayne State University, Detroit, MI, USA

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Iltefat Hamzavi, MD, FAAD, President HSF, Dermatologist, Department of Dermatology, Henry Ford Hospital and Hamzavi Dermatology, Detroit, MI, USA

Joslyn Sciacca Kirby, MD, MEd, MS, Associate Professor and Vice Chair of Education, Department of Dermatology, Pennsylvania State, Hershey, PA, USA

Hadar Lev-Tov, MD, MAS, Assistant Professor, Dr. Philip Frost Department of Dermatology and Cutaneous Surgery, University of Miami, Miller School of Medicine, Miami, FL, USA

Angela Miller, Clinical Research Manager, Department of Dermatology, Henry Ford Health Systems, National Director, HS Foundation, Detroit, MI

Elizabeth O'Brien, MD, Associate Professor, Internal Medicine, McGill University, Senior Staff, Dermatologist, Montreal General Hospital, Montreal, QC, Canada

Vincent Piguet, MD, PhD, FRCP (London), Division Director, Dermatology, University of Toronto and Division Head, Dermatology, Women's College Hospital, Toronto, ON, Canada

Se Mang (Simon) Wong, MD, FRCPC, Clinical Associate Professor, Director Undergraduate Education, UBC Department of Dermatology and Skin Science, Vancouver, BC, Canada



## Faculty List

**Afsaneh Alavi**, MD, MSc, FRCPC, Co-Chair SHSA 2019, Professor, Div. of Dermatology, University of Toronto, Women's College Hospital, Toronto, ON, Canada

**Bassam Batarse**, MD, Associate Chief of Staff, Integrated Clinical Services, John D. Dingell Va Medical Center, Detroit, MI, USA

**Falk Bechara**, Professor, Head of the Department of Dermatologic Surgery, Senior Physician, Department of Dermatology, Allergy and Venereology, Ruhr-University Bochum, Germany

**Ricardo Cibotti**, Ph.D., Program Director, Immunobiology and Immune Diseases of Skin Program, National Institute of Arthritis and Musculoskeletal and Skin Diseases, National Institute of Health, USA

**Patricia Coutts**, RN, York Dermatology Center, Toronto, ON, Canada

**Rhonda Dailey**, MD, Assistant Professor, Behavioral Sciences Division, Department of Family Medicine and Public Health Sciences, Wayne State University School of Medicine Scientific Director, Office of Community Engaged Research (OCEnR), Detroit MI, USA

**Steven Daveluy**, MD, FAAD, Associate Professor and Program Director, Dept of Dermatology, Wayne State University, Detroit, MI, USA

**Veronique del Marmol**, MD, PhD, Head, Dept. of Dermatology & Venereology, Hôpital Erasme Université Libre de Bruxelles, Brussels, Belgium

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**Amit Garg**, MD, Founding Chairman for the Department of Dermatology at the Zucker School of Medicine, Senior Vice President of the Dermatology Service Line at Northwell Health, New York, NY, USA

**Ralph George**, MD, FRCS, Associate Professor, General Surgery, University of Toronto, Medical Director, CIBC Breast Centre, St. Michael's Hospital, Toronto, ON, Canada

**Stephanie Goldberg**, MD, Associate Professor of Surgery, Medical Director of VCU ACCESS, General Surgery, Virginia Commonwealth University School of Medicine, Richmond, VA, USA

**Sandra Guilbault**, Hope for HS, Detroit, MI, USA

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**Marsha Henderson**, MD, FAAD, Senior Staff Physician, Dept. of Dermatology, Henry Ford Hospital, Detroit, MI, USA

**John Ingram**, MA, MSc, DM(Oxon), FRCP(Derm), FAcadMed, Senior Lecturer & Consultant Dermatologist, Cardiff University, UK

**Gregor Jemec**, MD, DMSc, University of Copenhagen Roskilde Hospital, Copenhagen, Denmark

**Olivier Join-Lambert**, MD, PhD, Chef de Service, Laboratoire de Microbiologie, Centre Hospitalier et Universitaire de Caen Normandie, France

**Nirmal Kaur**, MD, Director, Inflammatory Bowel Disease Center, Division of Gastroenterology and Hepatology, Henry Ford Health System

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**Angela Miller**, Clinical Research Manager, Department of Dermatology, Henry Ford Health Systems, National Director, HS Foundation, Detroit, MI, USA

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**Saqib Nakadar**, DO, Medical Director, Doc Greens Clinic, Michigan Marijuana Review Panel, Clinical Assistant Professor, Michigan State University, Sterling Heights, MI, USA

**Elizabeth O'Brien**, MD, Associate Professor, Internal Medicine, McGill University, Senior Staff, Dermatology, Montreal General Hospital, Montreal, QC, Canada

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**Christopher Sayed, MD**, Assistant Professor, Department of Dermatology, University of North Carolina School of Medicine, Chapel Hill, NC, USA

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**Nicole Van Haren**, RN, BSN, Dermatology, Henry Ford Hospital, Detroit, MI

**Kerstin Wolk**, PhD, Research Team Leader, Senior Lecturer and Consultant Immunologist, Psoriasis Research and Treatment Center, Charité – University Medicine, Berlin, Germany

**Se Mang (Simon) Wong**, MD, FRCPC, Clinical Associate Professor, Director Undergraduate Education, UBC Department of Dermatology and Skin Science, Vancouver, BC, Canada

**Christos C. Zouboulis**, MD, Departments of Dermatology, Venereology, Allergology and Immunology, Dessau Medical Center, Brandenburg Medical School Theodore Fontane, Dessau, Germany

## Sponsors

We gratefully acknowledge the support of the following sponsors

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# General Information

## Certificate of Attendance

Certificates of Attendance will be emailed to delegates following the conference. Delegates may request a hard-copy Certificate of Attendance at the SHSA Registration Desk.

## Travel Grant

The 4<sup>th</sup> Annual Symposium on Hidradenitis Suppurativa Advances (SHSA) organizing committee is delighted to announce that this year we were able to award a limited number of travel grants to junior investigators (within 10 years of completion of training), residents, fellows, post-docs, professional and graduate students with a demonstrated interest in HS.

Funding for the travel grants was made possible (in part) by R13 AR076260 from **the National Institute of Arthritis and Musculoskeletal and Skin Diseases**. The views expressed in written conference materials or publications and by speakers and moderators do not necessarily reflect the official policies of the Department of Health and Human Services; nor does mention of trade names, commercial practices, or organizations imply endorsement by the U.S. Government.

## Speaker Centre

A Speaker Centre is located in the Ambassador Room, 3<sup>rd</sup> Floor of the Westin Book Cadillac. Presenters are asked to check in to the speaker centre on arrival or 24 hours prior to their presentation. The Speaker Centre will be open during the conference hours, beginning at 9:00 am on Friday, November 1<sup>st</sup>.

## Electronic Posters

Electronic posters are available for viewing on LCD monitors, located in the convention level foyer, 4<sup>th</sup> floor. Posters will be displayed for the duration of the conference.

## Satellite Room

Attendees who wish to view the main session room presentations in a more informal setting may go to the **Satellite Room**. This room is located on the **3<sup>rd</sup> Floor in the Esquire Room**.



## International Invited Speakers



**Veronique del Marmol, MD, PhD**

Head, Department of Dermatology & Venereology,  
Hôpital Erasme Université Libre de Bruxelles, Brussels, Belgium

**Session 4:** Outcomes in HS  
**Date:** Saturday, November 2, 2019  
**Title:** Quantify HS

**Date:** Saturday, November 2, 2019

Professor Veronique del Marmol is the Head of the Department of Dermatology at Hospital Erasme, Université Libre de Bruxelles, Belgium. Skin cancer, inflammatory diseases, wound healing and non-invasive imaging are the main areas of interest for Professor del Marmol. In recognition of her work in these fields, she has been awarded many scholarships and grants, including the Major Roche Dermatology Fundamental Research Award. She authored and co-authored more than 137 peer reviewed articles and 7 books (H index 35 - 5583 citations) and in particular in *Experimental Dermatology*, *Journal of the European Academy of Dermatology and Venereology (JEADV)*, *Nature* and *New England Journal of Medicine*. Since 2009 she is leading at the European level the European skin cancer prevention campaign EUROMELANOMA. She is a founding member of European Hidradenitis Suppurativa Foundation and leading the European registry for Hidradenitis suppurativa. She is board member of the European dermatology forum (EDF), the Academy of Dermatology and Venerology (EADV) the European Academy of Dermato-oncology (EADO) and the European Pigment cell society (ESPCR). She is actually vice president of the Belgian society of dermatology and in 2014 she has been elected as member of the Belgian Royal Academy of Medicine.



**Olivier Join-Lambert, MD, PhD**

Chef de Service, Laboratoire de Microbiologie  
Centre Hospitalier et Universitaire de Caen Normandie, France

**Session 5:** Clinical HS and Medical Treatment  
**Date:** Saturday, November 2, 2019  
**Title:** Antibiotic stewardship in hidradenitis suppurativa

Olivier Join-Lambert made his medical studies at the Pierre et Marie Curie University in Paris France. He made his PhD on the pathophysiology of central nervous system infections at the Paris Descartes University, France and became Assistant Professor in Microbiology at the Necker-Enfants malades Hospital. Since 2010, Olivier Join-Lambert developed a translational research with Dr Aude Nassif, a dermatologist at the Paris Institut Pasteur Medical Center to decipher the microbiology of Hidradenitis Suppurativa and its potential role as triggering inflammatory factor in HS. Using bacterial cultures and advanced high throughput sequencing methods, he demonstrated that specific opportunistic bacterial pathogens are associated with HS lesions, depending on the clinical severity of the disease. These results led to develop new treatment strategies using targeted antibiotics treatments. Olivier Join-Lambert is now Professor in Microbiology and the head of the Department of Microbiology at the Caen Normandie University Hospital.



**Angelo Valerio Marzano, MD**

Dermatology Unit, Fondazione IRCCS Ca' Granda Ospedale Maggiore Policlinico, Dipartimento di Fisiopatologia Medico-chirurgica e dei Trapianti, Università degli Studi di Milano, Milan, Italy

**Session 2:** Basic and Translational Research  
**Date:** Friday, November 1, 2019  
**Title:** Update on HS Pathogenesis

Angelo Valerio Marzano is Associate Professor of Dermatology, Consultant and qualified as Full Professor at the University of Milan and Fondazione IRCCS Ca' Granda Ospedale Maggiore Policlinico, Milan – Italy. He graduated in Medicine and Surgery at the University of Milan in 1991 and specialized in Dermatology and Venereology in the same University in 1995. He is author of approximately 250 publications (included 223 assessed works and 22 chapters of books) in international dermatological, immunological and rheumatological journals (Scopus h-index: 34; Scopus total citations: 4047). He is Co-Editor together with Daniel Wallach and Marie Dominique Vignon-Pennamen of the book “Neutrophilic Dermatoses” published by Springer in 2018. He is also Board Member of the Italian Society Of Dermatovenereology (SIDEMAST) and the European Dermatology Forum (EDF), Chairman of the “Italian Group of Immunodermatology”, Honorary member of the “Serbian Association of Dermatovenereologists” and of the “Swiss Society of Dermatology and Venereology”. He has also been Member of the Organizing Committee of the World Congress of Dermatology in 2019. His main fields of interest are neutrophilic dermatoses, autoinflammatory skin diseases, hidradenitis suppurativa, autoimmune bullous dermatoses and connective tissue diseases.



**Kerstin Wolk, PhD**

Research Team Leader, Senior lecturer and Consultant Immunologist  
Psoriasis Research and Treatment Center, Charité, University Medicine, Berlin, Germany

**Session 2:** Basic and Translational Research  
**Date:** Friday, November 1, 2019  
**Title:** The Cytokine Network in Hidradenitis Suppurativa

Dr. Kerstin Wolk is a dermatimmunologist and heads the experimental research team at the interdisciplinary Psoriasis Research and Treatment Center (PRTC) at the Charité - University Medicine in Berlin. She obtained both a diploma (5-year degree) in Biopharmacology from the University of Greifswald, Germany, and a diploma in Environmental Toxicology from the University of Metz, France. She later graduated with a Ph.D. from the University of Greifswald, before accepting a post-doctoral position in the dermatological department at Schering, Inc., Berlin. In 2018, she completed her habilitation at the Charité in Berlin.

With her team at the Charité's PRTC, she currently investigates the biology and role of epithelia-targeting cytokines (e.g., IL-22, IL-29, IL-17, IL-19, and IL-24) in the immunopathogenesis, skin barrier function, and epithelial immune defence in chronic inflammatory skin conditions such as Psoriasis and Hidradenitis suppurativa/Acne inversa. Further research activities involve the immune cell infiltration, the epigenetic memory of tissue cells, the question of tissue hyper-regeneration versus tissue destruction, the identification of biomarkers as well as the comorbidities and consequences of chronic inflammation. In the scope of clinical studies performed with Psoriasis and Hidradenitis suppurativa patients at the PRTC, her team conducts diagnostic and explorative investigations. Dr. Wolk is co-author of 48 peer-reviewed original articles and 16 review articles (first/last authorship in 41, more than 6000 citations), 2 meeting reports, and 9 book chapters. Furthermore, she has teaching duties for undergraduates at the Charité, works in the editor board of the journal 'Mediators of Inflammation', and is founder and co-leader of the task force 'Acne inversa' of the German Consortium for Dermatological Research (ADF).



**Christos C. Zouboulis, MD**

Departments of Dermatology, Venereology, Allergology and Immunology, Dessau Medical Center, Brandenburg Medical School Theodore Fontane, Dessau, Germany

**Session 1:** HS Foundation Presidents: Gaps in HS – Looking Forward

**Date:** Friday, November 1, 2019

**Title:** Pathophysiology of HS

**Session 5:** Clinical HS and Medical Treatment

**Date:** Saturday, November 2, 2019

**Title:** Toward new treatment guidelines for hidradenitis suppurativa

Prof. Dr. med. Christos C. Zouboulis is Director of the Departments of Dermatology, Venereology, Allergology and Immunology, Dessau Medical Center and Founding Professor of Dermatology, Venereology and Allergology at the Brandenburg Medical School Theodor Fontane, Germany. He is also elected Prof. honoraire of the University of Franche-Comté, France, Dr. h.c. of the National Kapodistria University of Athens, Greece, Visiting Professor of the Shanghai Jiao Tong Medical University, China and has been awarded the Medal in Silver of the Wroclaw Medical University, Poland. He currently serves as President of the European Hidradenitis Suppurativa Foundation (EHSF) e.V., Honorary President of the European Society of Preventive, Regenerative and Anti-Aging Medicine (ESAAM), Board member of the European Academy of Dermatology and Venereology (EADV) and the International Society on Behçet's Disease and coordinator of the EADV Task Force on Acne, Rosacea and Hidradenitis Suppurativa (ARHS). Prof. Zouboulis is currently the Editor of the EADV News, Co-Editor of Rejuvenation Research and serves in the Editorial Boards of several leading international scientific journals. He is honorary member of the French, the Hungarian, the Maltese and the Lithuanian Dermatological Societies. Prof. Zouboulis has an extensive publication record on the pilosebaceous unit and its diseases (acne, hidradenitis suppurativa), skin endocrinology, skin stem cells, molecular ageing, cryosurgery and rare skin diseases. He has received numerous awards, including the Oskar Gans Prize, the EADV Research Fellowship, the Felix Wankel Animal Protection Research Prize, the Paul Gerson Unna Prize and the Springer Prize for Dermatology. His Departments have been decorated with the title "Germany land of ideas - 2009 place of excellence" for the work on skin stem cells. Prof. Zouboulis publication list includes over 700 peer reviewed articles and over 180 books and book chapters (h-index 92, personal IF 1787).

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## SHSA 2019 Program

### Friday, November 1, 2019

<b>10:00 – 12:00</b>	<b>Pre-Conference Workshop: Office-Based Procedures for HS</b> (Pre-registration is required)	<i>Venetian Ballroom</i>
<b>Learning Objectives</b> <ul style="list-style-type: none"> <li>Identify ideal candidates for carbon dioxide laser, laser hair removal, and/or deroofting for hidradenitis suppurativa (HS)</li> <li>See application of pre-operative ultrasound imaging to evaluate HS severity prior to carbon dioxide laser excision</li> <li>Recognize tools and staffing needed for implementation of tumescent anesthesia for carbon dioxide laser excision</li> </ul>		
10:00	Introduction and Welcome	Iltefat Hamzavi
10:05	Nd: YAG Laser Hair Removal in the treatment of HS (lecture with video)	Marsha Henderson, Steven Daveluy
10:15	Q&A	
10:30	Sinus Tract Deroofing with US Mapping (lecture with video)	Pranita Rambhatla, Christopher Sayed
10:40	Q&A	
10:55	Carbon Dioxide Laser Excision with US Mapping and Tumescent Anesthesia (lecture with video)	Iltefat Hamzavi, Paul Hazen
11:20	Q&A	
11:55	Final Remarks	
<b>11:00 – 18:00</b>	<b>Registration Desk Open</b>	<i>Foyer, 4<sup>th</sup> Floor</i>
<b>13:00 – 13:15</b>	<b>Welcome Remarks</b> <i>Iltefat Hamzavi, Isabelle Delorme</i>	<i>Venetian Ballroom</i>
	Introduction and Welcome	Isabelle Delorme, Iltefat Hamzavi
	Welcome to SHSA – Patient Perspective	Sandra Guilbault
<b>13:15 – 14:00</b>	<b>Session 1 - HS Foundation Presidents: Gaps in HS - Looking Forward &amp; "Top Stories"</b> <i>Moderators: Afsaneh Alavi, Michelle Lowes</i>	<i>Venetian Ballroom</i>
<b>Learning Objective:</b> <ul style="list-style-type: none"> <li>To understand the gaps in HS disease awareness, clinical course, management and pathophysiology of HS</li> <li>To learn about "top stories" in HS from submitted abstracts</li> </ul>		
13:15	Disease Awareness and Clinical Course	Iltefat Hamzavi
13:19	Management of HS	Isabelle Delorme
13:23	Pathophysiology of HS	Christos C. Zouboulis
13:27	Epithelialized Tracts are Active Mediators of Inflammation in Hidradenitis Suppurativa	Kristina Navrazhina
13:32	Fibroblast Subpopulations are Associated with Tunnel Formation and Inflammation in Hidradenitis Suppurativa	John Frew
13:37	Healthcare Utilization in Pediatric Patients with Hidradenitis Suppurativa	Alison Dempsey
13:42	High Prevalence of Musculoskeletal Pain, but Little Inflammatory Changes in Patients with Hidradenitis Suppurativa	Kelsey van Straalen
13:47	Epigenetic Modifications in the Inflammatory Process of Hidradenitis Suppurativa	Thomas Meyer

13:52	The Sweat Gland Antimicrobial Peptide Dermcidin is Distinctly Dysregulated in Hidradenitis Suppurativa Versus Healing and Non-Healing Skin Wounds	Paula Mariottoni
13:57	<b>Q&amp;A</b>	
<b>14:00 – 14:15</b>	<b>Refreshment Break / Exhibits / Poster Viewing</b>	<i>Foyer, 4<sup>th</sup> Floor</i>
<b>14:15 – 16:05</b>	<b>Session 2 – Basic and Translational Research</b> <i>Moderators: Vincent Piquet &amp; John Frew</i>	<i>Venetian Ballroom</i>
<b>Learning Objectives</b>		
<ul style="list-style-type: none"> <li>To understand the currently appreciated HS pathogenesis pathways</li> <li>To learn of new developments in basic and translational research in HS</li> </ul>		
14:15	Update on HS Pathogenesis	Angelo Marzano
14:30	The Cytokine Network in Hidradenitis Suppurativa	Kerstin Wolk
14:45	Role of Complement in HS	Vincent Piquet
14:55	Identifying Novel Small Molecule Targets in Hidradenitis Suppurativa	John Frew
15:05	An Analysis of Monogenic Disorders with Hidradenitis Suppurativa Symptom Overlap Recapitulates Hidradenitis Suppurativa Comorbidities	Lynn Petukhova
15:10	Epigenetically Dysregulated MicroRNAs Involved in the Pathogenesis of Hidradenitis Suppurativa	Nazia Sayed
15:15	Exploring the Role of p53 Signaling in Hidradenitis Suppurativa	William Shipman
15:20	Gut Microbiome: Differences in Composition in Patients with Hidradenitis Suppurativa	Sarah Kam
15:25	Immuno-Metabolomic Alterations in Hurley Stage 1 Hidradenitis Suppurativa	Aude S. Nassif
15:30	<b>Q&amp;A</b>	
15:35	<b>Debate:</b> Promising Therapeutic Targets for HS in 2019	<b>Moderator:</b> Vincent Piquet
<b>16:05 – 16:45</b>	<b>Exhibits, Poster Viewing Reception</b>	<i>Foyer, 4<sup>th</sup> Floor</i>
<b>16:50 – 18:00</b>	<b>Session 3 – Challenges in Clinical Trials for HS</b> <i>Moderators: Hadar Lev-Tov, Alexa B. Kimball</i>	<i>Venetian Ballroom</i>
<b>Learning Objectives:</b>		
<ul style="list-style-type: none"> <li>To appreciate the challenges of clinical trial design for HS from the perspective of clinicians and industry representatives</li> <li>To understand the experience of participation in clinical trials in HS from the HS patient perspective</li> <li>To understand the challenges and opportunities for community engagement for clinical trials in HS</li> </ul>		
16:45	Words of welcome, Congresswoman Rashida Tlaib, US House of Representatives Member, Michigan, 13 <sup>th</sup> Congressional District	
16:50	Patient Perspective	Athena Gierbolini
16:55	Physician Perspective	Joslyn Kirby
17:05	<b>CANCELLED</b> - Research Recruitment and Retention Challenges, Successful Strategies, and Best Practices for Community Engagement	Rhonda Dailey
17:15	HS Progress	Haley Naik
17:20	<b>Q&amp;A</b>	
17:30	<b>Panel:</b> Challenges in Clinical Trials for HS: Industry Perspective	<b>Moderator:</b> Alexa B. Kimball
<b>18:00 – 19:30</b>	<b>Welcome Reception, Exhibits, Poster Viewing</b>	<i>Foyer, 4<sup>th</sup> Floor</i>
18:15	Meet & Greet with Patients & HS Ambassadors (15 mins)	<i>Meet group at Registration Desk</i>

## Saturday, November 2, 2019

<b>07:00 – 08:00</b>	<b>Hidradenitis Suppurative Foundation Board Meeting</b> <i>(invitation only)</i> <b>Canadian Hidradenitis Suppurativa Foundation Board Meeting</b> <i>(invitation only)</i>	<i>Jefferson, 3<sup>rd</sup> Fl</i> <i>Book BR, 3<sup>rd</sup> Fl</i>
<b>07:30 – 18:00</b>	<b>Registration</b>	<i>Foyer, 4<sup>th</sup> Floor</i>
<b>07:30 – 08:30</b>	<b>Continental Breakfast</b>	<i>Foyer, 4<sup>th</sup> Floor</i>
<b>08:30 – 09:30</b>	<b>Session 4 – Outcomes in HS</b> <i>Moderators: Elizabeth O'Brien, Joslyn Kirby</i>	<i>Venetian Ballroom</i>
<b>Learning Objective</b>		
<ul style="list-style-type: none"> <li>To understand the current knowledge of outcomes measurement in HS</li> </ul>		
08:30	Quantify HS	Veronique del Marmol
08:40	Update on IDEOM/HISTORIC	Joslyn Kirby
08:50	THESEUS Study to Evaluate New Outcomes for HS	John Ingram
09:00	Validation of Patient Global Item for Quality of Life Impact on Hidradenitis Suppurativa	Brittainy Hereford
09:05	Agreement of Disease Severity Staging for Hidradenitis Suppurativa Between Patients and Providers in a Clinical Setting	Melissa Butt
09:10	Development and Validation of HSCAPS-1: a Prediction Model for Diagnosis of Hidradenitis Suppurativa Over Cutaneous Abscess	Shari Wright
09:15	The Skindex-Mini: a Streamlined QOL Measurement Tool for Assessing Quality of Life in HS	Adaugo Amah
09:20	<b>Q&amp;A</b>	
<b>09:30 – 10:00</b>	<b>Refreshment Break / Exhibits / Poster Viewing</b>	<i>Foyer, 4<sup>th</sup> Floor</i>
<b>10:00 – 12:00</b>	<b>Session 5 – Clinical HS and Medical Treatment</b> <i>Moderators: Afsaneh Alavi, Amit Garg</i>	<i>Venetian Ballroom</i>
<b>Learning Objective</b>		
<ul style="list-style-type: none"> <li>To understand the current knowledge of clinical course of HS and medical treatment options</li> </ul>		
10:00	Disease Trajectories in Hidradenitis Suppurativa	Gregor Jemec
10:10	Toward New Treatment Guidelines for Hidradenitis Suppurativa	Christos C. Zouboulis
10:25	Antimicrobial Stewardship in Hidradenitis Suppurativa	Olivier Join-Lambert
10:40	CAM Options for Management for HS	Vivian Shi
10:50	Management of Acute HS Flares	Christopher Sayed
10:55	Patients' Online Journey in HS	Steven Daveluy
11:00	The Utility of PHQ Depression Screening in Patients with Hidradenitis Suppurativa	Katherine Berry
11:05	Development of a Patient Decision Aid for Hidradenitis Suppurativa	Olivia McBride, Donna McLean
11:10	Stigmatization in Patients with Hidradenitis Suppurativa	Dorra Bouazzi
11:15	Incidence of Major Adverse Cardiovascular Events in Patients with Hidradenitis Suppurativa: a Population Based Analysis in the United States	Shari Wright
11:20	Dietary Factors in Hidradenitis Suppurativa	Vivian Shi
11:25	Hidradenitis Suppurativa and Pregnancy: A Retrospective Review	Anjelica Peacock
11:30	<b>Q&amp;A</b>	
11:35	Therapeutic Drug Monitoring in Patients with HS	Afsaneh Alavi

11:40	Therapeutic drug monitoring for TNF inhibitors in IBD	Nirmal Kaur
11:45	<b>Panel:</b> Optimizing response to biologics- new concepts for HS	<b>Moderator:</b> Gregor Jemec
<b>12:00 – 13:30 Buffet Lunch / Exhibits / Poster Viewing</b>		<i>Foyer, 4<sup>th</sup> Floor</i>
<b>13:30 – 15:00 Session 6: Management of HS Pain</b> <i>Moderators: Steven Daveluy, Iltefat Hamzavi</i>		
<b>Learning Objectives:</b>		
<ul style="list-style-type: none"> <li>To understand that pain is the most debilitating symptom for patients living with HS</li> <li>To learn about management options for pain in HS from pain specialists, dermatologists, and psychologists</li> </ul>		
13:30	Patient Perspective of Pain in HS	Jasmine Sidhu
13:35	<b>Cancelled</b> - Management of Chronic Pain in the Post-Opioid Era	Bassam Batarse
13:45	Medical Cannabis	Saqib Nakadar
13:55	HS Pain Management for the Dermatologist	Lauren Orenstein
14:05	Psychological Approaches to Pain Management	Zarine Patel
14:15	Itch and Pain are Dual Burdens in Hidradenitis Suppurativa Patients	Kyla Price
14:20	<b>Cancelled</b> - Increasing Engagement and Treatment Adherence Through Emotional and Mental Well-Being	Erin Martinez
14:25	<b>Q&amp;A</b>	
14:30	<b>Panel:</b> Management of HS Pain	<b>Moderator:</b> John Ingram
<b>15:00 – 15:30 Refreshment Break / Exhibits / Poster Viewing</b>		<i>Foyer, 4<sup>th</sup> Floor</i>
<b>15:30 – 17:00 Session 7: Concurrent Session A &amp; B</b>		
<b>15:30 – 16:15 - 1A: Practice Management for HS</b> <b>Learning Objectives:</b>		<b>Venetian Ballroom</b>
<ul style="list-style-type: none"> <li>List key specialties needed for the care of the HS patient</li> <li>Review how to triage HS patients and educate them on various treatment options</li> <li>Understand how to integrate supports groups into the feedback the HS clinic gathers from patients</li> </ul>		Iltefat Hamzavi, Steven Daveluy
<b>15:30 – 16:15 - 1B: Setting up an HS Support Group</b> <b>Learning Objectives:</b>		<b>Crystal Ballroom</b>
<ul style="list-style-type: none"> <li>Understand the importance and benefits of developing and hosting a support group</li> <li>Implement initial steps for identifying medical and patient community to take part</li> <li>Review support group meeting formats •Navigate local obstacles and support group challenges</li> </ul>		Angela Miller, Sandra Guilbault
<b>16:15 – 17:00 - 2A: HS Progress Workshop: Registry and Biospecimen collection</b> <b>Learning Objectives:</b>		<b>Venetian Ballroom</b>
<ul style="list-style-type: none"> <li>To learn about the mission, goals, structure, and status of HS Progress, a collaborative effort to facilitate HS research in order to improve the lives of people living with HS.</li> </ul>		Haley Naik
<b>16:15 – 17:00 - 2B: Wound Care</b> <b>Learning Objectives:</b>		<b>Crystal Ballroom</b>
<ul style="list-style-type: none"> <li>Provide an opportunity to learn current technology for managing chronic wounds of hidradenitis suppurativa</li> </ul>		Hadar Lev-Tov, Angela Miller, Nicole Van Haren, Patricia Coutts
<b>17:00 – 17:30 Mentoring Reception</b>		<i>Crystal Ballroom</i>
<b>17:30 – 18:30 Exhibits / Poster Viewing Reception</b>		<i>Foyer, 4<sup>th</sup> Floor</i>



## Sunday, November 3, 2019

<b>07:30 – 11:00</b>	<b>Registration</b>	<i>Foyer, 4<sup>th</sup> Floor</i>
<b>07:00 – 09:00</b>	<b>IDEOM Historic Meeting (by invitation)</b>	<i>Jefferson, 3<sup>rd</sup> Floor</i>
<b>08:00 – 09:00</b>	<b>Continental Breakfast</b>	<i>Foyer, 4<sup>th</sup> Floor</i>
<b>09:00 – 11:00</b>	<b>Session 8: Surgery &amp; Lasers &amp; Imaging for HS</b> <i>Moderators: Stephanie Goldberg, Ralph George</i>	<i>Venetian Ballroom</i>
<b>Learning Objective:</b>		
<ul style="list-style-type: none"> <li>To understand the role of surgery and lasers in the management of HS</li> </ul>		
09:00	Evolution of Surgery in HS (Surgical Techniques Pollocak, I&D, Deroofing, Wide Excision, Closure Techniques)	Stephanie Goldberg
09:10	Combined Surgical and Medical Management for Superior Outcomes	Ralph George
09:20	Lasers for HS	Iltefat Hamzavi
09:30	Presurgical Assessment of Sinus Tracts in HS	Steven Daveluy
09:40	Wound Care Management of Surgical and Deroofed Wounds	Ashley Shoultz
09:45	Critical Evaluation of Non-invasive Imaging Modalities in Hidradenitis Suppurativa	David Grand
09:50	Evaluating the Safety and Efficacy of Intense Pulsed Light with Radiofrequency in U.S. Patients with Hidradenitis Suppurativa- A Split Body Study	Alexis Lyons
09:55	The Impact of Every Day Wound Care in Hidradenitis Suppurativa - an Update	Suzanne Moloney
10:00	<b>Q&amp;A</b>	
10:10	<b>Panel: Surgical Questions</b>	<b>Moderator:</b> Falk Bechara
10:35	Elevated Hepcidin in Hidradenitis Suppurativa	Mondana H. Ghias
10:40	Peri-Operative Use of Ertapenem as a Bridge to Surgical Resection in Severe Hidradenitis Suppurativa	Stephanie Goldberg
10:45	Hidradenitis Suppurativa has a Clear Impact on Work Productivity and Activity Impairment	Lisette M. Prens
10:50	Change in Body Mass Index Before and After Diagnosis of Hidradenitis Suppurativa	Shari Wright
10:55	<b>Q&amp;A</b>	
<b>11:00 – 11:30</b>	<b>Refreshment Break / Exhibits / Poster Viewing</b>	<i>Foyer, 4<sup>th</sup> Floor</i>
<b>11:30 – 12:20</b>	<b>Session 9: Future Directions</b> <i>Moderators: Simon Wong, Haley Naik</i>	<i>Venetian Ballroom</i>
<b>Learning Objective:</b>		
<ul style="list-style-type: none"> <li>To learn about future directions in HS</li> </ul>		
11:30	HS Tales	Various
11:45	10 Tips in 10 Minutes	Various
12:00	NIAMS Update	Ricardo Cibotti
12:05	Summary of Hot Topics of the Conference	Various
12:15	SHSA Journey	Michelle Lowes, Afsaneh Alavi
<b>12:20 – 12:30</b>	<b>Closing Remarks &amp; Awards</b> <i>Moderators: Iltefat Hamzavi, Isabelle Delorme</i>	<i>Venetian Ballroom</i>

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## Abstracts

**Session 1 – HS Foundation Presidents: Gap in HS - Looking Forward & “Top Stories”**  
**Friday, November 1, 2019**

**13:15 – 13:19**

### **Disease Awareness and Clinical Course**

*Iltefat Hamzavi, MD, FAAD*

President HSF, Dermatologist, Department of Dermatology, Henry Ford Hospital and Hamzavi Dermatology, Detroit, MI, USA

*Summary not available*

**13:19 - 13:23**

### **Management of HS**

*Isabelle Delorme, MD*

Dr. Isabelle Delorme Inc., Drummondville, QC, Canada

HS is a chronic inflammatory skin disease that has a profound negative impact on patient quality of life. In addition to its typical clinical manifestations, HS is often accompanied by a multitude of physical and psychological comorbidities. Its management is therefore complex and multidisciplinary. It must include comorbidity screening, adjuvant therapy as needed and proper medical and surgical treatments.

Evidence-based guidelines, including the 2019 North American clinical management guidelines for HS, are available to help health care providers make optimal treatment decisions but strong evidence is still lacking for most levels of intervention.

#### **Learning Objectives:**

- Understand that HS management is multidisciplinary.
- Review the evidence-based management guidelines available.
- Recognize that strong evidence is still lacking for most therapeutic interventions in HS.

**13:23 – 13:27**

### **Pathophysiology of HS**

*Christos C. Zouboulis, MD*

Departments of Dermatology, Venereology, Allergology and Immunology, Dessau Medical Center, Brandenburg Medical School Theodore Fontane, Dessau, Germany

*Summary not available*

**13:27 - 13:32**

### **Epithelialized Tracts are Active Mediators of Inflammation in Hidradenitis Suppurativa**

*Kristina Navrazhina<sup>1, 2</sup>, John W. Frew<sup>1</sup>, Mary Sullivan-Whalen<sup>1</sup>, Patricia Gilleaudeau<sup>1</sup>, James G. Krueger<sup>1</sup>*

1. The Rockefeller University, NY, NY, USA, 2. Weill Cornell/Rockefeller/Sloan Kettering Tri-Institutional MD-PhD Program, New York, NY, USA

**Introduction:** Hidradenitis Suppurativa (HS) is a chronic, inflammatory disease characterized by painful nodules, abscesses and draining sinuses, most commonly in the inguinal, axillary, and submammary regions. Severe disease is associated with discharging sinus tracts and fibrotic scarring. The development of dermal tunnels and interconnecting tracts is poorly understood, and they are traditionally considered an end-stage feature of disease. Here, we characterize the inflammatory characteristics of epithelialized tracts to better understand their development and function.

**Methods/Results:** After receiving approval from the Rockefeller University's Institutional Review Board, unaffected, perilesional and lesional skin of HS patients was collected by punch biopsies. Biopsies from healthy volunteers and patients with psoriasis were used as negative and positive controls, respectively. Immunohistochemistry of HS dermal tracts demonstrated strong S100A7, filaggrin, loricrin and keratin 16 staining, as well as the presence of melanocytes and Langerhans cells. Comparable levels of CD3, CD11c, CD163 and Neutrophil Elastase were found surrounding the dermal

tracts as within the superficial dermis, with the tracts exhibiting higher number of Neutrophil Extracellular Traps (NETs). RT-PCR showed a consistent increase of IL-6, IL-17A, IL-17C, IL-17F, IL-19, IL-36 $\alpha$ , IL-36 $\gamma$ , IL-22, CXCL1, CXCL8, CCL20 and INF $\gamma$  between unaffected, perilesional, and lesional skin, with lesional skin having similar levels of the pro-inflammatory cytokines as psoriasis. Unaffected HS skin had higher levels of pro-inflammatory cytokines compared to healthy volunteers.

**Conclusions:** Our data demonstrates that the epithelialized tracts in HS mimic the morphology and function of the overlying epidermis. It also demonstrates the parallels between psoriatic epidermis and epithelialized tracts in HS, suggesting psoriasis-like feed-forward mechanisms may be involved in dermal tract inflammation in HS. Our data argues that epithelialized tracts are active mediators of inflammation, rather than fibrotic end-stage feature of HS.

**Learning Objectives:**

1. To demonstrate that epithelialized HS tracts are active, inflammatory mediators of HS
2. To highlight the increasing levels of pro-inflammatory cytokines between unaffected, perilesional and lesional skin in HS
3. To establish that the unaffected skin of HS patients has higher levels of pro-inflammatory cytokines compared to skin of healthy volunteers

**Takeaway Message:**

HS tracts have traditionally been considered an end-stage, fibrotic feature of the disease. Here, we show that dermal tracts play an active role in inflammation in HS. This may explain the presence of active inflammatory disease even in clinically normal appearing skin, and demonstrates the parallels between feed forward inflammation in psoriasis and the inflammation in dermal tracts.

**13:32 - 13:37**

### **Fibroblast Subpopulations Are Associated with Tunnel Formation and Inflammation In Hidradenitis Suppurativa**

John W. Frew<sup>1</sup>, Kristina Navrazhina<sup>1</sup>, Meaghan Marohn<sup>2</sup>, Catherine P. Lu<sup>2</sup>, James Krueger<sup>1</sup>

1. Laboratory for Investigative Dermatology, Rockefeller University, New York, NY, USA, 2. New York University, The Hansjorg Wyss Department of Plastic Surgery, Department of Cell Biology, New York, NY, USA

Hidradenitis Suppurativa differs from other inflammatory skin diseases due to the presence of hypertrophic scarring, tunnels and sinus tracts. This suggests that fibroblasts (including myofibroblasts, fibroblasts, pericytes etc) may be involved in the development and progression of disease. Dermal fibroblasts derive from multiple sources and are involved in chronic inflammation, delayed wound healing, fibrosis and the development of fistulae in other chronic inflammatory diseases such as inflammatory bowel disease, rheumatoid arthritis and chronic venous ulcers. Epigenetic modification of fibroblasts in the setting of acute inflammation results in the development of discrete fibroblast subpopulations. Each subpopulation has specific functional attributes including: maintaining epidermal integrity, activation of pro-inflammatory pathways (including Caspase-1 and NLRP3 inflammasome activity); Wnt- Beta Catenin signaling in follicular regeneration; and extra cellular matrix remodeling. The inflammatory signature of HS is suggestive that fibroblasts play a prominent role in the pathogenesis of HS due to the high level of TGF-beta signaling, elevation in MMPs and IL-1B signaling pathways. Gamma secretase pathways are also involved in N-Cadherin and CXCL-14 mediated pro-fibrotic pathways in fibroblasts which may explain extensive remodeling seen in inherited HS. The role of fibroblasts may also explain the association of Pyoderma Gangrenosum, Inflammatory Arthropathies with HS, given the role of fibroblasts in Arthropathies and delayed wound healing.

We present novel preliminary data on the existence of activated fibroblast subpopulations in HS lesional tissue commensurate with known populations in IBD associated with fibrosis, fistulae formation and inflammation.

Through examination of known pathological pathways in arthritis and IBD, testable hypotheses can be developed and novel potential therapeutic targets currently being explored (including Cadherin-11, CDK, FRP2/ALX, PDPN) can be applied to HS.

**Learning Objectives:**

- To examine potential role of fibroblasts in tunnel formation and inflammation in HS.

**Takeaway Message:**

Fibroblast subpopulations mediating fibrosis, fistula formation and inflammation in IBD exist in HS and may present novel therapeutic targets

**13:37 - 13:42**

### **Healthcare Utilization in Pediatric Patients with Hidradenitis Suppurativa**

Alison Dempsey<sup>1</sup>, Katherine Hallock<sup>2</sup>, Joslyn S. Kirby<sup>2</sup>, Steven Maczuga<sup>2</sup>

1. Penn State College of Medicine, Hershey, PA, USA, 2. Penn State Department of Dermatology, Hershey, PA, USA

**Introduction:** It can take up to seven years for an adult patient to be correctly diagnosed with Hidradenitis suppurativa (HS) with multiple emergency department (ED) and inpatient visits. Thus, there is an opportunity to improve recognition of HS in children. To facilitate this, we sought to evaluate the health care utilization prior to HS diagnosis in the pediatric population.

**Methods/ Results:** This is a retrospective cohort study using the 2012-2016 MarketScan medical claims database. Participants either <18 or  $\geq$  18 years old with HS based on International Classification of Diseases (ICD-9-CM 705.83; ICD-10-CM L73.2). Overall, there were 40,424 pediatric and 384,108 adult patients with HS. The mean/median age of onset for



HS in the children was 14.34/15. In the adult population, the mean and median age of onset was 37. The most frequent 'first sign' of HS was cellulitis in children (30%) and adults (29%). The most common comorbidities in children were acne vulgaris (51%) and obesity (34%). The most common comorbidities in adults were obesity (44%), anxiety (42%), and hypertension (40%). Oral prednisone, cephalexin, and clindamycin were the most common treatment modalities in children and adults were similar. ED use was slightly higher among pediatric patients (2.8% vs 2.4%,  $p < 0.001$ ). Pediatric patients had fewer inpatient claims compared to adults (0.06% vs 0.08%,  $p < 0.001$ ). Pediatric patients with HS were more likely to see pediatricians, emergency room physicians, and dermatologists leading-up to HS diagnosis, with 40% of pediatric patients seeing a dermatologist leading to diagnosis compared to 26% of adults ( $p < 0.001$ ).

**Conclusion:** This data suggests that non-dermatologists are less likely to recognize HS in children compared to adults and further education for non-dermatology providers is needed in recognizing manifestations of pediatric HS. Pediatric HS accounts for overutilization of high cost emergency department and inpatient claims.

#### Learning Objectives:

1. Identify healthcare utilization of pediatric populations with HS compared to adults
2. Characterize comorbidities of HS in children compared to adults.
3. Describe treatments of HS in children compared to adults.

#### Takeaway Message:

In the pediatric population with HS, healthcare utilization, comorbidities, and treatments have some similarities and important differences to adults with HS.

13:42 – 13:47

### High Prevalence of Musculoskeletal Pain, But Little Inflammatory Changes in Patients with Hidradenitis Suppurativa

*Kelsey R. van Straalen<sup>1</sup>, A.M.P. Boeren<sup>2</sup>, K. Wervers<sup>2</sup>, E.P. Prens<sup>1</sup>, M. Vis<sup>2</sup>*

1. Department of Dermatology, Erasmus University Medical Center, Rotterdam, Netherlands, 2. Department of Rheumatology, Erasmus University Medical Center, Rotterdam, Netherlands

**Introduction:** Previous studies show a high prevalence of spondyloarthritis (SpA) features in patients with hidradenitis suppurativa (HS). However, most data on the prevalence of SpA in HS patients comes from self-reported studies and ultrasound has not yet been used to assess SpA features in HS patients. The aim of this study was to evaluate the prevalence of sonographic enthesitis, as a key symptom of SpA, in patients with HS.

**Methods:** One hundred patients with HS were included from the specialised outpatient clinic in the Erasmus University Medical Center in the Netherlands from October 2018 to February 2019. Patient characteristics, the presence of joint or back pain, and a history and family history of rheumatological and associated diseases were collected. Additionally, pain elicited by local pressure of enthesal points was assessed as a marker for clinical enthesitis, according to the Spondyloarthritis Research Consortium of Canada (SPARCC) Enthesitis Index, in 16 entheses. Subsequently, the presence of sonographic enthesitis was assessed using the MASEI-criteria.

**Results:** Musculoskeletal symptoms were reported by 62% of the included patients. Fifty-three percent of patients presented with painful entheses. Of these patients 37% had three or more tender entheses and 7% had  $\geq 10$  tender entheses. In 26% of the included patients at least one active enthesitis was found on ultrasound examination (power Doppler signal  $\geq 2$ ), compared with 28% in healthy Dutch controls from other studies.

**Conclusions:** In this study, active sonographic enthesitis as sign of SpA, is not more common in HS patients compared with the general population. However, we did find a high prevalence of musculoskeletal symptoms and enthesal tenderness which might suggest another origin, such as fibromyalgia, and requires further investigation.

#### Learning Objectives:

1. A high prevalence of musculoskeletal symptoms and enthesal tenderness was found in patients with hidradenitis suppurativa.
2. However, in patients with hidradenitis suppurativa sonographically active enthesitis was not more common than in the general Dutch population.
3. The high prevalence of musculoskeletal symptoms in patients with hidradenitis suppurativa might suggest another origin.

#### Takeaway Message:

Enthesitis diagnosed on ultrasound was not more common in patients with hidradenitis suppurativa than in the general Dutch population. Therefore, the high prevalence of musculoskeletal symptoms and enthesal tenderness in HS patients might be due to another underlying cause.

13:47 – 13:52

## Epigenetic Modifications in the Inflammatory Process of Hidradenitis Suppurativa

Thomas Meyer<sup>1</sup>, Schapoor Hessam<sup>2</sup>, Christina U. Köhler<sup>3</sup>, Kerstin Lang<sup>3</sup>, Heiko U. Käfferlein<sup>3</sup>, Falk G. Bechara<sup>1</sup>

1. St. Josef Hospital, Department of Dermatology, Ruhr University Bochum, Bochum, Germany, 2. Katharinen Hospital Department of Dermatology, Unna, Germany, 3. IPA, Ruhr University Bochum, Bochum, Germany

**Introduction:** The mechanisms underlying the chronic inflammatory process in hidradenitis suppurativa (HS) are not fully understood. The initiation of the pathologic process is assumed to be associated with some kind of instability of the infundibular epithelium of the hair follicle, characterized by hyperplasia and hyperkeratosis, as well as by overactive keratinocytes with abnormal production of pro-inflammatory cytokines and antimicrobial peptides. The latter may cause an inadequate reaction against the physiological microbial colonization of the hair follicle, leading to a chronic inflammatory reaction. In previous studies, we could show that various inflammation-associated microRNA (miRNA) species are dysregulated in HS and described key regulators of miRNA biogenesis and transport to be differentially expressed between HS lesions and healthy control tissue. Here, we aimed to investigate whether the suppression of Drosha and Dicer observed in HS might be mediated by promoter-methylation.

**Methods and results:** We analyzed the methylation patterns of Drosha and Dicer promoters using the EpiTYPER MassArray system. The level of methylation of 52 and 59 CpG sites in the Drosha and the large Dicer promoter, respectively, were compared in each 20 healthy control, lesional and perilesional HS tissues. At most CpG sites of both the Drosha and Dicer promoter no methylation or low levels of methylation (< 10%) were detected. Reliable median methylation level of >25% were detected at 4 sites of both promoters only, however with similar median methylation levels in healthy, lesional and perilesional tissues.

**Conclusions:** The downregulation of Drosha and Dicer observed in HS appears to be independent on methylation of the analyzed CpG sites in the Drosha and Dicer promoter regions.

### Learning Objectives:

1. understanding mechanisms of chronic inflammation in hidradenitis suppurativa (HS)
2. the role of micro RNAs in the dysregulated inflammatory reaction of HS
3. reduced expression of components of the micro RNA biogenesis in HS

### Takeaway Message:

down regulation of Drosha and Dicer in HS appears not be associated with promoter methylation

13:52 – 13:57

## The Sweat Gland Antimicrobial Peptide Dermcidin is Distinctly Dysregulated in Hidradenitis Suppurativa versus Healing and Non-Healing Skin Wounds

Paula Mariottoni, Margaret Coates, David L. Corcoran, Tarranum Jaleel, David A. Brown, Amanda S. MacLeod

Duke University, Durham, NC, USA

Hidradenitis suppurativa (HS) is a debilitating disease affecting skin of high hair follicle and sweat gland (SG) density, characterized by recurrent abscesses, sinus tracts and non-healing wounds (NHW). The pathogenesis of HS is unclear, but may involve dysbiosis-driven aberrant activation of the innate immunity leading to inflammation.

We took biocomputational and wet lab approaches to interrogate regulation of innate immune factors in HS. We analyzed microarray gene expression and defined differentially expressed genes (DEGs) in patient-matched HS lesional and non-lesional skin samples (GSE72702), and then compared to DEGs from skin of healing wounds (HW) vs. normal skin (GSE97617) and to DEGs from diabetic foot ulcer vs. diabetic foot skin (GSE80178). Several innate antimicrobial genes encoding members from the S100 and human beta defensin families, and interferon-stimulated antiviral genes were significantly upregulated in HS and wounded skin samples. In contrast, the SG antimicrobial dermcidin (DCD) was among the most down-regulated genes in HS lesional skin, but was up-regulated in HW on day (D)3 and D6 after injury. Similarly, diabetic foot ulcers also down-regulated DCD compared to diabetic foot skin. Genes associated with SG function, such as secretoglobins and aquaporin 5 (AQP5) demonstrated statistically significant decreased expression in HS lesional skin and NHW, but increased expression in HW. Secretoglobulin 2A2 (correlation 0.99), secretoglobulin 1D2 (0.97), and AQP5 (0.79) were positively correlated with DCD, while STAT1 was negatively correlated with DCD (-0.88) by Pearson correlation in the HS dataset. Furthermore, we found that type I interferon, known to signal via STAT1, significantly suppresses DCD transcription in human SG cells.

Our discovery that SG associated DCD is decreased in HS lesional skin and in non-healing diabetic foot ulcers, but not in HW skin, may suggest that impaired SG function and reduced DCD may be a unique pathologic feature of HS and NHW.

### Learning Objectives:

1. Understand the influence aberrant immune responses and dysregulated microbiota may play in HS and connect this to the anatomical sweat gland-rich areas of HS disease
2. Learn about innate antimicrobial defense systems of the skin and understand that dermcidin is a sweat gland specific antimicrobial peptide
3. Learn that HS and skin wounds have shared and dissimilar transcriptional innate immunity and sweat gland signatures

#### Takeaway Message:

1. Hidradenitis suppurativa (HS) is a debilitating disease affecting skin of high hair follicle and sweat gland density and may result in chronic non-healing wounds. Its pathogenesis is unclear but may involve dysbiosis-driven aberrant activation of the innate immunity leading to chronic inflammation and non-healing wounds.
2. The sweat gland peptide Dermcidin has antimicrobial function.
3. HS and chronic non-healing wounds have suppressed Dermcidin expression and additional genes necidong meolecules of sweat gland function, while wounds that go on to heal produce Dermcidin.

## Session 2 – Basic and Translational Research

### Friday, November 1, 2019

**14:15 – 14:30**

#### Update on HS Pathogenesis

*Angelo V. Marzano, MD*

Dermatology Unit, Fondazione IRCCS Ca' Granda Ospedale Maggiore Policlinico, Dipartimento di Fisiopatologia Medico-chirurgica e dei Trapianti, Università degli Studi di Milano, Milan, Italy

Hidradenitis suppurativa (HS) is a chronic-relapsing, debilitating autoinflammatory skin disease of terminal hair follicles. It is clinically characterized by painful, deep-seated, recurrent nodules commonly ending in abscesses and sinus tracts, with suppuration and hypertrophic scarring of apocrine gland bearing skin.

HS is encompassed in the group of autoinflammatory diseases, clinically characterized by recurrent episodes of sterile inflammation in the affected organs, in the absence of high titers of circulating autoantibodies and autoreactive T cells. HS can also be considered a neutrophilic dermatosis, which is an inflammatory skin disorder caused by the accumulation of neutrophils in the skin and rarely in internal organs.

HS patients have an increased risk of developing associated diseases, such as inflammatory bowel diseases and spondyloarthropathies, thereby suggesting a common pathophysiological mechanism. HS is a complex disease where environmental factors trigger chronic cutaneous inflammation of genetically predisposed individuals. Despite the efforts made to understand HS etiopathogenesis, the exact pathogenetic mechanisms need to be still unraveled.

Familial cases, which are around 35% of HS patients, have allowed the identification of susceptibility genes. HS may have also a syndromic counterpart. Pyoderma gangrenosum, acne and suppurative hidradenitis (PASH) syndrome, characterized by the clinical triad of these three autoinflammatory skin disorders is the prototype of syndromic HS. It is associated with CCTG duplications/replications involving the promoter region of the PSTPIP1 gene. It belongs to a single clinicopathological spectrum having abnormal activation of innate immunity as the crucial pathogenetic event and involving also PAPA (pyoderma gangrenosum, acne, pyogenic arthritis), PAPASH (pyogenic arthritis, pyoderma gangrenosum, acne, suppurative hidradenitis) and SAPHO (synovitis, acne, pustulosis, hyperostosis, osteitis). In particular, in PAPASH it has been suggested that the key molecular feature in this patient was neutrophil activation by the Th17/TNF- $\alpha$  axis, which is involved in the pathogenesis of psoriasis, acne, HS, arthritis and PG.

#### Learning objectives:

- Understanding the genetics of hidradenitis suppurativa (HS), focusing on autoinflammatory genes
- Describing the immunopathological pathways, particularly the dysregulation of pro-inflammatory cytokines, such as tumor necrosis factor- $\alpha$ , interleukin 17 and interleukin-23, which are connected to auto-inflammatory mechanisms in the pathogenesis of HS
- Providing the rationale for current and new pathogenesis-driven treatments

**14:30 – 14:45**

#### The Cytokine Network in Hidradenitis Suppurativa

*Kerstin Wolk, PhD*

Research Team Leader, Senior Lecturer and Consultant Immunologist, Psoriasis Research and Treatment Center, Charité – University Medicine, Berlin, Germany

Hidradenitis suppurativa (HS) is a chronic inflammatory skin disorder with a profound unmet medical need. Cutaneous alterations in HS are quite specific and differ from those observed in other inflammatory skin disorders such as psoriasis. This concerns not only their body localization. While psoriatic lesions are homogeneous and scaling plaques, HS skin includes inflammatory nodules, abscesses, and fistulas with purulent discharge. Importantly, psoriatic skin represents epidermal hyper-renewal, while tissue destruction and scarring are major issues in HS. Moreover, while bacteria propagate

in HS lesions, psoriatic skin has an amazing antimicrobial capacity. Because cytokines are the pathogenetic key players in inflammatory conditions, our studies of the past 10 years have been focusing on the elucidation of the cytokine network in HS skin lesions. We are pursuing a strategy of comparing HS lesions with healthy and psoriatic skin as well as integrating patient data with ex vivo cytokine neutralization and in vitro cytokine stimulation. Our data show strong activation of both the innate (with pro-inflammatory and anti-inflammatory elements) and the adaptive (dominated by the Th17 and Th1 pathway) immune system in HS. While the importance of the cytokines TNF- $\alpha$  and IL-23/IL-17 appear to be similar in HS and psoriasis, activation of pathways involving IL-1 $\beta$ , IL-10, lipocalin 2 and deficiency of IL-22 are predominantly features of HS pathogenesis. In my presentation, I will explore how these cytokines lead to the massive immune cell infiltration, pus formation, irreversible tissue destruction and deficient antibacterial defense seen in the HS skin.

#### Learning Objectives

- For participants to become familiar with cytokine cascades activated in HS that are known to also be crucial in psoriasis (-> encourage application of anti-psoriatic biologics in HS);
- For participants to be introduced to cytokine cascades that may explain the HS-specific features

**14:45 – 14:55**

### Role of Complement in HS

*Vincent Piquet, PhD, FRCP (London)*

Division Director, Dermatology, University of Toronto and Division Head, Dermatology, Women's College Hospital, Toronto, ON, Canada

*Summary not available*

**14:55 - 15:05**

### Identifying Novel Small Molecule Targets in Hidradenitis Suppurativa

*John W. Frew, Kristina Navrazhina, David Grand, Jason E. Hawkes, James Krueger*

*Laboratory for Investigative Dermatology, Rockefeller University, New York, NY, USA*

There is a strong need for novel therapies in Hidradenitis Suppurativa (HS). Our increasing understanding of the pathophysiology of disease is allowing for the identification of novel pathways which may be targeted by the development of novel therapies. However, a number of novel small molecule targets have been developed for other inflammatory diseases, including psoriasis, atopic dermatitis and alopecia areata which may have relevance in HS. Small molecular therapies such as phosphodiesterase 4 (PDE4) inhibitors have demonstrated efficacy in HS, and novel therapies including spleen tyrosine kinase (SYK) inhibitors, Adenosine A3 Receptor (A3R) Agonists, Sphingosine 1 Phosphate (S1P) Receptor Antagonists, Histamine 4 (H4) Receptor Agonists and ROR gamma t (RORgt) inhibitors are in various stages of development in Psoriasis.

By comparing the published HS transcriptome to psoriasis, atopic dermatitis and alopecia areata, we have identified various small molecular targets as differentially expressed in HS lesional skin and blood. We have then localized the expression of such markers within lesional, perilesional and unaffected tissues of untreated HS patients to demonstrate the site of action of these small molecular targets.

This proof of principle study suggests that these small molecule targets may be novel therapeutic options in HS, with verification in pilot clinical studies suggested to assess whether this in vitro work translates into safety, tolerability and in vivo clinical improvement.

#### Learning Objectives:

- To Identify novel small molecular targets in HS through comparison of lesional tissue transcriptome and immunohistochemistry.

#### Takeaway Message:

Novel small molecular targets developed for other inflammatory dermatoses may be relevant in HS and exploration of the potential of these drugs in vivo would provide initial assessment of safety and tolerability in the HS population.

**15:05 - 15:10**

### An Analysis of Monogenic Disorders with Hidradenitis Suppurativa Symptom Overlap Recapitulates Hidradenitis Suppurativa Comorbidities

*Lynn Petukhova*

*Columbia University, New York, NY, USA*

Epidemiological studies of patient medical records or surveys can identify disease comorbidities, but provide limited insight into the causal relationships among co-occurring diseases. For example, a co-occurrence of diseases in patients exceeding

rates expected by chance may arise from confounding or bias; or alternatively have a biological basis. Monogenic diseases, which occur when a patient inherits a mutation in a single causal gene from one or both parents, may present with multiple symptoms thereby demonstrating that single gene mutations can link disparate clinical presentations. Such causal genes have been discovered for many chronic diseases, including breast cancer, diabetes, dyslipidemia, and inflammatory bowel disease, among others. Although most patients with a chronic disease will not have a monogenic form of it, the biology of monogenic subtypes of chronic diseases has proven to be relevant to common (i.e. polygenic) forms of disease.

Hidradenitis suppurativa (HS) is a chronic disease with monogenic and polygenic disease subtypes. HS patients have a high burden of comorbidities, including other skin conditions, as well as metabolic, rheumatic, gastrointestinal, and neuropsychiatric disorders. Some monogenic syndromes include symptoms that are shared with HS, such as skin abscesses and folliculitis. Thus, we hypothesized that an analysis of monogenic diseases that include HS symptoms can be used to investigate whether there is a biological basis for the comorbidities observed in cohorts of HS patients. Here, we identified a set of 45 monogenic disorders that include HS symptoms among additional symptoms. An analysis of the symptom spectrum of these disorders recapitulates some of the comorbidities identified in epidemiological studies of HS and suggests a biological basis of those findings. This evidence also suggests that the clinical heterogeneity observed among HS patients is being driven in part by genetic heterogeneity and that subtyping patients on the basis of comorbidities may improve gene-mapping efforts.

#### Learning Objectives:

- To understand how genetic evidence complements evidence from epidemiological studies (e.g. informs on causal order, distinguishes confounding).
- To understand the relationship between monogenic and polygenic forms of chronic diseases.
- To understand how clinical heterogeneity may help to inform on the genetic architecture of hidradenitis suppurativa.

#### Takeaway Message:

We have identified a set of 45 monogenic disorders that include symptoms that overlap with hidradenitis suppurativa and also present with additional symptoms. An analysis of the symptom spectrum of these disorders recapitulates comorbidities identified in epidemiological studies of hidradenitis suppurativa and suggests a biological basis to those findings.

**15:10 - 15:15**

### Epigenetically Dysregulated MicroRNAs Involved in the Pathogenesis of Hidradenitis Suppurativa

Nazia Saaved<sup>1</sup>, Sangeetha Vishweswaraiah<sup>3</sup>, Uppala Ratnamala<sup>4</sup>, Raghu Metpally<sup>5</sup>, Radhakrishna Uppala<sup>2</sup>

1. Genexplore Diagnostics and Research Centre, Ahmedabad, GJ, India, 2. Department of Zoology, School of Sciences, Gujarat University, Ahmedabad, GJ, India, 3. Department of Obstetrics and Gynecology, Oakland University-William Beaumont School of Medicine, Royal Oak, MI, USA, 4. Department of Pharmacology, Creighton University, Omaha, NE, USA, 5. Department of Molecular and Functional Genomics, Danville, PA, USA

**Introduction:** MicroRNAs (miRNA) are small non-coding, highly conserved post-transcriptional negative regulators of gene expression. Recent studies have reported an altered miRNA expression pattern in many ailments such as cancer, wound healing, obesity, metabolic disease, and inflammation. Hidradenitis suppurativa (HS) is a debilitating chronic disease that remains poorly understood, difficult to manage, and has few available treatments. Epigenetic modifications such as DNA methylation of microRNAs play a vital role in tissue differentiation, and disease development through control of gene expression.

**Methods Results:** To elucidate the epigenetic mechanism(s) underlying the pathophysiology of HS, we investigated DNA methylation levels of miRNA encoding genes using the Illumina MethylationEPIC BeadChip array in 24 HS cases and an equal number of age, gender, sex and ethnic matched controls. Several “R” packages were used to identify the significant CpG targets of miRNA. We performed bioinformatic analysis by mining the MicroRNA Target Prediction and Functional Study Database (miRDB) to predict the possible genes regulated by the identified methylated miRNAs. We identified 46 significantly differentially methylated miRNAs associated with HS. All identified miRNAs were found to be methylated at their transcription start site or at the 5'UTR region. Pathway analysis of these microRNA-associated genes identified relevant biological functions controlled by important pathways including signaling for leukocyte-extravasation, estrogen receptors, ILK, integrin, glucocorticoid receptors, Wnt/ $\beta$ -catenin, and the pathways for the molecular mechanisms of cancer and nucleotide excision repair.

**Conclusions:** Our results suggest that deregulation of microRNAs is linked to HS, which were also validated in another 24-sample set. Altered methylation of miRNAs detectable in blood may potentially be a sensitive biomarker to detect early risk of HS. The identified microRNAs might be involved in disease mechanisms and could be used to develop biomarkers for HS.



### Learning Objectives:

1. To identify the differential expression patterns of blood microRNA in patients with Hidradenitis suppurativa
2. To identify microRNA (miRNA) mediated mechanisms that contribute HS and its comorbidities pathogenesis
3. To develop miRNA-based therapeutic interventions

### Takeaway Message:

MicroRNAs might be involved in the disease mechanisms and could be used to develop biomarkers for Hidradenitis suppurativa

15:15 - 15:20

## Exploring the Role of p53 Signaling in Hidradenitis Suppurativa

William D. Shipman<sup>1</sup>, Michelle L. Kerns<sup>2</sup>, Lance S. Lew<sup>2</sup>, Janielle P. Maynard<sup>2</sup>, Qaren Q. Quartey<sup>3</sup>, Uchechukwu J. Okoh<sup>2</sup>, Ginette A. Okoye<sup>2,4</sup>, Angel S. Byrd<sup>2,4</sup>

1. Weill Cornell/Rockefeller/Sloan-Kettering Tri-Institutional MD-PhD Program, New York, NY, USA, 2. Johns Hopkins University School of Medicine, Baltimore, MD, USA, 3. University of Maryland School of Medicine, Baltimore, MD, USA, 4. Howard University School of Medicine, Washington, DC, USA

Hidradenitis suppurativa (HS) is a chronic skin disease characterized by inflammation of the pilosebaceous unit and the development of painful draining lesions, abscesses, and pilonidal sinuses. HS is more common among African-Americans, has been linked to lower socioeconomic backgrounds, and often leads to an impaired quality of life. Although the pathogenesis of HS remains poorly understood, dysregulation of the T-helper cell 17 (Th17)/regulatory T cell (Treg) cell axis has been implicated as a possible mechanism. Tumor suppressor p53 has been shown to regulate Th17/Treg cell balance in autoimmune and inflammatory conditions via STAT3 and STAT5 signaling. We found that in peri-lesional HS skin, p53+ cells were dispersed throughout the epidermis; whereas in lesional HS skin, p53 expression was markedly reduced, suggesting deactivation of this pathway. We are further characterizing the relationship of p53 signaling to HS severity (Hurley staging), the correlation of p53 expression to inflammation, and expression of upstream regulators of p53 signaling, such as Mdm2. Great interest has been shown recently in better understanding lesional versus peri-lesional or non-lesional skin in HS and elucidating the cellular or molecular characteristics that distinguish these areas. Our findings of distinct patterns and expression levels of p53 may offer new insight into key differences in lesional and peri- or non-lesional HS skin. In addition, since p53 is a widely investigated target in cancer treatment with several ongoing clinical trials for p53-targeted gene therapy, these findings highlight the possibility for novel therapeutic targets for HS.

### Learning Objectives:

1. Provide overview of HS lesional vs peri- or non-lesional skin.
2. Describe p53 expression patterns in HS lesional and peri-lesional skin.
3. Assess the correlation of p53 expression to inflammation and upstream regulators of p53 signaling.
4. Explore possible implications of dysregulated p53 signaling in future HS treatments.

### Takeaway Message:

p53 signaling is dysregulated in HS lesional skin and may provide new insights on key differences in lesional and peri-lesional skin in HS.

15:20 - 15:25

## Gut Microbiome: Differences in Composition in Patients with Hidradenitis Suppurativa

Sarah Kam, Rhoda Alani

Boston University Dermatology/Boston Medical Center, Boston, MA, USA

The link between gut microbiome and systemic inflammatory conditions such as inflammatory bowel disease (IBD), adipose tissue inflammation leading to obesity and insulin resistance, and multiple sclerosis has been well-documented in the literature. Recently, we have seen an increased association between gastrointestinal health and inflammatory cutaneous conditions. One such example is the association between IBD and a variety of cutaneous manifestations including erythema nodosum, pyoderma gangrenosum, and Sweet syndrome. In these cases, the severity of the cutaneous manifestations have been shown to parallel the disease activity of IBD and possibly the degree of gut dysbiosis. Hidradenitis suppurativa (HS) is a complex disease characterized by recurrent draining nodules and sinus tracts in body folds. Patients with HS often have multiple comorbidities including obesity, IBD and, hormone dysregulation. We suspect that gut dysbiosis, which plays a role in multiple inflammatory conditions, is also involved in the pathogenesis of hidradenitis suppurativa (HS).

To test our hypothesis, we recruited 10 male subjects between 18 and 40 years old, diagnosed with HS of at least Hurley Stage 2. Subjects were recruited from a database of HS patients seen at Boston Medical Center from Nov 5, 2008 to Nov 5, 2018. We recruited another 10 matched, healthy subjects as controls. Exclusion criteria include any gastrointestinal illness, antibiotic, or biologic use in the past 30 days and any history of IBD. Stool samples were uniformly collected using OMNIgene-GUT kits. The microbiome of the samples collected will be profiled based on the 16S ribosomal RNA gene amplification method.

We hypothesize that our results will show that the normal gut flora of individuals with HS is different from that of unaffected individuals. We hope that our results will lead to new insights into the prevention and treatment of HS.



#### Learning Objectives:

1. Understand that current data show that gut microbiome dysregulation is associated with multiple systemic and cutaneous inflammatory conditions
2. Discuss different methods of studying gut microbiome in patients including the use of the 16S ribosomal RNA amplification method
3. Discuss the role and importance of studying gut dysbiosis in patients with HS

#### Takeaway Message:

We hypothesize that the normal gut flora of individuals with HS is different from that of unaffected individuals. Studying the microbiome of these patients may lead to novel insights into the treatment of HS such as fecal transplantation and explain the variability in efficacy of our current treatments of HS.

**15:25 - 15:30**

### Immuno-metabolomic alterations in Hurley Stage 1 hidradenitis suppurativa

Laure Guenin-Mace<sup>3</sup>, Jean-David Morel<sup>3</sup>, Maïa Delage<sup>1</sup>, Jean-Marc Doisne<sup>2</sup>, Angèle Schiavo<sup>2</sup>, Marie-Noelle Ungeheuer<sup>4</sup>, Thi Lam<sup>1</sup>, Aude S. Nassif<sup>1</sup>, James Di Santo<sup>2</sup>, Caroline Demangel<sup>3</sup>

1. Pasteur Institute, Medical Center, Paris, France, 2. Innate Immunity Unit, Institut Pasteur, INSERM U1223,, Paris, France, 3. Immunobiology of Infection Unit, Institut Pasteur, INSERM U1221,, Paris, France, 4. ICAREB Platform, Institut Pasteur,, Paris, France

**Introduction:** Although Gamma-secretase genes have been reported in 5% hidradenitis suppurativa (HS) patients, the pathophysiology of the disease remains poorly understood. The association of HS lesions with a commensal opportunistic bacterial flora and the efficacy of an antibiotherapy targeted against this flora strongly suggest that a host-microbiome disease could underlie HS. However, it is unclear how microbiome contributes to HS development. Here, we profiled the immuno-metabolic responses of HS patients with the view to unravel novel pathogenic mechanisms.

**Methods:** The metabolomes of 20 lesional and peri-lesional Hurley stage 1 patients and 20 healthy control skin biopsies were compared. We also analyzed the immune signatures of patients and controls in peripheral blood and skin.

**Results:** Compared to healthy skin, HS lesions showed distinctive alterations in the metabolism of tryptophan (Trp), with significant accumulation of downstream products: kynurenine and quinolinate. Metabolic changes correlated with an increased expression of IDO, a rate-limiting enzyme in Trp catabolism, that is expressed by dermal fibroblasts and immune infiltrates and induced by IFN-g. Consistently, HS patients displayed a systemic activation of IFN-g-producing NK cells and IFN-g-expression was markedly upregulated in lesional skin, highlighting the induction of a NK cell IFN-g-IDO axis in HS.

**Conclusion:** Kynurenin and quinolinate, which are involved in Tryptophane catabolic pathway, were markedly increased in Hurley 1 lesional skin biopsies. Experiments are underway to connect these immuno-metabolic alterations with HS-associated bacteria.

#### Learning Objectives:

- Metabolome of Hurley stage 1 lesions in comparison to non lesional skin and control skin
- Tryptophane metabolism
- Cytokine expression in blood and lesional skin

#### Takeaway Message:

Tryptophane pathway may be involved in HS pathophysiology.

## Session 3 – Challenges in Clinical Trials for HS

Friday, November 1, 2019

**16:50 – 16:55**

### Patient Perspective

Athena Gierbolini

Summary not available

**16:55 – 17:05**

### Physician Perspective

Joslyn Kirby, MD, MEd, MS

Associate Professor and Vice Chair of Education, Department of Dermatology, Pennsylvania State, Hershey, PA, USA

Summary not available

**17:05 – 17:15**

## **Research Recruitment and Retention Challenges, Successful Strategies, and Best Practices for Community Engagement**

*Rhonda Dailey, MD*

Assistant Professor, Behavioral Sciences Division, Department of Family Medicine and Public Health Sciences, Wayne State University School of Medicine Scientific Director, Office of Community Engaged Research (OCEnR), Detroit MI, USA

The practice of participant recruitment and retention for research is in itself, difficult. Including diverse participants is important for study generalizability but complicates recruitment approaches. The newer call for investigators to use either a community-based or patient-centered research approach rounds off this list of challenges. Successes have been made when recruitment and retention efforts consider study barriers, participant barriers, and cultural norms. Dr. Dailey, the Scientific Director for the Office of Community Engaged Research at Wayne State University, will discuss research recruitment and retention challenges, successful strategies, and best practices for community engagement.

### **Learning Objectives:**

- Identify challenges and barriers to study recruitment and retention
- Identify successful recruitment and retention strategies
- Identify best practices for successful community engagement

**17:15 – 17:20**

## **HS Progress**

*Hailey Naik, MD*

Dermatologist, UCSF, San Francisco, CA, USA

The mission of the Hidradenitis Suppurativa Prospective Observational Registry and Biospecimen Repository (HS PROGRESS) is to facilitate hidradenitis suppurativa research through collaboration between investigators, clinicians, patients, and industry in order to improve the lives of people living with HS. In this interactive session, we will discuss the goals and structure of this collaborative effort, as well as the logistics of participation.

### **Learning Objectives:**

- Describe the goals and the structure of HS PROGRESS.
- Describe the processes for data and specimen collection, sharing, monitoring under HS PROGRESS

## **Session 4 – Outcomes in HS** **Saturday, November 2, 2019**

**08:30 – 08:40**

## **Quantify HS**

*Veronique del Marmol, MD, PhD*

Head, Dept. Of Dermatology & Venereology, Hopital Erasme Université Libre de Bruxelles, Brussels, Belgium

*Summary not available*

**08:40 – 08:50**

Update on IDEOM/HISTORIC

*Joslyn Kirby, MD, MEd, MS*

Associate Professor and Vice Chair of Education, Department of Dermatology, Pennsylvania State, Hershey, PA, USA

*Summary not available*

**08:50 – 09:00**

## **THESEUS Study to Evaluate New Outcomes for HS**

*John Ingram, MA, MSc, DM(Oxon), FRCP(Derm), FAcadMed*

Senior Lecturer & Consultant Dermatologist, Cardiff University, UK

THESEUS, Treatment of Hidradenitis Suppurativa Evaluation Study, is a prospective observational cohort study that has just started recruitment. It is the first study to receive public funding for HS in the UK, being funded by the National Institute for Health Research (NIHR).

150 participants can choose one of five interventions, guided by their clinician: oral doxycycline 200mg OD, clindamycin and rifampicin both 300mg BD, LASER treatment, skin tunnel deroofting, or conventional surgery. Follow up will be for a total of 12 months.

HISTORIC outcome instruments will be used to contribute to validation, in terms of validity, reliability and feasibility.

A qualitative aspect of the study includes interviews with participants and clinicians about recruitment facilitators and hurdles. A focus group at the end of the study will determine the optimal design of subsequent randomised controlled trials.

#### Learning outcomes

- Understand the design of the THESEUS observational cohort study
- Gain insight into THESEUS medical and non-medical interventions
- Learn about validation of HISTORIC instruments using THESEUS results

**9:00 – 9:05**

### Validation of Patient Global Item for Quality of Life Impact on Hidradenitis Suppurativa

Brittany Hereford, Joslyn S. Kirby

Penn State College of Medicine, Hershey, PA, USA

Hidradenitis suppurativa (HS) is a chronic inflammatory disease that is not well understood. The HS core outcome set calls for a patient global assessment (PtGA). Our aim is to assess the reliability and validity of a candidate single-item PtGA for health-related quality of life (HRQOL) due to HS. A cross-sectional study was conducted of adults with HS in the United States and Denmark. People who gave informed consent and had a confirmed diagnosis of HS were recruited by phone and in clinic. Multiple patient-reported scales, demographic items, and the candidate PtGA were evaluated. The scales included the Hidradenitis Suppurativa Quality of Life (HiSQOL) scale, Dermatology Life Quality Index (DLQI), numerical rating scale (NRS) for pain, and others. A web version of all instruments and items was developed in REDCap (Research Electronic Data Capture), a secure, web-based application designed to support data capture for research studies. Psychometric properties of the single PtGA item including test-retest reliability, convergent validity, known-groups validity, and responsiveness were assessed. The test-retest reliability was good (intraclass correlation coefficient [ICC] = -0.82, [95% confidence interval [95CI]: 0.78-0.85]). Convergent validity of the PtGA was supported with its largest and high correlations with the HiSQOL ( $r = 0.82$  [95CI: 0.78-0.85]) and DLQI ( $r = 0.78$ , [95CI: 0.74-0.82]). The PtGA had significant, but lower correlations with measures of depression, anxiety, and pain. The PtGA also displayed known-groups validity through statistical significance ( $p < 0.0001$ ) of PtGA score and known bands for DLQI scores. Findings for responsiveness will also be presented. The single-item PtGA has exhibited suitable reliability and validity for assessing HS-specific HRQOL and shows promise as a single-item clinical research tool.

#### Learning Objectives:

1. Review core outcome set for HS
2. Discuss the development of patient global assessment item for HS.
3. Summarize measurement properties of patient global assessment item for HS.

#### Takeaway Message:

Patient global assessment is a core outcome for HS and a candidate single item assessment shows promise with its validity and reliability.

**9:05 – 9:10**

### Agreement of Disease Severity Staging for Hidradenitis Suppurativa Between Patients and Providers in a Clinical Setting

Melissa Butt, Joslyn Kirby

Penn State Health, Hershey, PA, USA

Hidradenitis suppurativa (HS) staging is an important clinical measure to assess because it informs disease management. Prior studies have investigated the accuracy and agreement of self-staging (using Hurley) and demonstrated moderate agreement between patients and providers. These studies had limitations including using only photos, select populations, and limited sample sizes. This study evaluated the agreement between patient and provider Hurley Staging in a clinical setting using both photos and descriptors. Data was prospectively collected from patients in a specialty HS Clinic at Penn State Health. Patients assessed their own Hurley staging using a tablet that showed both images and text descriptors at each visit. The assessment included Hurley Stage 1, 2 and 3 along with the option of "HS is not currently active" for the worst area of their body. A dermatology provider completed Hurley Staging and the Physician Global Assessment (PGA). These data were retrospectively abstracted. In the analysis, frequencies and percentages were calculated along with correlations and weighted Kappa. From February 2018 to June 2019, 149 patients with HS attended 233 visits. Most patients were female (84.56%,  $n=126$ ) and white (61.74%,  $n=92$ ). Age was normally distributed with the largest age group being 27-

35 (28.86%, N=43). Spearman correlation between patient and provider Hurley staging was 0.57. Weighted Kappa was 0.47 with a 95% Confidence Limit of [0.37, 0.57] indicating mild-moderate agreement. Complete agreement occurred 58.3% of the time (n=109), under-rating occurred 25.7% of the time (n=48) and overrating occurred 16.0% of the time (n=30). Overall, adding descriptive text did not improve the agreement between patients and providers in a clinical setting. Future studies should be done to identify factors that lead patients to over- and underrating their disease severity.

#### Learning Objectives:

1. Review the literature on self-staging in HS.
2. Evaluate the correlation and agreement between patients and providers of HS staging using images and text.
3. Make suggestions about future studies to improve self-staging.

#### Takeaway Message:

1. Self-staging of HS moderately agrees with provider assessments.
2. Additional research is needed to understand what factors impact under- and overrating disease severity.
3. Additional research is needed to understand the psychosocial implications regarding self-staging.

9:10 - 9:15

## Development and Validation of HSCAPS-1: a Prediction Model for Diagnosis of Hidradenitis Suppurativa Over Cutaneous Abscess

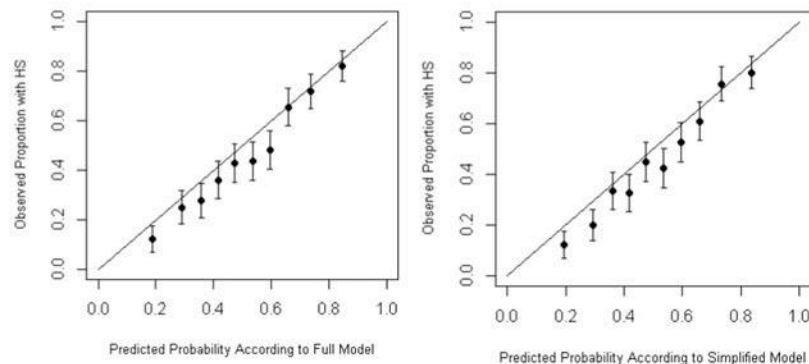
Sarah Reddy<sup>1</sup>, Shari Wright<sup>1</sup>, Andrew Strunk<sup>1</sup>, Joslyn Kirby<sup>2</sup>, Amit Garg<sup>1</sup>

1. Zucker School of Medicine at Hofstra Northwell, New Hyde Park, NY, USA, 2. Penn State Hershey, Hershey, PA, USA

**Introduction:** Clinical recognition of hidradenitis suppurativa (HS) in the medical community is poor. We developed and validated a diagnosis prediction model that facilitates recognition of HS among patients whose presentation may be confused with cutaneous abscess.

**Methods and Results;** In this retrospective cross-sectional analysis, we identified 7,974 patients presenting to ambulatory and ED settings for HS (50.9%, n=4,060) or cutaneous abscess of axilla, groin, perineum, or buttock (49.1%, n=3,914) for the derivation cohort. Modeling was developed using multivariable LR with backward elimination of predictors (selected apriori) and HS as the outcome. In simplified model, factors which were stronger independent predictors of HS included female sex; African American race; increasing BMI; history of acne; Down syndrome; and prescription for  $\geq 7$  opioid prescriptions in the past year. Up to age 45 years, increasing age was a stronger predictor of HS diagnosis. Factors which were stronger independent predictors of cutaneous abscess included race other than Caucasian or African American; history of diabetes; history of smoking; history of substance use disorder; and up to 6 opioid prescriptions in the past year. Model performance was assessed in the validation cohort, which was comprised of 1,560 patients presenting to ambulatory and ED settings for HS (45.4%, n=709) or for abscess (54.6%, n=851). The simplified model showed good discrimination [c-statistic 0.746 (SE 0.013)] and moderate calibration [calibration intercept -0.260 (SE 0.055); calibration slope 1.142 (SE 0.076)].

**Conclusion:** HSCAPS-1 shows good performance in predicting diagnosis of HS and distinguishing it from cutaneous abscess in ambulatory and ED settings.



#### Learning Objectives:

1. Upon completion participants should be able:
2. Describe development and initial validation of a diagnosis algorithm
3. Describe which factors predict diagnosis of HS over cutaneous abscess
4. Apply the HSCAPS-1 algorithm to facilitate diagnosis of HS

#### Takeaway Message:

This clinical decision tool may facilitate early and accurate recognition of HS

**9:15 – 9:20**

## **The Skindex-mini: a Streamlined QOL Measurement Tool for Assessing Quality of Life in HS**

Adaugo Amah<sup>1</sup>, Fiona Shaw<sup>2</sup>, Suephy Chen<sup>2</sup>, Robert Swerlick<sup>2</sup>, Lauren Orenstein<sup>2</sup>

1. Morehouse School of Medicine, Atlanta, GA, USA, 2. Emory University School of Medicine, Atlanta, GA, USA

**Introduction:** Hidradenitis suppurativa (HS) is a chronic inflammatory skin disease that severely impairs patients' quality of life (QoL). Patient reported outcomes allow a better understanding and mechanism for monitoring the impact of skin disease on QoL. Recently, the Skindex Mini (SDM) was validated among patients with predominantly pruritic skin disorders. This study evaluates the validity of the SDM in HS patients with diverse racial backgrounds.

**Methods and Results:** We retrospectively examined charts of HS patients seen in The Emory Dermatology HS Specialty Clinic between 1/1/19 and 8/1/19. In this clinic, patients complete the SDM and Skindex-16 (SD-16) at each visit. For each encounter, patient demographics (race, sex, ethnicity and age), clinical characteristics (Patient Global Assessment, Physician Global Assessment, Itch Numeric Rating Scale (NRS), and Pain NRS), and item level responses to the SDM and SD-16 were extracted from the chart. Descriptive statistics for each variable were calculated. The Pearson correlation coefficient (CC) was used to measure concurrent validity between the SDM and SD-16 domain scores.

This chart review identified 97 encounters among 67 unique HS patients. The sample population was predominantly female (69/97) and was racially diverse (African Americans 54/97, Caucasians 24/97, Asian/Pacific Islanders 5/97, Latino 3/97, other 9/97, and unknown 2/97). The mean pain NRS score in the week prior to the appointment was 3.97 (SD 3.26) and mean itch was 3.44 (SD 3.32). Pearson CC between the SD-16 and SDM domain scores were 0.782, 0.776, and 0.814 for the symptom, emotion, and function domains, respectively.

**Conclusions:** This study demonstrates good concurrent validity between the domain scores of the SD-16 and SDM when administered in HS. SDM is a promising new QoL instrument that is practical for use in routine clinical care. Further work is needed to compare the SDM to disease specific QoL tools in HS.

## **Session 5 – Clinical HS and Medical Treatment** **Saturday, November 2, 2019**

**10:00 – 10:10**

### **Disease trajectories in Hidradenitis Suppurativa**

Gregor Jemec, MD, DMSc

Professor, University of Copenhagen Roskilde Hospital, Copenhagen, Denmark

*Summary not available*

**10:10 – 10:25**

### **Toward New Treatment Guidelines for Hidradenitis Suppurativa**

Christos C. Zouboulis, MD

Departments of Dermatology, Venereology, Allergology and Immunology, Dessau Medical Center, Brandenburg Medical School Theodore Fontane, Dessau, Germany

*According to a former empirical analysis of traditional conservative treatment measures only topical 1% clindamycin solution, the oral systemic combination of clindamycin and rifampicin and a hormonal antiandrogen combination of ethinyl estradiol and high dose cyproterone acetate reached an evidence level 2 and a grade B recommendation. In more recent studies, the biologics adalimumab and infliximab also reached a grade A and B recommendation, respectively, other biologic agents are still under investigation. The European guidelines recommend that HS should be treated based on the subjective impact and objective severity of the disease. Locally recurring lesions can be treated by classical surgery or LASER techniques, whereas medical treatment either as monotherapy or in combination with radical surgery is more appropriate for widely spread lesions. Medical therapy may include antibiotics and immunosuppressants. A Hurley severity grade-relevant treatment of HS has been recommended by the expert group following a treatment algorithm. Since the field is developing rapidly, a systematic literature search in the Medline database was conducted since 2013 under the term "hidradenitis" in order to evaluate the current validity of the guideline. No change seems to be required on the basic aspects. New aspects represent: First line medical therapy may include a combination of systemic antibiotics (clindamycin plus rifampicin) or single systemic antibiotics (tetracycline) and acitretin. As second line, medical treatment with biologics can be administered. The anti-TNF agent adalimumab represents the only approved treatment for moderate to severe HS in adults with an inadequate response to conventional systemic HS treatment. Hurley severity grading is no more sufficient for treatment decision and a new dynamic HS severity score (mild/moderate/severe disease), the IHS4, has been suggested. Weight loss and tobacco abstinence are adjuvant measurements, proven to improve the severity of HS as independent factors. In conclusion,*



research in HS increases rapidly. Since the publication of the European S1 guideline for the treatment of HS new important findings have emerged, which have led to a partial guideline actualization.

**10:25 – 10:40**

### **Antimicrobial Stewardship in Hidradenitis Suppurativa**

*Olivier Join-Lambert, MD, PhD*

Chef de Service, Laboratoire de Microbiologie, Centre Hospitalier et Universitaire de Caen Normandie, France

The goal of antimicrobial stewardship is to spare and optimize the use of antibiotics. During the last decade, advanced microbiological molecular methods improved our knowledge on the microbiology of Hidradenitis Suppurativa (HS). Accordingly, retrospective cohort studies suggested that targeted prolonged antibiotic treatments can control the activity of the disease or induce clinical remissions in Hurley stage 1 and 2 patients. Hurley stage 3 lesions are characterized by a slower and lower clinical remission rate and an increased risk of relapses. These patients can be significantly improved by antibiotics but will often require surgery. Treatment strategies should be therefore adapted to the disease clinical severity.

In an era of emerging multidrug-resistance, the indication of antibiotics in HS should be carefully evaluated before starting a treatment. When feasible, systemic anti-inflammatory drugs (corticosteroids and NSAID), that are suspected to induce flares, should be first stopped and the clinical severity of HS re-assessed at least one month later. Physicians should be aware that the occurrence of antimicrobial resistance is just a matter of time but depends on antibiotics. Low dosing regimen or deleterious pharmacokinetics associations should be prohibited because they promote the emergence of resistance and any antibiotherapy with poor efficacy should be stopped. In that last case, microbiological samples should be sent to the Microbiology Laboratory to rule out selected resistant pathogens.

In the absence of prospectively validated antibiotic treatments in HS, treatment protocols should be set up by a multidisciplinary team including dermatologists, surgeons / plastic surgery, infectious diseases physicians and microbiologists. Patients should be informed at first visit that surgery will usually be necessary for any lesion that rapidly and repeatedly relapses, with an adapted preparation to surgery in order to cool down lesions and avoid repeated courses of antibiotics.

#### **Learning Objectives:**

- To know the rationale of antibiotics in HS
- To know how to prescribe antibiotics in HS
- To know the suspected causes of antibiotic treatment failures in HS, how to prevent and how to manage them

**10:40 – 10:50**

### **CAM Options for Management for HS**

*Vivian Shi, MD*

Assistant Professor, Director, Eczema and Skin Barrier Research Program, Director, Hidradenitis Suppurativa Specialty Clinic, Department of Medicine, Dermatology Division, University of Arizona, Tucson, AZ, USA

*Summary not available*

**10:50 – 10:55**

### **Management of Acute HS Flares**

*Christopher Sayed, MD*

Assistant Professor, Department of Dermatology, University of North Carolina School of Medicine, Chapel Hill, NC, USA

#### **Learning objectives:**

1. Understand the role of a punch tool in incision and drainage or small unroofing procedures.
2. Consider the appropriate use of intralesional triamcinolone for HS.
3. Minimize discomfort during acute flares, including during procedures.

**10:55 – 11:00**

### **Patients' Online Journey in HS**

*Steven Daveluy, MD, FAAD*

Associate Professor and Program Director, Dept of Dermatology, Wayne State University, Detroit, MI, USA

*Summary not available*



**11:00 - 11:05**

## **The Utility of PHQ Depression Screening in Patients with Hidradenitis Suppurativa**

Katherine Berry, Kassidy Shumaker, Joslyn Sciacca Kirby

Penn State Health, Hershey, PA, USA

Hidradenitis suppurativa is a chronic inflammatory skin condition that causes abscess formation and scarring in predominately intertriginous areas. It has many well-defined psychiatric comorbidities, including depression and suicidal ideation. The use of the Patient Health Questionnaire-2 (PHQ-2) and the Patient Health Questionnaire-9 (PHQ-9) to screen for these psychiatric conditions has been recommended in other skin conditions, such as acne. However, PHQ-2 and PHQ-9 use in HS has never been investigated.

This study sought to interrogate the validity and usefulness of the PHQ-2 and PHQ-9 questionnaires in screening patients with HS for depression and suicidal evaluation.

We evaluated 144 patients who were seen in the Penn State Hershey Hidradenitis Suppurativa clinic. All patients were asked to complete the PHQ-2 to screen for depression. If they scored 4 or higher, they were also asked to complete the PHQ-9. It is important to note that the standard is to be pushed to the PHQ-9 with a score of 5 or greater.

135 patients completed the PHQ-2. The majority of patients were adults (86.9%), females (84%), and white (61%). 65 patients (45%) reported a history of depression, which is comparable to the reported rates in the literature. In our cohort, 22 patients (16%) scored 4 or higher on the PHQ-2, and were then asked to complete the PHQ-9. 21 of these patients also scored 5 or higher on the PHQ-9. Analysis showed a PHQ-2 score of 4 or higher had a positive predictive value of 100% for scoring 5 or higher on the PHQ-9, which suggests at least mild depression.

As the PHQ-2 is concise with only 2 questions and has been shown to have a PPV of 100% in our patient population, it may be an effective screening option for a busy dermatology clinic to help diagnose HS patients with unrecognized depression or suicidal ideation.

### **Learning Objectives:**

1. Learn what the PHQ-2 and PHQ-9 are and how to use them
2. Understand the validity of these screening tools in the HS population
3. Emphasize that it is both important and feasible to screen for depression and suicidal ideation in patient's with HS, even in a busy clinic.

### **Takeaway Message:**

The PHQ-2 is a concise screening tool to evaluate patients with HS for depression and suicidal ideation, and preliminary data supports its use in the dermatology clinic.

**11:05 - 11:10**

## **Development of a Patient Decision Aid for Hidradenitis Suppurativa**

Olivia McBride<sup>1</sup>, Donna McLean<sup>1</sup>, Jerry Tan<sup>1,2</sup>, Christine Yannuzzi<sup>6</sup>, Sandra Guilbault<sup>7</sup>, Chris J. Sayed<sup>5</sup>, Barry I. Resnik<sup>4</sup>, Robert Dellavalle<sup>3</sup>

1. Windsor Clinical Research Inc., Windsor, ON, Canada, 2. University of Western Ontario, Schulich School of Medicine and Dentistry, London; Windsor, ON, Canada, 3. Dermatology Service, Eastern Colorado Health Care System, US Department of Veteran Affairs; Department of Dermatology, University of Colorado Anschutz Medical Campus; Department of Epidemiology, Colorado School of Public Health, Denver; Aurora, CO, USA, 4. Miller School of Medicine Department of Dermatology and Cutaneous Surgery, University of Miami; Provider Network Solutions, Specialty Telehealth Solutions, Miami, FL, USA, 5. University of North Carolina Hospital, Chapel Hill, NC, USA, 6. Hidradenitis Suppurativa Warriors, Buffalo, NY, USA, 7. Hope for HS; HS Foundation, Troy, MI, USA

**Introduction:** Shared decision-making (SDM) incorporates patient values and preferences, health care provider expertise, and best-evidence to facilitate optimal choices for patients. SDM can be assisted by patient decision aids (PDAs), tools that offer evidence-based information about treatments, clarify expectations, and interrogate values and preferences. Despite being suited to the values-based needs of dermatology, PDAs have been underutilized. We have previously developed two PDAs for acne and psoriasis, which are available at [www.informed-decisions.org](http://www.informed-decisions.org).

**Objective:** Develop a PDA for hidradenitis suppurativa (HS). We hypothesize that our PDA will facilitate treatment decision-making through its emphasis on patient preferences and values.

**Methods/Results:** PDA development was initiated in 2018, and consists of 4 stages: 1) *Content Development* has been completed, in which evidence-based guidelines and treatment recommendations were systematically reviewed and translated into patient-friendly language. Specifically, content was developed in accordance with the North American HS guidelines; 2) *Focus Group Evaluation* with HS patients to evaluate patients' values and gain feedback on the PDA website's content, format, and accessibility; 3) *Health Care Provider Assessment* to gain feedback from physicians who are experts in HS on the PDA's content and applicability to practice; 4) *Randomized Controlled Trial* to compare the efficacy of the PDA against an existing HS resource on treatment decisional conflict and preparedness. We are conducting stages 2-4 and completing the PDA by late 2019.

**Conclusion:** We invite SHSA 2019 attendees to refer to the PDA when it is made publicly available to assist HS patients and their health care providers.

**Learning Objectives:**

1. Identify the needs of HS patients specific to treatment decision-making.
2. Create a publicly accessible patient decision aid (PDA), containing comprehensible, evidence-based treatment information to improve shared treatment decision-making between patients and their health care providers.
3. Test the efficacy of the HS PDA against an existing HS resource on patient treatment decisional preparedness and decisional conflict.

**Takeaway Message:**

We are developing a PDA for HS and invite SHSA 2019 attendees to utilize this tool to help patients and health care providers make better treatment decisions together.

**11:10 - 11:15**

### Stigmatization in Patients with Hidradenitis Suppurativa

Dorra Bouazzi<sup>1,3</sup>, Afsaneh Alavi<sup>2</sup>, Gregor Jemec<sup>1,3</sup>

1. Department of Dermatology, Zealand University Hospital, Roskilde, Denmark, 2. Faculty of Medicine, University of Toronto, Toronto, ON, Canada, 3. Health Sciences Faculty, University of Copenhagen, Copenhagen, Denmark

**Introduction:** Hidradenitis Suppurativa (HS) is a chronic and high impact disease. Because the skin is a visible organ having HS, like many other skin diseases, may subsequently lead to stigmatization and therefore negatively affect the disease perception. Stigmatization is defined as having a discrediting mark that leads to social discrimination and alienation.

**Methods:** This is a cross-sectional study of stigmatization in HS patients. We will evaluate the level of stigmatization in HS patients from different geographical areas/cultural backgrounds. Disease severity will be measured by Hurley staging and IHS4. Stigmatization will be evaluated using the 6-item Stigmatization Scale and Perceived Stigmatization Questionnaire. In addition quality of life will be measured using Dermatology Life Quality Index and EQ5D questionnaires. Finally, anxiety and depression will be assessed using the Hospital Anxiety and Depression Scale. The level of fatigue as a potential contributing factor to depression or stigmatization will also be assessed using the multidimensional fatigue inventory questionnaire.

**Results:** The project was approved by Independent Research Ethics Board (REB). Data collection in process, and will be ready for presentation.

**Conclusions:** By investigating the level of stigmatization in HS patients it will clarify if stigmatization is a problem. This study will furthermore have great relevance in understanding the psychological impact of HS in a multicultural setting.

**Learning Objectives:**

1. To evaluate the burden of stigmatization in a HS society
2. To illustrate if stigmatization is affected by the cultural background of HS patients

**Takeaway Message:**

Our clinical experience shows that many HS patients suffer from depression/anxiety, which may be affected by the cultural background for the stigma. By assessing if stigmatization is a problem, it will help clinicians to focus not only on improving treatments, but also help raising awareness in contemporary societies that HS is a disease like many other chronic conditions, hopefully improving the patients' quality of life.

**11:15 – 11:20**

### Incidence of Major Adverse Cardiovascular Events in Patients with Hidradenitis Suppurativa: a Population Based Analysis in the United States

Sarah Reddy<sup>1</sup>, Shari Wright<sup>1</sup>, Andrew Strunk<sup>1</sup>, Gregor Jemec<sup>2</sup>, Amit Garg<sup>1</sup>

1. Zucker School of Medicine at Hofstra Northwell, New Hyde Park, NY, USA, 2. Roskilde Hospital, Roskilde, Denmark

**Introduction:** Hidradenitis suppurativa (HS) is associated with several cardiovascular risk mediators, however data information on the risk of major adverse cardiovascular events (MACE) is sparse. We compared risk of MACE, including myocardial infarction (MI) and cerebrovascular accident (CVA), in patients with HS, stratified by biologic use, to controls without HS.

**Methods and Results:** This was a retrospective cohort analysis using the IBM Explorys analytics platform. We calculated and compared incidence rates (IR) of overall MACE, and of MI and CVA, in 49,862 patients with HS and 1,421,233 controls without HS. The crude IR of MACE was 6.6 per 1,000 person-years in patients with HS compared to 6.8 per 1,000 person-years in controls. In adjusted analysis, HS patients had a 23% increased risk of MACE [HR 1.23 (95% CI 1.17-1.30) p<0.001], and a similar increase in the risk of MI [HR 1.21 (95% CI 1.12-1.32) p<0.001] and CVA [HR 1.22 (95% CI 1.14-1.31) p<0.001] compared to control patients. The relative difference in MACE risk between HS patients and controls was highest among younger patients. Patients with HS who received biologics had 1.11 (95% CI 0.71-1.75, p=0.65) times the risk of MACE compared to patients with HS who did not receive biologics.

**Conclusion:** Patients with HS have increased risk of MACE. Early management of modifiable cardiovascular risk mediators may be warranted in patients with HS.

#### Learning Objectives:

- Upon completion, participants should be able to:
- Describe the incidence of major adverse cardiac events among HS patients
- Identify subgroups at greatest risk
- Consider management strategies to reduce risk

#### Takeaway Message:

Patients with HS are at increased risk of incident major adverse cardiac events, including myocardial infarction and cerebrovascular accident.

**11:20 - 11:25**

### Dietary Factors in Hidradenitis Suppurativa

*Elizabeth Mata<sup>1</sup>, Kendra Marr<sup>1</sup>, Kyla Price<sup>2</sup>, Aleks J. Hendricks<sup>1</sup>, Melody Maarouf<sup>3</sup>, Alyssa M. Thompson<sup>1</sup>, Jennifer Hsiao<sup>4</sup>, Vivian Y. Shi<sup>3</sup>*

1. University of Arizona, College of Medicine, Tucson, AZ, USA, 2. University of Illinois, Chicago, College of Medicine, Chicago, IL, USA, 3. University of Arizona, Department of Medicine, Division of Dermatology, Tucson, AZ, USA, 4. University of California, Los Angeles, Los Angeles, CA, USA

**Introduction:** Diet has been thought of as a modifiable factor in HS, but data on diet and HS are very limited. The goal of this study is to explore dietary patterns in HS patients and determine correlations between dietary habits, demographic characteristics, BMI and HS severity.

**Methods:** Responses from an anonymous questionnaire were collected from patients in HS specialty clinics (University of Arizona, UCLA, and the University of California-Davis) and in collaboration with HS support groups (Hope For HS, the International Association of HS Network, HS Warriors).

**Results:** Among the 856 respondents (mean age 35 years, range 16-74, 90.1% females), 87% reported having moderate-severe HS (51.3% Hurley II, 35.9% Hurley III). Average BMI is 34.9 (range 14.4-78.1). 82.8% have comorbid condition(s) (diabetes, hypertension, dyslipidemia, heart and lung diseases).

Sweets (23%) are the most commonly reported food to exacerbate HS, followed by complex carbohydrates (bread/pasta) (17%), dairy (16.8%), and high fat foods (13.4%). Vegetables and fruits (16.6%) are the most common foods reported to improve HS symptoms, followed by chicken (6.2%) and fish (4.8%). However, 51% and 59% of the respondents could identify triggering or alleviating foods, respectively. In addition, only 35.4% of the participants reported ever receiving lifestyle and diet counseling from a healthcare provider for their HS.

Frequent red meat consumption (>5X/week) positively correlates with higher HS severity ( $p=0.0021$ ). Interestingly, the respondents with lower income (mean \$27,055) eat out more frequently (>once daily) than those with higher income (mean \$57,965, 4-6X/week) ( $p=0.00074$ ). Respondents with concomitant diabetes, hypertension or lung disease are significantly more likely to have a higher Hurley stage ( $p=0.0058$ ,  $p=0.01$  and  $p=0.031$ , respectively).

**Conclusion:** Dietary habits and the presence of certain comorbidities are linked to a higher Hurley stage. Future investigations are needed to evaluate which and how dietary interventions can modify clinical outcomes in HS patients.

#### Learning Objectives:

1. Understand that certain food types may worsen and/or alleviate HS symptoms.
2. Recognize that high red meat consumption is associated with increased HS severity.
3. Review concomitant diseases that are modifiable by dietary interventions (such as obesity, diabetes, hypertension) are associated with higher HS severity.

#### Takeaway Message:

Diet appears to be an important but under-addressed factor in HS. More nutritional counseling and research on dietary interventions are needed in HS.

**11:25 - 11:30**

### Hidradenitis Suppurativa and Pregnancy: A Retrospective Review

*Alexis B. Lyons<sup>1</sup>, Anjelica Peacock<sup>2</sup>, Shanice A. McKenzie<sup>3</sup>, Haley Naik<sup>4</sup>, Vivian Y. Shi<sup>5</sup>, Iltefat H. Hamzavi<sup>1</sup>, Jennifer L. Hsiao<sup>3</sup>*

1. Henry Ford Hospital, Detroit, MI, USA, 2. St. Mary Mercy, Livonia, MI, USA, 3. UCLA, Los Angeles, CA, USA, 4. UCSF, San Francisco, CA, USA, 5. College of Medicine Tucson, Tucson, AR, USA

**Introduction:** Hidradenitis suppurativa (HS) disproportionately affects women of childbearing potential.<sup>1</sup> Various metabolic, endocrine, and inflammatory changes occur during pregnancy and may contribute to disease pathogenesis.<sup>2</sup> Despite this, there is a paucity of information regarding HS course during pregnancy. A few small studies examining HS activity during pregnancy found mostly no change or amelioration of symptoms during pregnancy.<sup>3-5</sup> The objective of this study was to

explore HS disease course during and after pregnancy.

**Methods:** Pregnant patients with a diagnosis of HS were identified using ICD 9/10 codes between January 2008-December 2018 in the Henry Ford Health System. Patients were excluded if first diagnosis of HS occurred after current pregnancy.

**Results:** 202 pregnancies in 127 HS patients were included. Nine patients had HS onset during pregnancy. Mean age at time of pregnancy was 25.9 years (range, 14-41 years). The majority of patients had mild HS during pregnancy (103 (50.9%) were Hurley Stage I, 70 (34.7%) Stage II, and 18 (8.9%) Stage III). 171 (84.6%) of the pregnancies were in Black patients and 25 (12.4%) were in White patients. In 13 (6.4%) pregnancies, patients quit smoking when they found out they were pregnant; in 27 (13.4%) pregnancies, patients smoked through the pregnancy. Dermatology was involved in managing HS in 28 (13.9%) pregnancies. Oral antibiotic treatment of HS during pregnancy occurred in 52 (25.7%) of the pregnancies. 70 (34.7%) pregnancies had worsening in severity of HS during pregnancy, 34 (16.8%) pregnancies had no change, 9 (4.5%) had improvement, and 86 (42.6%) were unknown. Post-partum HS exacerbation was reported in 81 (40.1%) pregnancies.

**Conclusion:** In this single center study, HS patients had a high rate of exacerbation during pregnancy and after delivery; dermatologists were not involved in the majority of the cases. Close monitoring and improved collaborative care between dermatology and ob-gyn is warranted.

#### **Learning Objectives:**

1. Describe the HS disease course in pregnant patients in this study
2. Describe the HS disease course in post-partum HS patients in this study
3. Recognize that in this single center study, dermatologists were not involved in the care of HS pregnant patients for the majority of cases

#### **Takeaway Message:**

Many physiologic changes occur during pregnancy and can affect the disease course of HS. Our study found that pregnant patients with HS had a high rate of exacerbation of their disease during pregnancy as well as in the postpartum period. Dermatologists need to work closely with their ob-gyn colleagues to provide care for HS patients when they are pregnant.

**11:35 – 11:40**

### **Therapeutic Drug Monitoring in Patients with HS**

*Afsaneh Alavi, MD, MSc, FRCPC*

Professor, Div. of Dermatology, University of Toronto, Women's College Hospital, Toronto, ON, Canada

Therapeutic drug monitoring is used in a number of inflammatory conditions to optimize response to treatment. Studies on psoriasis, psoriatic arthritis, rheumatoid arthritis, inflammatory bowel disease, and ankylosing spondylitis demonstrated that the presence of AAAs are associated with decrease in serum drug concentration concentrations and decrease in clinical response. Therapeutic drug monitoring can provide clinical utility in optimizing HS management similar to IBD. Subtherapeutic drug levels can guide therapy to either allow for dose escalation or change in biologic class. The objectives of this session is to discuss the role of TDM in HS and the application of the lesson learned in gastroenterology in the management of HS.

**11:40 – 11:45**

Therapeutic drug monitoring for TNF inhibitors in IBD

*Nirmal Kaur, MD*

Director, Inflammatory Bowel Disease Center, Division of Gastroenterology and Hepatology, Henry Ford Health System, Detroit, MI

*Summary not available*

## **Session 6 – Management of HS Pain**

### **Saturday, November 2, 2019**

**13:30 – 13:35**

### **Patient Perspective of Pain in HS**

*Jasmine Sidhu*

*Summary not available*

**13:35 – 13:45**

### **Management of Chronic Pain in the Post-Opioid Era**

*Bassam Batarse, MD*

Associate Chief of Staff, Integrated Clinical Services, John D. Dingell Va Medical Center, Detroit, MI, USA

*Summary not available*

**13:45 – 13:55**

### **Medical Cannabis**

*Saqib Nakadar, D.O.*

Medical Director, Doc Greens Clinic, Michigan Marijuana Review Panel, Clinical Assistant Professor, Michigan State University, Sterling Heights, MI, USA

The presentation will give some background information about cannabis. The main objective will be to understand the medicinal components of cannabis specifically THC and CBD. We will review some of the myths and misinformation surrounding cannabis.

#### **Learning Objectives:**

1. Defining Cannabis and its medicinal components
2. Understanding the Endocannabinoid System
3. Practical Applications of Cannabis

**13:55 – 14:05**

### **HS Pain Management for the Dermatologist**

*Lauren Orenstein, MD*

Assistant Professor, Dermatology Division of Grady Memorial University, Emory University School of Medicine, Atlanta, GA, USA

Among individuals living with HS, pain is consistently rated as one of the greatest causes of morbidity and impaired quality of life. Yet, evidence-based international HS treatment guidelines are sparse when it comes to managing HS pain. This presentation provides a practical approach that dermatologists may apply for treating HS pain with topical analgesics, NSAIDs, acetaminophen, serotonin-norepinephrine reuptake inhibitors (SNRIs), and anti-epileptics.

#### **Learning Objectives:**

- Review what's currently known about HS pain: its character, impact on quality of life, and recommendations for treatment from international guidelines.
- Discuss a practical, dermatologist-oriented approach to treating HS related pain

**14:05 – 14:15**

### **Psychological Approaches to Pain Management**

*Zarine Patel, PhD*

The Motherhood Center, New York, NY, USA

Pain has been identified as a central component of hidradenitis suppurativa (HS). However, optimal pain management treatment options for HS remain unclear. A recent study utilizing phenomenological interviews resulted in a set of 10 core themes describing the experience of HS-related pain: Flare-Ups; Coping with HS and HS-Specific Pain; HS is Painful; HS is Present on the Body; Physical Limitations and Interference; Emotionally and Mentally Exhausting; Social Impact and Isolation; Routine Activities Exacerbate Pain; Unknown, Uncertain & Unpredictable; HS Impacts Daily Functioning. The themes spanned across life domains, including emotional and physical functioning.

A biopsychosocial approach to the treatment of pain in HS should be strongly considered as part of interdisciplinary treatment. There are a number of empirically supported therapies for pain, including cognitive behavioral therapy (CBT) and acceptance and commitment therapy (ACT). Cognitive behavioral therapy for chronic pain emphasizes psycho-education, relaxation techniques, behavioral goals (e.g. increasing exercise and other activities), behavioral activation, activity pacing, and cognitive restructuring. Acceptance and commitment therapy for pain emphasizes psychological flexibility; encompassing acceptance, cognitive defusion, awareness, valued and committed action. These types of treatments hold promise, in conjunction with medical management, in the comprehensive and multidimensional treatment of HS.

#### **Learning objectives:**

1. There are a number of empirically supported treatments for chronic pain, including CBT and ACT.
2. Future studies should examine the efficacy of these treatments to reduce pain in HS.
3. An interdisciplinary approach to managing pain in HS could include collaboration between dermatologists, pain management specialists, health psychologists, nurses and physical therapists.

**14:15 – 14:20**

### **Itch and Pain are Dual Burdens in Hidradenitis Suppurativa Patients**



Omar Rizvi<sup>1</sup>, Melody Maarouf<sup>3</sup>, Aleks J. Hendricks<sup>1</sup>, Kendra Marr<sup>1</sup>, Kyla Price<sup>4</sup>, Alyssa M. Thompson<sup>1</sup>, Jennifer Hsiao<sup>2</sup>, Vivian Y. Shi<sup>3</sup>

1. University of Arizona, College of Medicine, Tucson, AZ, USA, 2. University of California, Los Angeles, Los Angeles, CA, USA, 3. University of Arizona, Tucson, Department of Medicine, Division of Dermatology, Tucson, AZ, USA, 4. University of Illinois, Chicago, College of Medicine, Chicago, IL, USA

**Introduction:** Although pain is one of the most debilitating symptoms in HS, itch is gaining attention as a significant symptom. We aim to explore the intensity, anatomic distribution, circadian rhythm and QoL impact of itch and pain symptoms in HS patients.

**Methods:** An anonymous questionnaire was deployed through social media to major international HS support groups (Hope For HS, the International Association of HS Network, HS Warriors) and in HS specialty clinics (University of Arizona, University of California, Los Angeles, University of California, Davis).

**Results:** 856 HS patients completed the questionnaire. 95.2% of our HS respondents report having pain, and 74.9% report concomitant itch. Among patients with itch, 65.0% report that pain is more bothersome, but 27.4% report that itch and pain are equally bothersome. Areas with the most itch and pain burden are, respectively, groin folds (61.0%, 63.5%), underarms (59.0%, 61.4%), medial thighs (47.1%, 52.7%), buttocks (44.1%, 51.9%), and genitals (36.7%, 41.6%).

In terms of pain and itch by HS lesion morphology, active boils are most painful (96.3%), followed by sores/ulcerations (55.0%), draining sinus tracts (53.2%), scars (23.9%), and blackheads (7.4%). Active boils are the itchiest (66.5%), followed by draining sinus tracts (56.79%), scars (49.9%), sores/ulcerations (42.0%), and blackheads (14.3%).

Respondents are most likely to experience both pain and itch symptoms at "random times" (75.9% and 70.0%), followed by in the evening (29.3% and 24.0%). Discomfort from HS most commonly interfered with exercise/sports (65.4%), leisure activities (62.3%), sleep (59.7%), walking (59.4%), activity of daily living (57.1%), and sitting (56.89%).

**Conclusion:** Our respondents reports significant pruritus in the setting of pain. Intertriginous areas have the most itch and pain. Surprisingly, scars from HS have prominent itch and pain that may have been previously overlooked. Further investigations are needed for further explore symptoms and burdens beyond pain in HS patients.

#### **Learning Objectives:**

1. Recognize that most HS patients who experience pain also have significant concomitant itch in the same anatomical areas.
2. Understand the prevalence of itch and pain distribution in various anatomical areas and by lesional morphology.
3. Review that symptoms from HS significantly interferes with exercise, leisurely activities and activities of daily living.

#### **Takeaway Message:**

While the management of HS has largely focused on alleviating pain, our study suggests that itch may play an equally large role in the morbidity of HS. Future investigations are needed to incorporate itch into HS clinical evaluation tools and identify appropriate therapies to alleviate itch.

**14:20 – 14:25**

## **Increasing Engagement and Treatment Adherence Through Emotional and Mental Well-Being**

Erin Martinez

University of Michigan, Ann Arbor, MI, USA

This oral presentation seeks to describe the ways that Hidradenitis Suppurativa impacts the emotional, relational, psychological and sexual domains of a patient's life. The presentation will demonstrate that emotional and psychological support are critical to the engagement and treatment adherence of medical treatment interventions. The benefits of treating the whole person and navigating communication about mental and sexual functioning in brief patient-practitioner encounters will be explored.

Differentiation between illness distress and typical symptoms of depression and anxiety will be briefly examined. Defining and assessing subjective well-being and the benefits of subjective well-being on improved health outcomes will be described. Methodology related to somatic symptoms and psychological distress and how this informs healing interventions will be described.

An overview of a typical course of treatment for a patient referred to mental health services will be explored. Questions to encourage dialogue with patients regarding mental/emotional functioning will be offered as part of this presentation. Benefits of coordinated care to increase patient progress will be discussed.

#### **Learning Objectives:**

1. This presentation will define illness distress and typical presentation of illness distress.
2. This presentation will describe purpose of measuring benefits of subjective well-being and relationship quality in the assessment of health improvement.
3. This presentation will outline direct and approachable methods for interacting with patients related to their emotional and psychological functioning as well as discussion points to encourage referrals to care.

#### **Takeaway Message:**

The presentation will demonstrate that support and services for patient's emotional and psychological well-being result in a higher level of engagement and adherence to medical treatment.



## Session 7 – Concurrent Session A & B

### Saturday, November 2, 2019

**15:30 – 16:15**

#### **1A: Practice Management for HS**

*Iltefat Hamzavi*, MD, FAAD, President HSF, Dermatologist, Department of Dermatology, Henry Ford Hospital and Hamzavi Dermatology, Detroit, MI, USA

*Steven Daveluy*, MD, FAAD, Associate Professor and Program Director, Dept of Dermatology, Wayne State University, Detroit, MI, USA

The role of a multidisciplinary team is critical for the management of the HS patient. This session will discuss how Henry Ford Hospital has developed its clinic. It will discuss the specialties involved along with a referral process. It will also discuss the various education and administrative functions which help the clinic function effectively for patients along with the challenges faced by the HS team.

##### **Learning Objectives:**

- List key specialties needed for the care of the HS patient
- Review how to triage HS patients and educate them on various treatment options
- Understand how to integrate support groups into the feedback the HS clinic gathers from patients

**15:30 – 16:15**

#### **1B: Setting up an HS Support Group**

*Angela Miller*, Clinical Research Manager, Department of Dermatology, Henry Ford Health Systems, National Director, HS Foundation, Detroit, MI

*Sandra Guilbault*, Hope for HS, Detroit, MI, USA

Support groups for HS are a critical resource in assisting those with HS to feel a sense of belonging in their community, and validation that only others with HS can provide. Support groups allow for an open exchange of dialogue without clinical time constraints to provide insight into the patient experience and unmet needs. Hosting an HS support group is rewarding while unique challenges may exist. With an online presence and in-person support group chapters in multiple locations throughout the US, Hope for HS has developed a platform that encourages partnership and collaboration between the HS and medical communities while empowering patients and caregivers to be advocates.

##### **Learning Objectives:**

- Understand the importance and benefits of developing and hosting a support group
- Implement initial steps for identifying medical and patient community to take part
- Review support group meeting formats
- Navigate local obstacles and support group challenges

**16:15 – 17:00**

#### **2A: HS Progress Workshop: Registry and Biospecimen collection**

*Haley Naik*, MD, UCSF, San Francisco, CA, USA

##### **Learning Objectives:**

- To learn about the mission, goals, structure, and status of HS Progress, a collaborative effort to facilitate HS research in order to improve the lives of people living with HS.

**16:15 – 17:00**

#### **2B: Wound Care**

*Hadar Lev-Tov*, MD, MAS, Assistant Professor, Dr. Philip Frost Department of Dermatology and Cutaneous Surgery, University of Miami, Miller School of Medicine, Miami, FL, USA

*Angela Miller*, Clinical Research Manager, Department of Dermatology, Henry Ford Health Systems, National Director, HS Foundation, Detroit, MI

*Patricia Coutts*, RN, York Dermatology Center, Toronto, ON, Canada

*Nicole Van Haren*, RN, BSN, Dermatology, Henry Ford Hospital, Detroit, MI

Good control of HS is multifactorial and even with best disease control, good wound care is always needed. Wound care can be thought of as disease related or surgery related. The workshop will focus on areas that the facilitators thought are relevant. Participants will rotate through interactive centers themed around these concepts: HS wound care on a budget, handling tricky anatomy and exudate/odor management.

**Learning Objectives:**

- Provide an opportunity to learn current technology for managing chronic wounds of hidradenitis suppurativa

## **Session 8 – Surgery & Lasers & Imaging for HS**

### **Sunday, November 3, 2019**

**09:00 – 09:10**

### **Evolution of Surgery in HS (Surgical Techniques Pollocak, I&D, Deroofing, Wide Excision, Closure Techniques)**

*Stephanie Goldberg, MD*

Associate Professor of Surgery, Medical Director of VCU ACCESS, General Surgery, Virginia Commonwealth University School of Medicine, Richmond, VA, USA

*Summary not available*

**09:10 – 09:20**

### **Combined Surgical and Medical Management for Superior Outcomes**

*Ralph George, MD, FRCS*

Associate Professor, General Surgery, University of Toronto, Medical Director, CIBC Breast Centre, St. Michael's Hospital, Toronto, ON, Canada

*Summary not available*

**09:20 – 09:30**

### **Lasers for HS**

*Iltefat Hamzavi, MD, FAAD*

President HSF, Dermatologist, Department of Dermatology, Henry Ford Hospital and Hamzavi Dermatology, Detroit, MI, USA

Adjunctive therapies, such as laser and light-based therapies, have become more commonly used in the management of HS. Different modalities are used for specific purposes, such as: to target the hair follicle or sebaceous gland, for bacterial load reduction, and for tissue debulking.<sup>[109]</sup> There appears to be RCT evidence behind using follicular laser ablation for early stage disease. The CO2 laser has been used successfully for many years in large case series with documented success.

**Learning Objectives:**

- 1) Understand when to use hair removal devices in HS patients
- 2) Review the Co2 laser technique and wound healing process
- 3) Review how to integrate laser therapy with medical and surgical

**09:30 – 09:40**

### **Presurgical Assessment of Sinus Tracts in HS**

*Steven Daveluy, MD, FAAD*

Associate Professor and Program Director, Dept of Dermatology, Wayne State University, Detroit, MI, USA

The success of surgical interventions in hidradenitis suppurativa relies on removal of the full extent of sinus tracts. Detecting all the sinus tracts can be challenging. I will review various methods to assess sinus tracts in HS, which can allow more accurate assessment, patient counseling and surgical planning.

**Learning Objectives:**

- Describe the techniques available in presurgical assessment of sinus tracts in HS
- Utilize these techniques appropriately for individual patients and procedures

**09:40 – 09:45**

### **Wound Care Management of Surgical and Deroofed Wounds**

*Ashley Shoultz, MSN, FNP-C, CWON*

Nurse Practitioner, Dept. of Surgery, VCU Medical Center Hospital, Richmond, VA, USA

#### Introduction

- I. Many general principles of wound management can be applied to managing a surgically excised or deroofted HS lesion.
- II. HS-related wounds pose unique challenges that sometimes require management that differs from that of other surgical wounds.

#### DIME Approach to Wound Care

- I. **Debridement-** Remove nonviable tissue
  - i. Surgical
  - ii. Chemical
  - iii. Autolytic
  - iv. Enzymatic
- II. **Inflammation/Infection-** Reduce bioburden and inflammation within the wound that can lead to increased drainage and sometimes a chronic inflammatory state. *Major issue for HS patients; due to their wound locations, hygiene may be challenging to maintain.*
  - i. Antimicrobial Compounds-Silver, iodine, gentian violet/methylene blue compounds, polyhexamethylene biguanide (PHMB), hypochlorous acid
  - ii. Regulate inflammation-Collagen based dermal matrix- regulate matrix metalloproteinases (MMPs)
- III. **Manage Moisture-** Dry wounds inhibit epithelial cell migration, wet wounds induce hypergranulation which can also result in decrease epithelial migration. *Most HS related wounds are overly wet, leading to hypergranulation, resulting in stalled wound (chronic, nonhealing)*
  - i. Alginates, foams, gauze-based, and compound dressings
  - ii. Adjust dressing change frequency to allow for proper moisture balance (*More-frequent changes than for non-HS wounds – Veer from standard package instructions*)
- IV. **Edge-** Treat stalled wound edges, reset wound healing cascade
  - i. Treat epiboled edges with debridement, silver nitrate, foam dressings
  - ii. Treat hypergranulation with silver nitrate and foam dressings

#### Conclusion

- I. By incorporating the DIME approach to our care of HS lesions, we can make an impact to our patient's lives by reducing time to healing.
- II. Especially manage inflammation and infection, plan for higher frequency dressing changes to address bioburden and moisture. Treat stalled wound edges as appropriate.

#### Learning Objectives

- 1) Name the four steps in the DIME approach in creating an optimal wound healing environment.
- 2) Apply the DIME approach to wounds specifically caused by HS.

**9:45 - 9:50**

### Critical Evaluation of Non-invasive Imaging Modalities in Hidradenitis Suppurativa

David Grand, Kristina Navrazhina, John W. Frew, James Krueger

Laboratory for Investigative Dermatology, Rockefeller University, New York, NY, USA

Valid and reliable clinical assessment of Hidradenitis Suppurativa disease severity, remains one of the major challenges to the accurate assessment of pharmacological interventions in this disease. Clinical examination alone risks underestimating the extent and severity of disease and serial biopsies are invasive, and sub-optimal to monitor the natural course of disease. Non-invasive imaging modalities such as ultrasound (USS) provide valuable additional information, however modalities including confocal microscopy (CM), electrical impedance spectroscopy (EIS) and Magnetic Resonance Imaging (MRI) provide alternative measures to assess specific aspects of cutaneous tissues in HS. Given the complex pathogenesis of disease, involving follicular occlusion, inflammation, tract formation and contribution of the microbiome through biofilm formation, we critically examine the benefits of each imaging modality in the assessment of various aspects of HS pathogenesis. Given the heterogeneity of disease presentation, particular imaging modalities may be more suited to certain presentations of disease. The need for anatomical site-matched control data is also highlighted given the unique immunological milieu of apocrine bearing skin.

#### Learning Objectives:

1. To identify potential imaging modalities of utility in the clinical assessment of Hidradenitis Suppurativa
2. To appreciate the imaging- histopathological correlation between different imaging modalities
3. To understand the benefits and disadvantages of specific imaging modalities for different stages of disease and their role in clinical assessment and clinical research.

### Takeaway Message:

1. Non-invasive imaging modalities hold potential in enabling in-vivo assessment of disease activity and assessment of natural history of Hidradenitis Suppurativa
2. Different imaging modalities have different benefits and disadvantages and are more appropriate for the imaging of different structures in HS.

9:50 - 9:55

### Evaluating the Safety and Efficacy of Intense Pulsed Light with Radiofrequency in U.S. Patients with Hidradenitis Suppurativa- A Split Body Study

Alexis B. Lyons<sup>1</sup>, Angela Parks-Miller<sup>1</sup>, Raheel Zubair<sup>2</sup>, Indermeet Kohli<sup>1</sup>, Taylor L. Braunberger<sup>1</sup>, Iltefat H. Hamzavi<sup>1</sup>

1. Henry Ford Hospital, Detroit, MI, USA, 2. Broward Health, Fort Lauderdale, FL, USA

**Introduction:** Laser and light-based treatments for hidradenitis suppurativa (HS) have gained popularity recently. It is hypothesized that these therapies work by one or more of: targeting melanin in the hair follicle leading to laser-induced hair removal, debulking, sebaceous gland reduction, or bacterial load reduction. Lait®-therapy (Lencura, Germany) is a European Union approved, non-invasive treatment for HS and acne, utilizing the combination of intense pulsed light (IPL) and radiofrequency (RF). IPL is believed to cause photothermolysis, where the absorption of light by chromophores in the skin creates enough heat to target the blood vessels that supply sebaceous glands to reduce sebum production and cause thermal damage to hair follicles. Similarly, it is hypothesized that RF causes thermal damage, inhibits sebaceous gland activity, and induces collagen production and collagen fiber remodeling in the dermis. The objective of this study is to determine the safety and efficacy of IPL with RF in U.S. patients with HS.

**Methods & Results:** Eight of ten subjects are currently enrolled. Exclusion criteria: pregnant/breastfeeding, not on stable medication dosing for HS (3 months), biologics, <3 nodules in the analyzed area, absence of bilateral involvement. Subjects had a total of 10 IPL with RF treatments 2 weeks apart to a randomized side of the body with a final follow up 2 weeks after the last treatment. Sonographic examination was performed at baseline and final visit for some subjects. Data and outcome measures including change in Hurley Stage, Dermatology Life Quality Index (DLQI), International Hidradenitis Suppurativa Severity Score System (IHSS), HS-Physician Global Assessment (HSPGA), and pain level as well as adverse events and number of patients achieving Hidradenitis Suppurativa Clinical Response (HiSCR) will be analyzed and presented at the conference.

**Conclusion:** Combination therapy with IPL with RF may be a safe and efficacious treatment for HS in the U.S.

### Learning Objectives:

1. Laser and light-based treatments for hidradenitis suppurativa have emerged in the literature and gained popularity in recent years.
2. It is hypothesized that these therapies work by one or more of: targeting melanin in the hair follicle leading to laser-induced hair removal, debulking, sebaceous gland reduction, or bacterial load reduction.
3. Intense pulsed light with radiofrequency is believed to lead to collagen production and remodeling as well as photothermolysis, where the absorption of light by endogenous chromophores in the skin creates enough heat and energy to target the blood vessels that supply sebaceous glands to reduce sebum production and causes thermal damage to hair follicles.

### Takeaway Message:

Combination therapy with intense pulsed light with radiofrequency may be a promising treatment for patients with hidradenitis suppurativa in the United States.

9:55 - 10:00

### The Impact of Every Day Wound Care in Hidradenitis Suppurativa - an Update

Suzanne Moloney

HidraMed Solutions, BioExel, National University of Ireland, Galway, Ireland

**Background:** Hidradenitis Suppurativa (HS) is a debilitating skin disease characterized by deep seated, painful nodules and suppurating lesions of apocrine gland-bearing skin regions. Most current literature remains focused on diagnosis, causality and treatment options. There is little published literature on effective HS wound management in a home care setting. HS patients spend significant time and money managing their lesions on a day to day basis and yet there is no standard for every day wound care in HS. There are no wound care products that meet HS patients' specific needs.

**Method:** A questionnaire was developed and disseminated through patient group social media channels. The survey was live for 31 days, beginning in May 2019 with 909 respondents.

1. Comparative research was conducted on current wound dressings and accessories such as tape and bandages, and their methods of use
2. 6 UK based Dermatology Nurses participated in a structured interview

**Results:** There is a very underestimated and unacknowledged burden imposed on patients by having to conduct their wound care routine in a home setting unguided and unaided. Patients are spending significantly out of pocket, experiencing excessive and unnecessary stress, anxiety and pain, and losing valuable time from their daily lives on account of regular dressing changes. HS Patient wound care needs were identified.

In line with these needs, there are no HS specific wound care dressing products on the market. A significant number of patients are using ineffective products or improvising with household items such as sanitary napkins and tissue paper.

**Learning Objectives:**

1. To gain a clear understanding of the burden imposed on patients due to every day wound care requirements
2. To assess and compare current wound care dressings and accessories used by HS patients
3. To define patient needs in terms of wound care dressings

**Takeaway Message:**

HS patients have a long and uncertain treatment pathway and live with chronic pain, embarrassing odour and drainage strike though from the use of improper wound care dressings. This has been shown to contribute to a reduced quality of life, higher levels of anxiety, depression, isolation and suicide. There are no widely available wound care dressings that meet HS patients' needs. A solution that meets HS patients' daily wound care requirements may contribute to an improved quality of life and empower patients to self-manage more efficiently, in turn reducing stress and mental health issues related to the everyday care of HS symptoms.

**10:35 - 10:40**

**Elevated Hepcidin in Hidradenitis Suppurativa**

Mondana H. Ghias<sup>1</sup>, Andrew D. Johnston<sup>1</sup>, Kayla M. Babbush<sup>1</sup>, Allison J. Kutner<sup>1</sup>, H. D. Hosgood<sup>1</sup>, Michelle A. Lowes<sup>2</sup>, Morayma Reyes Gil<sup>1</sup>, Steven R. Cohen<sup>1</sup>

1. Albert Einstein College of Medicine, New York, NY, USA, 2. Rockefeller University, New York, NY, USA

The immune dysregulation and chronic inflammation associated with hidradenitis suppurativa (HS) may explain several of the complications and comorbidities of this debilitating condition. Serum hepcidin is an acute phase reactant with reported utility in distinguishing iron deficiency anemia (IDA) and anemia of chronic disease (ACD) in inflammatory disease.

**Objective:** To determine the utility of serum hepcidin as a marker of HS disease severity and as a diagnostic tool in the characterization of anemia in HS.

**Methods:** Serum samples were analyzed for hepcidin quantitatively using an enzyme-linked immunosorbent assay (Quantikine® Human Hepcidin ELISA kit, R&D Systems Inc., Minnesota, USA, DHP250) according to the manufacturer instructions at 1:50 dilution. Additional laboratory parameters included hematologic data, markers of inflammation (erythrocyte sedimentation rate, C-reactive protein), and disease severity (HS-Physician Global Assessment (PGA) score).

**Results:** Multivariate analysis adjusting for all pertinent covariates, hematologic, and inflammatory laboratory values identified serum hepcidin as the only variable significantly related to HS-PGA scores ( $p=0.03$ ). Additionally, anemic patients had significantly higher hepcidin relative to non-anemic. Of the anemic cohort, individuals with iron-replete ferritin levels had significantly higher hepcidin than those with low total-body iron (ferritin < 30 ng/mL). A subset of patients initiating HS treatment had a significant decrease in serum hepcidin after four weeks of therapeutic intervention ( $p=0.02$ ).

**Conclusions:** Hepcidin may be used as a novel biomarker of disease activity and as a diagnostic tool in distinguishing IDA from ACD in HS. Additionally, hepcidin levels may guide therapeutic management, as patients with elevated hepcidin, indicative of ACD, are not likely to benefit from iron supplementation.

**Learning Objectives:**

1. Evaluate serum hepcidin as a potential biomarker of HS disease severity, as defined by HS-PGA scores.
2. Utilize serum hepcidin as a diagnostic tool in the characterization of the type of anemia seen in HS patients at the Einstein/Montefiore HS Treatment Center (iron deficiency anemia vs. anemia of chronic disease).
3. Determine whether hepcidin levels may guide therapeutic management in anemic HS patients by identifying whether patients are likely to benefit from iron supplementation.

**Takeaway Message:**

Given the significant association between hepcidin and HS disease severity, as defined by HS-PGA scores, hepcidin may serve as a biomarker of disease severity. Additionally, elevated hepcidin levels in anemic HS patients suggests an underlying diagnosis of anemia of chronic disease. Patients initiating HS treatment had a significant decrease in serum hepcidin within four weeks of therapeutic intervention.

**10:40 – 10:45**

**Peri-operative Use of Ertapenem as a Bridge to Surgical Resection in Severe Hidradenitis Suppurativa**

Stephanie Goldberg, Maggie McKenna, Daniel Luppens, Mark Mochel, Michael Stevens  
Virginia Commonwealth University School of Medicine, Richmond, VA, USA

**Background:** Hidradenitis Suppurativa (HS) is a multi-factorial inflammatory disease with a bacterial component. The role of surgical intervention in severe HS patients has not yet been fully elucidated, and there are challenges to surgical resection with severe inflammation. Ertapenem decreases inflammation and improve quality of life in HS patients with Hurley stage 3



disease. We hypothesized that ertapenem could be used peri-operatively to decrease inflammation in patients who would otherwise not be candidates for surgical resection.

**Methods/Results:** Two patients with severe HS were identified; neither were initially surgical candidates due to the severity of the inflammation. One patient with focal disease and one patient with diffuse intertriginous disease underwent daily ertapenem infusions. Both patients experienced a significant decrease in inflammation making them candidates for surgical excision and deroofting by day 9 (Figure 1). Ertapenem was continued throughout the perioperative period. Both patients reported improvement in quality of life. One patient with focal disease achieved a curative result. The second patient had resolution of the chronic draining tracts that were addressed operatively, but developed additional areas of disease once the ertapenem was stopped.

**Discussion:** Ertapenem may be used as an adjunctive therapy to decrease inflammation prior to surgery in severe HS. Further studies are necessary to determine which subset of patients will benefit most from peri-operative ertapenem, specifically those with focal or diffuse disease. This series highlights the importance for ongoing medical management of HS in conjunction with surgical treatments, and indicates the need for multidisciplinary surgical/medical clinics dedicated to treating HS.

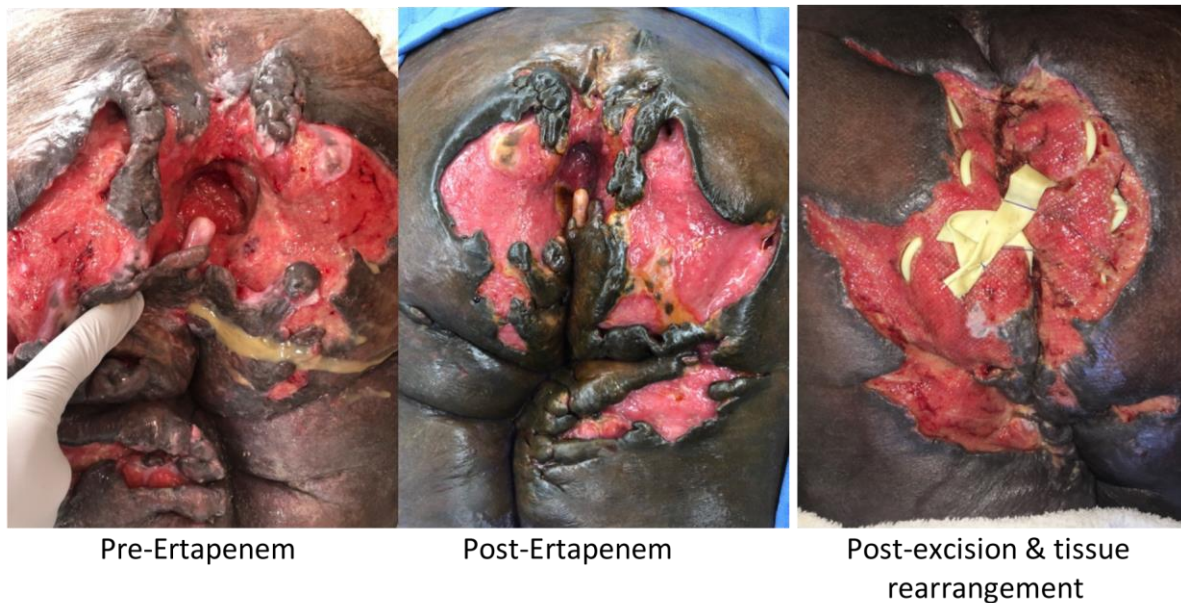


Figure 1. Patient with Severe refractory HS pre- and post- Ertapenem rescue therapy.

**Learning Objectives:**

1. Understand the role of peri-operative ertapenem in severe HS
2. Understand the need for combined medical and surgical management in patients with HS
3. Understand implications and the limitations of surgical intervention in the setting of inflammation.

**Takeaway Message:**

Use of peri-operative ertapenem may decrease inflammation to facilitate surgical intervention in patients who may not otherwise be surgical candidates.

10:45 – 10:50

## Hidradenitis Suppurativa Has a Clear Impact on Work Productivity and Activity Impairment

Kelsey R. van Straalen<sup>2</sup>, Lisette M. Prens<sup>1</sup>, Tjerk H. Hylkema<sup>1</sup>, Errol P. Prens<sup>2</sup>, Hessel H. van der Zee<sup>2</sup>, Barbara Horváth<sup>1</sup>

1. University Medical Center Groningen, Groningen, Netherlands, 2. Erasmus University Medical Center, Rotterdam, Netherlands

**Introduction:** Hidradenitis suppurativa (HS) is a chronic, auto-inflammatory skin disease characterised by painful inflammatory nodules and abscesses. Hidradenitis suppurativa has a profound impact on the quality of life and predominantly affects individuals in their work-productive years. However, the impact of HS on work productivity remains unknown. Therefore, the aim of this study was to examine the extent of both work productivity impairment (absenteeism, presenteeism, at-work productivity loss) and activity impairment outside work.

**Methods:** A cross-sectional study was performed collecting data through the registries from the Department of Dermatology of the University Medical Center Groningen and the Erasmus University Medical Center between April 2015 and July 2019.



Main outcomes were derived from the Work Productivity and Activity Impairment (WPAI) questionnaire and included activity impairment outside work, absenteeism (sick leave), presenteeism (reduced work performance), and at-work productivity loss (overall work productivity loss) in the last week. All outcomes were scaled 0-100%, with higher percentages indicating higher impairments.

**Results:** In total 843 patients were included (71.6% female; mean age  $38.0 \pm 12.2$  years) and 33.7% had severe HS based on the refined Hurley classification. The majority of patients had a low educational level (75.2%). Among both workers and non-workers median activity impairment outside work was 40.0% [IQR: 10.0-70.0]. Among workers ( $n=529$ ; 62.8%) median absenteeism was 0.0% [IQR: 0.0-5.3] and 26.4% of workers reported taking sick leave. Median presenteeism was 20.0% [IQR: 0.0-52.5] and at-work productivity loss was 20.0% [IQR: 0.0-69.0].

**Conclusion:** This study demonstrated that a quarter of HS patients report sick leave due to HS. While working HS patients experience reasonable at-work productivity loss. In addition, HS has major impact on people's activities outside of work. It is important physicians recognize the impact of HS on work beyond sick leave.

#### Learning Objectives:

1. To gain insight into the effect of HS on work productivity.
2. To assess absenteeism among working HS patients.
3. To assess the effect of HS on activities outside of work.

#### Takeaway Message:

Hidradenitis suppurativa does not only lead to absenteeism but also results in a reasonable at-work productivity loss and a substantial activity impairment outside of work.

10:50 – 10:55

Change in Body Mass Index Before and After Diagnosis of Hidradenitis Suppurativa

10:50 – 10:55

### Change in Body Mass Index Before and After Diagnosis of Hidradenitis Suppurativa

Amit Garg, Shari Wright, Andrew Strunk

Department of Dermatology, Donald and Barbara Zucker School of Medicine at Hofstra/Northwell, New Hyde Park, NY, USA

Temporal relationship between HS and obesity and the influence of weight change has not been established. We aimed to identify BMI trends among HS patients prior to and following diagnosis.

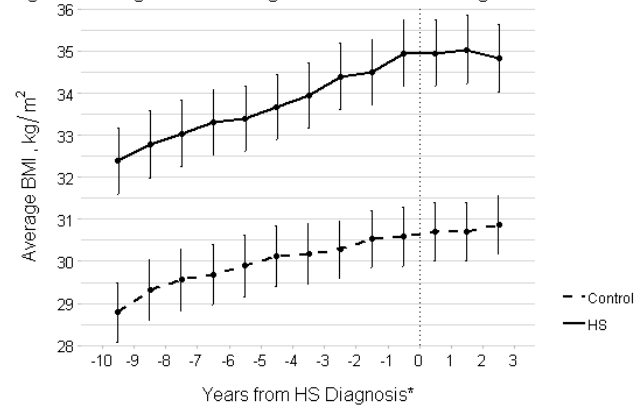
This was a retrospective cohort study of 488 HS patients and 488 matched controls identified using electronic data from January 1, 1998 to August 19, 2019. Average BMI change was assessed using linear mixed models, controlling for age, sex, race, and smoking status. Prior to diagnosis, average increase in BMI per year among HS patients ( $=0.28$ , 95% CI 0.25-0.30) was higher than that of controls ( $=0.18$ , 95% CI 0.16-0.21; interaction  $p<0.001$ , Figure I). Among HS patients, yearly increase in BMI prior to diagnosis was larger for women ( $=0.30$ , 95% CI 0.27-0.33) than men ( $=0.09$ , 95% CI 0.01-0.16, interaction  $p<0.001$ ). This sex difference in BMI trend was not observed in controls (Figure II). Average annual BMI increase prior to diagnosis was larger for HS patients diagnosed before age 40 ( $=0.58$ , 95% CI 0.53-0.62) than those diagnosed at or after ( $=0.09$ , 95% CI 0.06-0.13). This difference in BMI trend according to age was also observed in controls, though the effect was more pronounced in HS (Figure III). Rate of BMI change did not vary substantially according to race or smoking in HS or controls (Figures IV/V). Following diagnosis, there was no significant change in BMI among HS patients. ( $=-0.04$ , 95% CI: -0.17, 0.08;  $p=0.51$ ).

These results suggest BMI rate of change may influence development of HS, particularly in women and younger patients.

Table I. Patient demographics

Characteristic	Patients with HS (n=488)	Control patients (n=488)
Age at baseline, mean (sd)	35.8 (15.6)	35.8 (15.6)
Sex		
Female	429 (87.9)	429 (87.9)
Male	59 (12.1)	59 (12.1)
Race		
White	213 (43.6)	213 (43.6)
African American	235 (48.2)	235 (48.2)
Other	40 (8.2)	40 (8.2)

Figure I. Average BMI according to time from first HS diagnosis



\* For matched control group, time intervals were "anchored" around patient's first BMI measurement, rather than a diagnosis date.

a – n=488 patients with HS and n=488 control patients for each time period (12,688 BMI measurements total)

b – Error bars represent 95% confidence intervals

#### Learning Objectives:

1. To describe overall trends in BMI among hidradenitis suppurativa (HS) patients prior to and following HS diagnosis.
2. To describe subgroup trends in BMI among HS patients, based on age, sex, race and smoking status, prior to and following HS diagnosis.
3. To compare overall and subgroup trends to control patients without HS.

#### Takeaway Message:

Change in BMI appears to influence the incidence of HS in women and in younger patients.

## Session 9 – Future Directions

Sunday, November 3, 2019

Summaries not available for Session 9

## Poster Listing

Poster	Title	Presenting Author
<b>P1 – Basic and Translational Research</b>		
P1.01	The Role of Interleukin-6 in Anemia Associated with Hidradenitis Suppurativa	Kayla M. Babbush
P1.02	Adalimumab Differentially Regulates MMP Expression Revealing a Potential Wound Healing Phenotype in Patients with Hidradenitis Suppurativa Who Respond to	Yonghao Cao
P1.03	Study of Hidradenitis Suppurativa-Specific Ultrasonographic Signatures	Kenneth Elkin
P1.04	Topical, Systemic and Biologic Therapies in Hidradenitis Suppurativa: Pathogenic Insights by Examining Therapeutic Mechanisms	John W. Frew
P1.05	Novel Variants of MEFV and NOD2 Genes in Familial Hidradenitis Suppurativa	Abdulahdi H. Jfri
P1.06	Genetic Identification of Hidradenitis Suppurativa in Individuals Presenting for Clinical Care Within a Single U.S. Health Care System	Raghu P. Metpally
P1.07	Erythrocyte Sedimentation Rate, C-Reactive Protein, Interleukin-6, and Tumor Necrosis Factor alpha Levels Predict Hidradenitis Suppurativa Severity	Kristen P. Pacific
<b>P2 – Clinical Research Including Quality of Life</b>		
P2.01	Evaluation of Hidradenitis Suppurativa: A Survey of the Hidradenitis Suppurativa Foundation Board of Directors	Joseph W. Fakhoury
P2.02	Genotype-Phenotype Correlation in Inherited Hidradenitis Suppurativa: Stratification of Known Sequence Variants Against Current Phenotype Classifications	John W. Frew
P2.04	A Retrospective Analysis of the Duration of Long-term Oral Antibiotic Use for the Treatment of Hidradenitis Suppurativa	Sarah Kitts
P2.05	Presence of Arthralgia Exacerbates Decreased Quality of Life in Hidradenitis Suppurativa Patients	Michael Kremer
P2.06	The Majority of HS-related Publications Are Found in Internal Medicine and Dermatology Journals, Focus on Etiology and Treatment, and Do Not Report Original Research	Deborah B. Martins
P2.07	Symptoms of Hidradenitis Suppurativa: Beyond the Pain	Shanice A. McKenzie
P2.08	Kuraci: Harnessing Personal Informatics and Big Data to Discern Patterns in Hidradenitis Suppurativa	Jack Molnar
P2.09	Resolution of a Systemic Inflammatory Response with Hematologic Abnormalities in a Patient with Severe Hidradenitis Suppurativa After Treatment with Infliximab	Peyton C. Morss
P2.10	Hidradenitis Suppurativa PROspective Observational REgistry and BioSpecimen RepoSitory (HS PROGRESS)	Maia Paul
P2.11	Use of Hormonal Contraception in Hidradenitis Suppurativa with Peri-menstrual Flares	Monica Rosales Santillan
P2.12	HS Needs Assessment within an online HS Support Group Population	Christine Yannuzzi
P2.13	Impact of Delayed Diagnosis in Patients with Hidradenitis Suppurativa (HS): Real-world Data from the UNITE HS Registry	Alexa B. Kimball
<b>P3 – Clinical Trial Research and Innovation</b>		
P3.01	Efficacy of the Monoclonal anti-C5a Antibody IFX-1 in Patients with Moderate to Severe Hidradenitis Suppurativa: Initial Results of the Phase IIb Shine Study	Evangelos J. Giamarellos-Bourboulis
P3.02	Impact of Adalimumab on Stabilization or Sustained Improvement in Disease Activity in Moderate to Severe Hidradenitis Suppurativa: An Integrated Analysis of PIONEER Trials	Alexa B. Kimball
P3.03	Study Design of a Randomized, Double-Blind, Placebo-Controlled, Phase 2 Study of Avacopan in Patients with Hidradenitis Suppurativa (AURORA Study)	Joslyn S. Kirby
<b>P4 – Comorbidities and Complications</b>		
P4.01	Outcomes of Routine Diabetes Screening for Patients with Hidradenitis Suppurativa	Serene Ahmad
P4.03	Lithium Therapy Associated to Hidradenitis Suppurativa	Ferida Benhadou
P4.04	The Prevalence of Arthropathy in Hidradenitis Suppurativa: a Systematic Review	Michael Kremer
P4.05	Hidradenitis Suppurativa Associated with Galli-Galli Disease: Extending the Link with Dowling-Degos Disease	Maria del Mar Melendez Gonzalez
P4.06	Cutaneous Squamous Cell Carcinoma in Patients with Hidradenitis Suppurativa	Elysia Racanelli
P4.07	Depression Prevalence Prior to and Following Hidradenitis Suppurativa Diagnosis	Kevin T. Savage

Poster	Title	Presenting Author
P4.08	Continuing to Smoke Results in Slower Rates of Disease Remission in HS Patients Receiving TNFi Therapy	Victoria Shanmugam
P4.09	Anti-TNF Induced Lupus in a Patient with Hidradenitis Suppurativa	Dilara Turk
<b>P5 – Epidemiology and Health Services Research</b>		
P5.01	Hidradenitis Suppurativa Odor and Drainage Scale (HODS): A Novel Method for Evaluating Odor and Drainage in Patients with Hidradenitis Suppurativa	Afsaneh Alavi
P5.02	Demographics of HS Patients at Presentation May Lend Insight to the Natural History of HS	Kelsey S. Flood
P5.03	Differences in Dermatologic Care for Hidradenitis Suppurativa Patients with and without Autism Spectrum Disorder	Robert Fort
P5.05	Race-specific Prevalence of Hidradenitis Suppurativa: a Systematic Review	Muskaan Sachdeva
P5.06	Assessing Familial Risk in Patients with Hidradenitis Suppurativa	Christopher Sayed
P5.07	Characterization of 560 Patients with Hidradenitis Suppurativa Seen in a Subspecialty Hidradenitis Suppurativa Clinic	Christopher Sayed
P5.08	A Survey of Clinicians Regarding Preferred Severity Assessment Tools for Hidradenitis Suppurativa	Rob L. Shaver
P5.09	Opioid and Benzodiazepine Co-Use in Privately Insured Hidradenitis Suppurativa Patients	Kassidy Shumaker
<b>P6 – Medical Treatments and Wound Care</b>		
P6.01	Excellent Response to Treatment in Hidradenitis Suppurativa Patient Treated with Guselkumab	Susanne Gulliver
P6.02	Remission of Severe Hidradenitis Suppurativa and Pyoderma Gangrenosum with Targeted Antibiotherapy	Aude S. Nassif
P6.03	Short-lived Efficacy of Ertapenem for Refractory Hidradenitis Suppurativa	Avigdor Nosrati
P6.04	Increased Doses of Adalimumab are Safe and Associated with Improved Clinical Outcomes in Hidradenitis Suppurativa	Jazzmin C. Williams
<b>P7 – Surgical and Interventional Treatments</b>		
P7.01	Carbon Dioxide Laser Excision for Hidradenitis Suppurativa Patients: a Comparison of Patients with Regards to History of Diabetes Mellitus and Smoking Status	Taylor L. Braunberger

## Poster Abstracts

### P1 Basic and Translational Research

**P1.01**

#### **The Role of Interleukin-6 in Anemia Associated with Hidradenitis Suppurativa**

*Basic and  
Translational Research*

Kayla M. Babbush, Mondana H. Ghias, Avigdor Nosrati, Morayma Reyes Gil, Mark H. Chaitowitz, H. Dean Hosgood, Steven R. Cohen  
Albert Einstein College of Medicine, Bronx, NY, USA

**Introduction:** It is generally accepted that there is a high prevalence of anemia associated with hidradenitis suppurativa (HS). We recently reported a positive correlation between serum hepcidin, disease severity, and degree of anemia. Our findings suggest chronic systemic inflammation may induce anemia of chronic disease (ACD) in HS. Upregulation of inflammatory cytokines, namely interleukin-6 (IL-6), has been implicated in ACD. IL-6-mediated inflammation induces ferritin and hepcidin production, resulting in increased iron stores and limited iron transport in the circulation. Despite evidence of elevated IL-6 in both ACD and HS, IL-6 levels in patients with comorbid HS and ACD are not well defined.

**Methods:** We conducted an IRB-approved retrospective chart review of 98 HS patients to investigate the relationship between IL-6, anemia, and disease severity. All patients over 18 years old at the Montefiore/Einstein HS Treatment Center with documented serum IL-6 levels between February and July 2019 were enrolled in the study. Anemia was defined as hemoglobin <12.0 (females) or <13.0 (males). Demographic and clinical differences between anemic and non-anemic patients were tested by chi-squared and Mann-Whitney tests.

**Results:** Among the 98 patients meeting our inclusion criteria, the mean age was 37.6±12.1; mean HS-PGA was 3.02±1.35; 72 were female; and, 41 (41.8%) were anemic. Anemic and non-anemic patients were similar in age (37.7 vs. 37.6, p=0.94) and sex (73% vs. 74% female, p=0.95). Anemic patients had a higher HS-PGA relative to non-anemic patients (3.73 vs. 2.51, p<0.0001). Notably, anemic patients had significantly higher serum IL-6 levels compared to non-anemic patients (median [IQR]) (22.7 [4.56, 47.9] vs. 4.31 [2.54, 7.24], p<0.0001).

**Conclusion:** This study demonstrates an association between elevated IL-6 levels and anemia in hidradenitis suppurativa. In addition to functioning as a potential biomarker of disease severity, IL-6 may contribute to the systemic inflammation that leads to ACD in anemic HS patients.

#### **Learning Objectives:**

1. IL-6 values are significantly elevated in anemic HS patients compared to non-anemic.
2. Elevated IL-6 in severe HS may explain the greater prevalence of anemia observed in this population, due to its role in the pathogenesis of ACD.
3. IL-6 functions as a potential predictor of ACD in anemic HS patients, which may guide appropriate therapy for this cohort.

#### **Takeaway Message:**

The significant elevation of serum IL-6 in anemic HS patients suggests this inflammatory cytokine may play a role in the development of ACD in this patient population.

**P1.02**

#### **Adalimumab Differentially Regulates MMP Expression Revealing a Potential Wound Healing Phenotype in Patients with Hidradenitis Suppurativa Who Respond to**

*Basic and  
Translational Research*

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**Introduction:** Adalimumab is the first approved treatment for moderate to severe hidradenitis suppurativa (HS). However, the mechanism of action of adalimumab in HS remain poorly understood. We have previously demonstrated a distinct wound healing profile, including inhibition of matrix metalloproteinase (MMP) signaling, for inflammatory macrophages exposed to TNF-adalimumab complexes *in vitro*. MMPs play a pivotal role in regulating extracellular matrix degradation and deposition for wound epithelialization. Dysregulated MMP expression is a characteristic of chronic wound formation and impaired wound healing.

**Methods & Results:** To examine if a systemic wound healing phenotype correlates with adalimumab response at week 12, circulating MMP expression was examined for HS patients in PIONEER clinical trials based on more stringent criteria than outlined in the study protocol. Baseline and week 12 plasma samples from 25 super-responders (> 75% improvement in AN

count and no new abscess or fistula counts) and 25 non-responders (< 35% improvement AN count), both having at least 5 baseline AN count. Samples were evaluated for MMP and tissue inhibitor of metalloproteinase (TIMP) levels by multiplex technologies. Baseline MMP and TIMP levels were similar between responders and non-responders. MMP-1 and MMP-9, thought to impair wound healing upon prolonged inflammation, were significantly decreased in responders at week 12. In contrast, plasma TIMP-2, an inhibitor of inflammatory MMP activity, and MMP-13, a known inducer of tissue remodeling, trended higher in responders at 12 weeks. Collectively, these changes suggest that adalimumab responder HS patients demonstrate a shift from a chronic wound profile to one of wound healing.

**Conclusions:** These data demonstrate that adalimumab not only differentially regulates MMP expression in HS patients responding to the therapy but potentially induces a transition to a wound healing profile. Additional evaluation of wound healing parameters will be performed to validate the effects of adalimumab in the SHARPS clinical trial.

**Learning Objectives:**

1. Understand the mechanism of action of adalimumab in improved HS wound healing;
2. Study the expression of matrix metalloproteinases in adalimumab treated HS patients;
3. To examine if MMP expression correlates to adalimumab response as well as to improved wound healing.

**Takeaway Message:**

Adalimumab differentially regulates matrix metalloproteinases expression, suggesting that a wound healing profile can be induced in patients with hidradenitis suppurativa.

<b>P1.03</b>	<b>Study of Hidradenitis Suppurativa-Specific Ultrasonographic Signatures</b>	<i>Basic and Translational Research</i>
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The utility of ultrasound (US) imaging of hidradenitis suppurativa (HS) lesions is well documented. Among imaging modalities, high frequency ultrasound imaging (HFUSI) is the most used in the clinic and is able to aid in the confirmation of the diagnosis, staging, and improvement of clinical management and treatment. While imaging holds great potential in the management of HS patients, there is still a great need for precise detection of the full extent of HS lesions. Therefore, characterization of HS-specific ultrasonographic image features will be helpful for future, novel development or application of imaging modalities. The primary aim of this retrospective chart review was to develop an HS-specific atlas of US image patterns. The second primary objective was to assess the features of the US image patterns. The present study is a retrospective, observational chart review that evaluated US images of HS lesions in patients from a single Michigan dermatology clinic. A total of 400 images of HS lesions are expected to be collected for compilation into the atlas. It is anticipated that 75% of the collected images are of Stage I or Stage II lesions while 25% are Stage III. A collection of US images are divided into three groups: 1) No HS present, 2) HS nodules and abscesses, and 3) HS sinus tracts. Within groups 2 and 3, other features of HS including retained hairs and potential dermo-epidermal junction rupture are documented. An enhanced understanding of this technology has been shown to facilitate more precise staging of HS lesions and improved clinical management. It may also contribute to more accurate surgical excision of HS lesions, decreased recurrence, and, consequently, improve the quality of life in HS patients.

**Learning Objectives:**

1. Create an atlas of HS-specific US Images
2. Identify ultrasonographic features of nodules/abscesses and sinus tracts in HS lesions
3. Evaluate novel ultrasonographic features potentially present in HS lesions

**Takeaway Message:**

HS, which is increasingly prevalent in the United States, is among the most far-reaching, disabling skin diseases and is a diagnostic and surgical challenge. US imaging has the ability to drastically improve patient care in preoperative planning, in clinical management, and merits further attention. Characterization of ultrasonographic features may advance novel application of existing imaging modalities or development of novel modalities to precisely detect the full extent of HS lesions.

<b>P1.04</b>	<b>Topical, Systemic and Biologic Therapies in Hidradenitis Suppurativa: Pathogenic Insights by Examining Therapeutic Mechanisms</b>	<i>Basic and Translational Research</i>
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Hidradenitis Suppurativa is a chronic inflammatory disease of the skin, manifesting in chronic, recurrent painful pustules, nodules, boils and purulent draining abscesses. Our current understanding of the pathogenesis of the disease is incomplete. This review aims to identify available treatment options in HS and discuss the pharmacological mechanisms through which such agents function. Identifying common pathways may inform our understanding of the pathogenesis of HS as well as identify future therapeutic targets.

The pharmacological mechanisms implicated in topical therapies, antibiotic, hormonal, systemic immunomodulatory and biologic therapies for HS are discussed. Significant differences exist between agents and implicated pathways in therapy for mild and severe disease. This is an expression of the possible dichotomy in inflammatory pathways (and treatment



responses) in HS.

Studies involving monoclonal antibodies provide the greatest insight into what these specific mechanisms may be. Their variable levels of clinical efficacy compared with placebo bolsters the suggestion that differential inflammatory pathways may be involved in different presentations and severity of disease. NF- $\kappa$ B, TNF- $\alpha$  and other innate immune mechanisms are strongly represented in treatments which are effective in mild to moderate disease in the absence of scarring or draining fistulae, however complex feed-forward mechanisms in severe disease respond to IL-1 inhibition but are less likely to respond to innate immune inhibition (through NF- $\kappa$ B or TNF- $\alpha$ ) alone. It is unclear if IL-17 inhibition will parallel TNF- $\alpha$  or IL-1 inhibition in effect, however it is plausible that small molecule targets (JAK1 and PDE4) may provide effective new strategies for treatment of HS.

#### Learning Objectives:

- To examine potential pathogenic mechanisms in HS through the therapeutic mechanisms of currently used treatments.

#### Takeaway Message:

Significant differences exist between agents and implicated pathways in therapy for mild and severe disease. This is an expression of the possible dichotomy in inflammatory pathways (and treatment responses) in HS.

**P1.05**

### Novel Variants of MEFV and NOD2 Genes in Familial Hidradenitis Suppurativa

*Basic and  
Translational Research*

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**Background:** Patients with Hidradenitis Suppurativa (HS) frequently report a positive family history, strongly suggesting a genetic component to this disease. Familial HS have been reported as monogenic and polygenic.

**Objective:** To report the results of blood genetic testing on a family with three members afflicted with HS.

**Methods:** All 3 family members had blood genetic testing with a gene panel for periodic fever/autoinflammatory disorders that included the following genes: *ADA2, AP1S3, CARD14, ELANE, HAX1, IL10, IL10RB, IL1RN, IL36RN, LPIN2, MEFV, MVK, NCSTN, NLRC4, NLRP1, NLRP12, NLRP3, NLRP7, NOD2, PLCG2, PSEN1, PSENEN, PSMB8, PSTPIP1, RBCK1, SH3BP2, SLC29A3, TMEM173, TNFRSF11A, TNFRSF1A*.

**Results:** This Armenian-Canadian family included the 66 years old father with HS Hurley stage II and asthma who had 3 mutations [*MEFV* autosomal recessive (*c.2177T>C*), *NOD2* autosomal dominant (*c.2923C*) and *PLCG2* autosomal dominant (*c.2948C>T*)], a 20 year old daughter with acne, HS Hurley stage I with follicular phenotype [*MEFV* autosomal recessive (*c.2177T>C*)] and a 22 year old son with HS Hurley stage I [*NOD2* autosomal dominant (*c.2923C*)].

**Conclusion:** We report a new variation of known genes reported in HS. We recommend genetic testing with a periodic fever/autoinflammatory disorders gene panel of patients with a strong family history of HS.

#### Learning Objectives:

1. To investigate the genetic mutations in patients with a strong family history of HS.
2. To provide novel variation of known genes in patients familial HS.
3. To demonstrate the clinical phenotypes of genetic mutations in patients with a strong family history of HS.

#### Takeaway Message:

HS can be genetically inherited with the majority of reported gene mutations involve the *notch* signaling and inflammasome pathways. Testing for gene panel of periodic fever/autoinflammatory disorders should be considered in patients with a strong family history of HS.

**P1.06**

### Genetic Identification of Hidradenitis Suppurativa in Individuals Presenting for Clinical Care Within a Single U.S. Health Care System

*Basic and  
Translational Research*

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Hidradenitis Suppurativa (HS) is a painful skin disorder that has a significant impact on one's quality of life and often goes

undiagnosed or misdiagnosed. Mutations in  $\gamma$ -secretase complex and *PSTPIP1* genes account for the majority of known familial and sporadic HS cases. We assessed the prevalence and clinical impact of genomic variants associated with HS in 92,455 DiscovEHR cohort participants with available whole exome sequencing (WES) and were enrolled through the Geisinger's MyCode community health initiative.

**Methods:** WES and variant quality control procedure as described in Dewey et al 2016. Data Integration and mining of longitudinal electronic health records (EHR) to assess the relative incidence of comorbidities.

**Results:** There were 1006 (829 females (F) & 177 males (M)) participants aged 14 to 89 years (median 47 years) with HS (L73.2), indicating 1.08% prevalence (1.48% F & 0.48% M) among the individuals presenting for clinical care. Sixteen variants were identified among 71 individuals in known HS genes. Molecularly the estimated HS variant prevalence was 1:1300 in DiscovEHR cohort. 23% of HS variant carriers had HS diagnosis in EHR. Among the variant positive participants (n =54) without HS diagnosis, 40% had HS associated diagnostics codes.

HS is known to be associated with several comorbidities and in this study, the correlation was seen with hypertension (Odds Ratio (OR):3.4), BMI >30 (OR:3.1), smoking (OR:3.2), metabolic\_disorders (OR:2.8). There were significant associations of mental disorders including major depressive-disorder (OR:2.6), schizophrenia (OR:4.1), personality-disorder (OR:3.9), bipolar-disorder (OR:3.1) and mood-disorder (OR:3.0).

**Conclusions:** Population scale genomic screening of patients with longitudinal EHR identified a series of HS gene variants in a defined group of HS patients that can now be used to augment its clinical diagnosis particularly in ambiguous cases. This study demonstrates a personalized medicine application of high-throughput sequencing in the field of skin disorders.

#### Learning Objectives:

1. Application of Longitudinal Electronic Health Record data for the HS comorbidity assessment
2. Applications of high-throughput sequencing in the field of skin disorders especially to augment HS clinical diagnosis, particularly in ambiguous cases.

#### Takeaway Message:

This data highlights the comorbidity burden associated with HS and the HS germline alterations that belie these relationships, thereby demonstrating a personalized medicine application of high-throughput sequencing in the field of skin disorders

P1.07

### Erythrocyte Sedimentation Rate, C-Reactive Protein, Interleukin-6, and Tumor Necrosis Factor alpha Levels Predict Hidradenitis Suppurativa Severity

Basic and  
Translational Research

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Hidradenitis suppurativa (HS) is a chronic, recurrent skin disorder characterized by painful nodules, pustules, purulent abscesses, and sinus tracts ("tunnels") of intertriginous areas leading to progressive disability in advanced disease. Exaggerated inflammatory activity appears central to its pathogenesis. Previous studies suggest the acute phase reactants, erythrocyte sedimentation rate (ESR), C-reactive protein (CRP), and interleukin-6 (IL-6) vary with severity of disease. Tumor necrosis factor alpha (TNF- $\alpha$ ), a pro-inflammatory cytokine, is also implicated; its inhibition has been shown to diminish disease burden. We investigated the relationship between these inflammatory markers and HS severity.

This study included 36 new patients at a dedicated HS Treatment Center. Disease activity was classified according to the HS-Physician Global Assessment (HS-PGA) scale. Blood samples obtained prior to initiation of therapy were analyzed for ESR, CRP, IL-6 and TNF- $\alpha$  levels. ESR, CRP, and IL-6 were each positively correlated with HS-PGA score ( $r=0.727$ ,  $0.7137$ , and  $0.7236$ , respectively), while TNF was correlated to a lesser extent ( $r=0.289$ ). This was reflected by the best predictive ordinal logistic model, in which ESR, CRP, and IL-6 were included, but not TNF. When performing univariate analysis to more accurately simulate the clinic setting, we found that for every 1 unit increase in ESR, CRP, and IL-6, each patient was, respectively, 1.05, 2.01, and 1.23 times more likely to have severe disease (HS-PGA 3 through 5) than mild (HS-PGA 1 and 2).

Though various scales exist to stratify HS disease severity, few objective measures reliably correlate with clinical status. Our study reveals ESR, CRP, IL-6, and, to a lesser extent, TNF- $\alpha$  levels reflect HS severity. Though limited by sample size and single-timepoint data collection, these results invite further investigations to distill our understanding of serum inflammatory markers in HS.

#### Learning Objectives:

1. Serum inflammatory markers ESR, CRP, IL6, and TNF-alpha are elevated in HS.
2. Serum levels of ESR, CRP, IL6, and, to a lesser extent TNF-alpha, correlate with increasing severity of HS.
3. These inflammatory markers may be useful as objective metrics in quantifying HS severity.

#### Takeaway Message:

Serum levels of ESR, CRP, IL-6, and, to a lesser extent, TNF- $\alpha$  correlate to clinical severity of HS.

## P2 Clinical Research Including Quality of Life

P2.01

### Evaluation of Hidradenitis Suppurativa: A Survey of the Hidradenitis Suppurativa Foundation Board of Directors

*Clinical Research  
Including Quality of  
Life*

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**Background:** Hidradenitis Suppurativa (HS) is a chronic, recurrent inflammatory disease of the apocrine gland-bearing areas of the body. Previous studies have described criteria for diagnosis, disease evaluation, and assessing treatment outcomes. While these tools are essential in the development and conduction of clinical trials in HS, they have limited utility in the assessment of HS patients during everyday clinical practice.

**Methods:** To determine which elements of the history and physical exam (H/PE) are most critical when assessing HS patients during initial and follow-up visits, we surveyed the HS Foundation Board of Directors, which is comprised of 15 experts and leaders in the field of HS.

**Results:** Eight total responses were received (53% response rate). The most common H/PE components assessed on initial evaluation were tobacco use (100% of respondents), family history of HS (87.5%), associated diseases including autoimmune GI diseases (87.5%), pilonidal disease (75%), arthropathies (63%), hormonal imbalance (63%), acne/acne conglobata (63%), and depression (63%), triggers such as menstrual cycles (100%), activity (75%), and diet (63%), and specifying the Hurley stage (75%). The most common H/PE components assessed on follow-up evaluation were frequency (75%), severity (63%), location (63%), and triggers (63%) of flares, severity of pain (75%), quantity (63%) and location (63%) of drainage, interference with daily activities (87.5%), and determining Hurley stage (75%) and lesion counts (75%).

**Discussion:** Using these results, we have developed an instrument to optimally assess HS patients during everyday clinical practice (Table 1).

**Table 1: H/PE Elements Assessed by a Majority of Survey Respondents**

History – Initial visit	History – Follow-up visit
Tobacco use	
Family history of HS	Flares:
	-Frequency
History of:	-Severity
-Autoimmune GI disease	-Location
-Pilonidal disease	-Triggers
-Arthropathies	
-Hormonal imbalance	Pain Severity
-Acne/acne conglobata	
-Depression	Drainage:
	-Quantity/dressing changes
Triggers:	-Location
-menstrual cycle	
-activity	Interference with Daily Activities
-diet	

Physical Exam – Initial visit	Physical Exam – Follow-up visit
-Hurley Stage	-Hurley Stage
-Lesion Count (abscesses, nodules, sinus tracts, scars for each involved area)	-Lesion Count (abscesses, nodules, sinus tracts, scars for each involved area)

#### Learning Objectives:

1. To learn what elements of the history/physical exam (H/PE) are most critical when assessing HS patients during the initial clinic visit.
2. To learn what elements of the H/PE are most critical when assessing HS patients during follow-up clinic visits.
3. To take away a H/PE instrument that can be used to optimally assess HS patients during everyday clinical practice.

#### Takeaway Message:

A detailed elicitation of medical and social history is critical for mitigating comorbidities and disease flares, and disease severity should be evaluated through both a surgical assessment tool as well as a medical assessment capable of measuring improvement.

<b>P2.02</b>	<b>Genotype-Phenotype Correlation in Inherited Hidradenitis Suppurativa: Stratification of Known Sequence Variants Against Current Phenotype Classifications</b>	<i>Clinical Research Including Quality of Life</i>
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**Introduction:** Genotype phenotype correlation is a statistical relationship that predicts correlation between the presence of a physical trait with a given mutation or group of similar mutations. It can provide important information regarding the pathogenesis of a disease and provide information regarding predictions for the future progression, severity or activity of a disease. The identification of such indicators in Hidradenitis Suppurativa would be valuable for patients and clinicians alike given the lack of biomarkers or clinical predictors of disease activity. This study aimed to systematically identify all published sequence variants, along with corresponding clinical data in cases of sporadic and familial hidradenitis suppurativa; identify the clinical phenotypes of these reported cases; assess the inter-rater reliability of hidradenitis suppurativa clinical phenotypes; and assess genotype-phenotype correlation.

**Methods and Results:** Published sequence variants in hidradenitis suppurativa were identified. Three independent experts phenotypically classified each case using four published phenotype classifications. Inter-rater reliability was calculated using Cohen's kappa statistic with 95% confidence intervals. Genotype-Phenotype correlation was evaluated using Spearman correlation coefficient. Covariates included gene, mutation type, site of protein alteration and the effect upon downstream notch signaling (increased, decreased or no change). Cases assigned the LC1 phenotype were associated with the Regular phenotype ( $c^2=41.289$ ,  $p<0.0001$ ) and the Typical phenotype ( $c^2=29.013$ ,  $p<0.0001$ ). Cohen's kappa was highest for Van der Zee (0.815), followed by Martorell (0.813), Naasan (0.774) and Canoui (0.435) classifications. No significant genotype-phenotype correlations were found regarding gene, protein alteration or impact upon notch signaling.

**Conclusions:** These findings may be influenced by selection and publication bias or the underlying assumption that HS is a monogenic disorder. The poor inter-rater reliability of existing phenotype measures suggests limited utility of existing measures. Further investigations into the correlation of clinical phenotypes with inflammatory or other biomarkers may aid in prognostic efforts for this disease.

#### Learning Objectives:

To appreciate variable inter-rater reliability between phenotype classifications in HS and examine exploratory genotype-phenotype correlations

#### Takeaway Message:

No significant correlation between phenotype classification in four separate classification schema and gene, mutation type, or impact upon Notch signaling. The lack of genotype-phenotype correlation in HS is suggestive that the underlying assumption of inherited HS as a monogenic disorder may need revision.

<b>P2.04</b>	<b>A Retrospective Analysis of the Duration of Long-term Oral Antibiotic Use for the Treatment of Hidradenitis Suppurativa</b>	<i>Clinical Research Including Quality of Life</i>
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**Introduction:** Hidradenitis suppurativa (HS) is a chronic relapsing inflammatory skin condition that results in painful inflammatory lesions, often in intertriginous body sites. Oral antibiotics are a mainstay of treatment; however, the duration

of use in clinical studies is typically 12-16 weeks. It is possible that longer durations are used in clinical care. This study aimed to investigate the duration of long-term oral antibiotic use for the treatment of HS.

**Methods/Results:** The MarketScan® Commercial Claims and Encounters database was queried for patients with a diagnosis of HS from January 1, 2005 through December 31, 2014 using ICD-9 codes. Antibiotic use and duration was determined using National Drug Codes. Courses  $\geq 30$  days were included. Overall, 9,293 people with HS were identified; partial results are reported here on 1,470 HS patients with 1,725 total drug courses. The mean duration of treatment was 44 days. The majority of courses (55.7% [960/1725]) were 30 days or longer, but few were longer than 3 months (4% [n=41]) or 6 months (.5% [n=5]). Tetracyclines were the most frequently prescribed (45% [n=429]), followed by cephalosporins and other antibiotics (i.e. tri-sulfamethoxazole, clindamycin, rifampin, and dapsone). Single agent therapy was more common than combination therapy (3% [n=26]).

**Conclusion:** Our results show that the majority of oral antibiotic courses have a duration less than 90 days consistent with antibiotic stewardship found in guidelines for other dermatologic conditions. Limitations of the study include lack of data regarding patient adherence or information on HS severity and clinical outcomes. Additionally, the cumulative effect of courses  $< 30$  days was not assessed. Further research is needed to investigate the clinical outcomes associated with length of use, determine the optimal duration, and assess effects on antibiotic resistance.

#### Learning Objectives:

1. Examine the duration of long-term oral antibiotic use in hidradenitis suppurativa
2. Compare the duration of use to current guidelines
3. Investigate the use of combination antibiotics in long-term treatment of hidradenitis suppurativa

#### Takeaway Message:

The majority of longterm oral antibiotic courses do not exceed one month and few courses exceed three months.

**P2.05**

### Presence of Arthralgia Exacerbates Decreased Quality of Life in Hidradenitis Suppurativa Patients

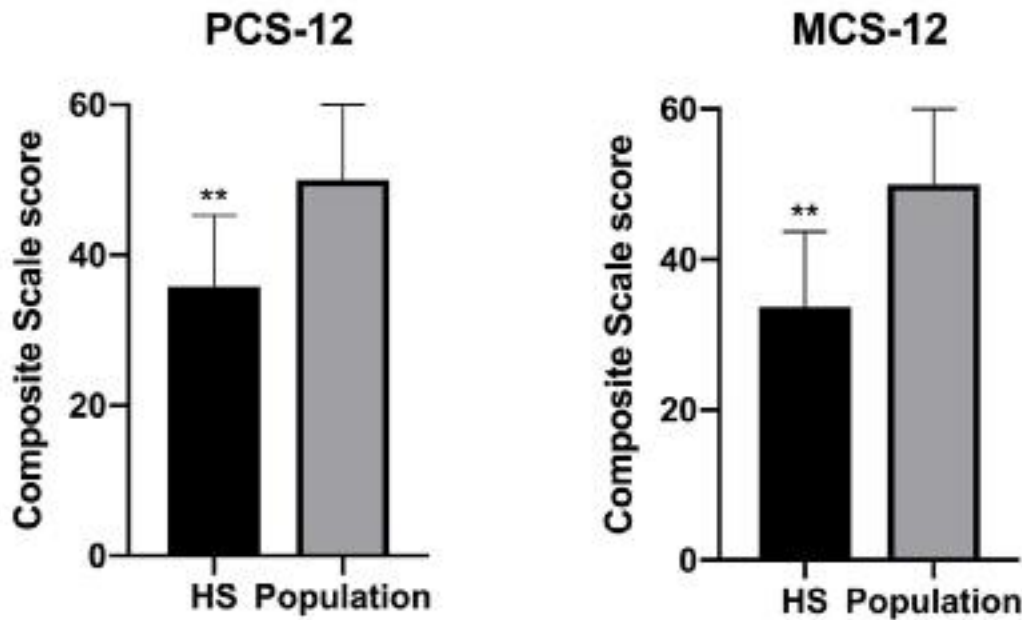
*Clinical Research  
Including Quality of  
Life*

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Hidradenitis suppurativa (HS) is a skin condition characterized by chronic follicular occlusion that can present with recurrent nodules, inflamed abscesses, and scarring. Previous research has shown that these patients have a decreased quality of life due to painful flare-ups and associated malodorous discharge. In addition to its psychosocial effects, hidradenitis suppurativa has recently been associated with joint pathology. In this study, we distributed a survey consisting of the Short Form 12 Health Survey, used for assessing health outcomes, along with additional questions about joint pain to an online hidradenitis suppurativa support group in order to understand the effect of comorbid arthralgia on quality of life in this disease. Of 1083 group members who viewed the survey posting, 228 participants began the survey, and 209 (19.3%) completed it. Survey respondents were predominantly female with a mean age of 37.2 years. The respondents in this study had significantly reduced PCS-12 (35.8 vs 50,  $p < 0.001$ ) and MCS-12 (33.7 vs 50,  $p < 0.001$ ) scores compared to the general population. Additionally, patients reporting severe arthralgia had significantly lower PCS-12 (32.3 vs 36.5;  $p < 0.05$ ) and MCS-12 (33.3 vs 40.5;  $p < 0.001$ ) scores compared to those with mild arthralgia. Despite the effect of arthralgia on quality of life, only 11% reported having been asked about joint pain by their dermatologist. Questions concerning associated arthralgia and diminished quality of life may be helpful during clinician assessment and treatment of HS patients.





#### Learning Objectives:

1. This study reinforces the knowledge that HS patients on average have a decreased quality of life using a well-validated survey, the Short Form 12 Health Survey.
2. Among those with HS, survey respondents with moderate to severe joint pain frequency had significantly reduced physical and mental health composite scores as compared to those with little to no pain.
3. Only 11% of survey respondents reported having been asked about joint pain by their dermatologist.

#### Takeaway Message:

Questions concerning associated arthralgia and diminished quality of life may be helpful during clinician assessment and treatment of HS patients.

**P2.06**

#### **The Majority of HS-related Publications Are Found in Internal Medicine and Dermatology Journals, Focus on Etiology and Treatment, and Do Not Report Original Research**

*Clinical Research  
Including Quality of  
Life*

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Hidradenitis suppurativa (HS) disease mechanisms are poorly understood, thus limiting development of novel effective therapies. Although multiple medical specialties manage patients with HS, the extent of ongoing research and education about HS across fields is unknown. We aimed to determine the number of HS-related publications across medical specialties in order to measure the extent of awareness, education and ongoing research about HS across medical specialties caring for HS patients.

All HS-related publications from January 1, 2000 to July 4, 2019 were ascertained from EMBASE using the following search terms: *hidradenitis suppurativa*, *acne inversa*, *apocrine acne*, *Fox-den disease*, *hidradenitis axillaris*, *pyoderma significans fistulans*, *Velpeau's disease*, and *Verneuil's disease*. Publications that were non-English or duplicates were removed. The remaining publications were categorized by specialty, topic and type.

We identified 2777 HS-related publications reported across journals in 37 specialties. Almost half (45.3%) were published from January 1, 2019 to July 4, 2019. The majority of publications were published in internal medicine (61.6%, n=1981), dermatology (14.7%, n=473), plastic surgery (3.6%, n=117), and gastroenterology (3.1%, n= 102) journals. 2722 (98%) publications could be categorized by article type and topic. 26.4% report original research (total n=719; internal medicine 54.8%, n=394; dermatology 14.5%, n=104; plastic surgery 3.5%, n=25), while 73.6% were reviews (total n=2002; internal medicine 66.4%, n=1329; dermatology 12%, n=241; plastic surgery 3.9%, n=79). Since 2015, 20.5% of articles published across all specialties were original research (n=536). Systemic treatment (26.3%), pathophysiology (12.6%), surgical therapy (11.9%), and clinical course (11.9%) comprised the most common topics.

HS-related publications are most commonly found in the internal medicine and dermatology literature, and most often focus on disease etiology and treatment. Although number of HS-related publications per year is increasing, only 26.4% of all publications since 2000 report original research. More original HS-related research is needed.

#### Learning Objectives:

This study aims to understand the breadth of literature published on HS. This study illuminates the types of publications that



exist on HS within different specialties, analyzing topic and type of article. By understanding the literature available on HS, we are able to better appreciate the need for more original research across sub-specialties that treat HS to improve delivery of care.

#### Takeaway Message:

Although HS-related publications are on the rise, this study highlights the need for more original research in HS across specialties treating HS patients in order to improve multidisciplinary management of this debilitating disease.

**P2.07**

### **Symptoms of Hidradenitis Suppurativa: Beyond the Pain**

*Clinical Research  
Including Quality of  
Life*

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**Introduction:** The quality of life (QOL) of patients with HS is greatly impaired by the physical, mental, and social aspects of the disease. Efforts are underway to develop HS-specific patient-reported outcome questionnaires. The aim of this study was to investigate the symptoms that patients with HS suffer from (beyond just pain), and HS disease impact.

**Methods and Results:** A retrospective analysis was done on patients who presented to UCLA HS clinic between August 2009 to March 2018 and completed both the Dermatology Life Quality Index (DLQI, score range 0-30) and a numeric rating scale (0-10) asking about the severity of HS-related symptoms and disease impact. In this cohort of 145 patients, 64.8% were women, 35.2% were men, mean age was 32.7 years old (range 15 to 65), 32.4% were Hurley I, 49.7% were Hurley II, and 17.9% were Hurley III. Mean DLQI was 13.9. Hurley stage III patients had significantly higher DLQI scores (mean 20.2) compared to Hurley stages I (11.3) and II (13.9) ( $p=0.0004$ ). When asked about HS-related symptoms, more than half of the patients endorsed irritation, drainage, pain, itching, bleeding, odor, burning, and sweating; and more than half endorsed disease impact items such as self-consciousness, embarrassment, disability, depression, difficulty shaving, feeling reclusive, and problems moving their arms. The mean severity scores (0-10) were highest for irritation (6.76), self-consciousness (6.26), drainage (6.14), pain (6.01), embarrassment (5.98), disability (5.41), and itching (5.03).

**Conclusions:** Patients with HS suffer many symptoms beyond pain, and the disease greatly impacts both their emotional and physical well-being. Over half of our study patients endorsed symptoms that are not included on the DLQI, such as drainage, odor, sweating, and difficulty shaving. HS patients would benefit from a validated patient centered questionnaire to measure the symptom severity and disease impact of HS.

#### Learning Objectives:

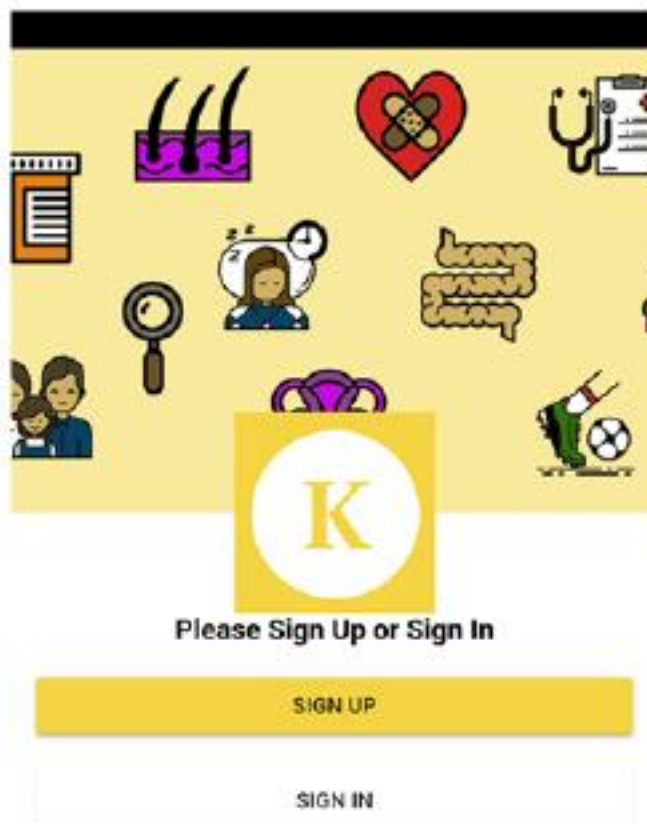
1. Describe symptoms associated with HS
2. Understand the disease impact of HS on lives of patients
3. Recognize the severity of the mental and emotional impact of HS in addition to the physical disease burden and disability

#### Takeaway Message:

There is a need for a validated and more comprehensive disease specific assessment of the physical symptoms, social and psychological impact, and impairment of activities of daily living for patients with HS.

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The factors that cause Hidradenitis Suppurativa (HS) have not yet been fully elucidated because they appear to be many and disparate. This is a problem much larger than identifying a single gene, pathogen, or food item. Innumerable factors increase the likelihood of developing HS as well as the severity of the disease. This ambiguity has led to the suggestion of many ultimate causes. Further, the cost and barriers to human subjects research (both bureaucratic and logistical) often limit the sample size. We have developed an app called *Kuraci*, which allows HS patients to monitor factors in their health, diet, and lifestyle which may increase or decrease the frequency or severity of outbreaks. Users are also able to share their data and participate in the search for answers. We propose that with a large enough sample size and a wealth of data, it will be possible to discern patterns that influence disease timing and severity.



#### Learning Objectives:

1. How can HS patients participate in research that directly benefits them?
2. How can we harness big data to answer questions about HS?
3. What are the factors that most strongly impact HS?

#### Takeaway Message:

Many HS patients believe that scientists and physicians are not listening to them. By allowing HS patients to participate in research that directly benefits them, we may be able to re-engage patients who have stopped seeking medical advice and have turned to dubious at-home remedies. Further, the data generated by HS patients who monitor their condition can be used to find associations with flare frequency and timing.

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**Introduction:** A systemic inflammatory response associated with hematologic abnormalities may be observed in people diagnosed with Hidradenitis Suppurativa (HS).<sup>1</sup> Biologic therapy has altered the therapeutic landscape of HS, offering

meaningful symptom improvement in many patients.<sup>2</sup> However, the effect of anti-inflammatory treatment on these lab abnormalities is not well characterized. Here we present a severe HS patient who demonstrated normalization of blood dyscrasias following infliximab treatment.

**Case Report:** An otherwise healthy 31-year-old Caucasian male with a ten year history of HS complicated by multiple blood dyscrasias presented to our subspecialty HS clinic. His prior HS course was complex; while on adalimumab significant leukocytosis raised concerns for infection leading to treatment discontinuation. Weight loss (28 pounds in one year) and blood dyscrasias prompted an oncology workup that was unremarkable, ultimately leading to referral to our clinic. On presentation he was Hurley stage III and had a hidradenitis suppurativa physician global assessment of very severe. Examination of his buttocks revealed diffuse indurated plaques and >10 abscesses. Notable labs at baseline included microcytic anemia (Hgb=10.4, nl=13.7-17.5), leukocytosis (WBC=24.3, nl=4.0-10.0), and thrombocytosis (Plt=556, nl=150-400). After 5 infliximab infusions (5mg/kg at weeks 0, 2, and 6, followed by maintenance dosing every 6 weeks), with concomitant methotrexate therapy, normalization of his laboratory abnormalities occurred (Hgb=14.3, WBC=14.2, Plt=276). He also experienced dramatic cutaneous improvement (HS-PGA: minimal), increased appetite, weight gain, and overall improved quality of life.

**Discussion:** The systemic inflammatory response of HS in those with severe disease may cause leukocytosis, anemia, thrombocytosis, and weight loss severe enough to prompt hematologic and oncologic investigation by clinicians unfamiliar with its disease course. Infliximab is an important therapeutic option for HS patients with concerning blood dyscrasias in whom other etiologies have been ruled out. Further investigation on the effect of biologics on deranged labs in HS is warranted.

#### Learning Objectives:

1. Characterize the effect of the systemic inflammatory response seen in HS patients on blood counts
2. Describe a case of multiple blood dyscrasias in an HS patient normalized with infliximab treatment
3. Explore the need for more research regarding the benefit of biologics in the treatment of HS

#### Takeaway Message:

1. Treatment of HS with Infliximab resulted in near total normalization of laboratory abnormalities experienced by a severe HS patient
2. Benefit of biologics in HS may manifest beyond cutaneous improvement

#### Bibliography

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All normal values from home institution reference ranges

**P2.10**

### **Hidradenitis Suppurativa PROspective Observational REgistry and BioSpecimen RepoSitory (HS PROGRESS)**

*Clinical Research  
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Despite an estimated prevalence of 1% in Western populations and significant quality of life impairment, Hidradenitis Suppurativa (HS) is understudied and underfunded. In order to accelerate clinical and translational research in HS, we developed the **Hidradenitis Suppurativa PROspective Observational REgistry and BioSpecimen RepoSitory (HS PROGRESS)**, a longitudinal, multi-institutional dataset and biospecimen repository of diverse and rigorously-phenotyped North American HS patients.

The primary objective of HS PROGRESS is to establish and follow a novel cohort of comprehensively-phenotyped HS patients in all stages of disease in order to understand clinical characteristics, clinical course, treatment effects, and psychosocial impacts of disease. The second objective is to establish a biospecimen repository from these rigorously-phenotyped HS patients to facilitate studies characterizing the etiology and pathophysiology of disease. A third objective is to establish a cohort of consented HS patients who are interested in being contacted for future studies.

Individuals with physician-confirmed diagnosis of HS are eligible to participate in HS PROGRESS. Consented subjects will complete electronic surveys comprising validated and expert consensus-derived objective and subjective measures every 6 months, and undergo comprehensive dermatologic evaluations. Subjects may also donate optional blood samples, skin biopsies, skin swabs, saliva samples, stool samples, and/or hair samples.

The University of California, San Francisco will act as the lead site and the Streamlined, Multisite, Accelerated Resources for Trials Institutional Review Board (SMART IRB) Reliance will be used for this multi-institutional effort. Each participating site will have access to the data and biospecimens they collect for their own research purposes, and specimens will be

stored locally. A Data and Biospecimen Monitoring Committee will facilitate de-identified data and biospecimen sharing with the guidance of a collaborative agreement.

This multi-institutional collaborative consortium will develop resources and provide infrastructure to accumulate important preliminary data, acquire funding, generate high-level evidence, and develop novel therapies for HS.

#### Learning Objectives:

1. The primary objective of HS PROGRESS is to establish and follow a novel cohort of comprehensively-phenotyped HS patients in all stages of disease in order to understand clinical characteristics, clinical course, treatment effects, and psychosocial impacts of disease.
2. The second objective is to establish a biospecimen repository from these rigorously-phenotyped HS patients to facilitate studies characterizing the etiology and pathophysiology of disease.
3. A third objective is to establish a cohort of consented HS patients who are interested in being contacted for future studies.

#### Takeaway Message:

In order to accelerate clinical and translational research in HS, we developed HS PROGRESS.

P2.11

### Use of Hormonal Contraception in Hidradenitis Suppurativa with Peri-menstrual Flares

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Life

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**Introduction:** Previous studies identified a role for hormones in hidradenitis suppurativa (HS). Androgens are thought to contribute to patient-reported HS flares in menses, and worsening of HS disease during the peri-menstrual period is described. Our study characterizes previous use of hormonal contraception for patients with and without peri-menstrual flares in HS.

**Methods/Results:** A retrospective study was conducted on HS patients seen at an academic subspecialty clinic in Boston, MA from 2016-2019. Males were excluded from the analysis. Hormonal contraception use, BMI, and age at presentation were recorded. Of 192 females, 45.8% reported peri-menstrual flares versus 54.2% with no peri-menstrual flares. Hormonal contraception was patient-reported and categorized as previous use of “progesterone-containing birth control”, “oral contraceptive use” (combined progesterone/estrogen therapy), and “no hormonal therapy”. Patients were excluded if previously-used hormonal contraception type was unknown. No significant differences for the types of hormonal contraception were found (Table 1). Patients with peri-menstrual flares were younger at time of presentation than those with no reported peri-menstrual flares (24.8 years vs. 29.7 years,  $p < 0.005$ ); additionally, no differences in BMI were found (Table 1).

**Conclusion:** HS appears to be a hormonally-mediated disease. HS patients with peri-menstrual flares were younger in our cohort, and early treatment with low androgenicity hormonal therapy may be warranted. As in hormonal acne, use of low androgenicity oral contraceptives and avoidance of progesterone-only contraception should be considered in HS patients with peri-menstrual flares. Further investigation into the use of low androgenicity hormonal contraception on disease improvement should also be pursued.

**Table 1. Hormonal birth control use, BMI, and Age at Presentation in Peri-menstrual Flares versus No Peri-menstrual Flare Groups**

	Peri-menstrual Flare	No Peri-menstrual Flare	P-value
Contraception type	(N= 88)	N= 104)	
Progestin-containing birth-control	10.22%	9.62%	0.8874
Oral contraceptive pill	32.95%	25.96%	0.2881
No hormonal therapy	45.45%	39.42%	0.3991
BMI	(N= 76)	(N= 87)	
<25	21.05%	19.54%	0.81055
>25	78.94%	80.46%	0.81055
Age at Presentation	(N= 80)	(N= 77)	
Mean Age	24.8 +/- 10.991 yrs	29.7 +/- 4.243 yrs	0.0003

#### Learning Objectives:

1. Identify percentage of female HS patients who report peri-menstrual flares

2. Compare the use of hormonal contraception, age, and BMI between HS patients who report peri-menstrual flares to those who do not report non peri-menstrual flare group
3. Evaluate results in regards to androgenic hormonal role in HS

**Takeaway Message:**

1. Approximately half of female HS patients report peri-menstrual flares
2. HS patients with peri-menstrual flares are younger than those without peri-menstrual flares
3. When considering contraception options for HS patients, low androgenicity hormonal contraception should be considered in those with peri-menstrual flares

**P2.12 HS Needs Assessment within an online HS Support Group Population**

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**Introduction:** Hidradenitis Suppurativa (HS) is a complex disease that has a debilitating effect on a patient's quality of life, both physically and mentally<sup>1</sup>. As there are limited studies directly addressing patients' needs in HS<sup>1,2</sup>, we conducted a needs assessment among members of an online HS support group.

**Objective:** To identify the needs of HS patients on knowledge of disease, decisional conflict, and preparedness for decision-making among members of an online HS support group.

**Methods/Results:** A survey was constructed to address HS patients' needs. Items addressed were adaptations of questions from the Ottawa Decision Support Framework (ODSF) scales for (1) knowledge, (1) decisional conflict, and (1) preparedness for decision-making<sup>3</sup>. All members (n=165) of the private HS Facebook support group, Hidradenitis Suppurativa Warriors for Research, were invited to participate via a survey monkey link posted to the group's main page. Members' participation in the survey remained anonymous. 151 respondents provided their feedback. Regarding knowledge, 9% stated they knew little about HS, with the remainder of respondents indicating a moderate amount of knowledge or more. However, the decisional conflict item revealed that 83% of participants find it difficult to choose a treatment for their HS. Lastly, in terms of preparedness for decision-making, 63% of participants indicated they feel somewhat or a little prepared to make a treatment decision.

**Conclusion:** Although patients have knowledge about HS, the majority experience decisional conflict and low levels of preparedness for decision-making. These unmet needs may require the development of tools to facilitate treatment decision-making.

**Learning Objectives:**

1. To identify the needs of HS patients on knowledge of disease.
2. To identify the needs of HS patients on treatment decisional conflict.
3. To identify the needs of HS patients on preparedness for decision-making.

**Takeaway Message:**

While patients demonstrate knowledge about HS, the majority experience decisional conflict and low levels of preparedness for decision-making. These unmet needs may require the development of tools to facilitate treatment decision-making. We invite SHSA 2019 attendees to assist in further research in the development of such tools.

**P2.13 Impact of Delayed Diagnosis in Patients with Hidradenitis Suppurativa (HS): Real-world Data from the UNITE HS Registry**

*Clinical Research  
Including Quality of  
Life*

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**Introduction:** Hidradenitis Suppurativa (HS) is a chronic, inflammatory skin disease affecting up to 4% of the general population. Diagnosis is globally delayed an average of 7 years. The clinical impact of delayed diagnosis is not well characterized. The current retrospective analysis assessed the association between diagnostic delay and disease severity (Hurley Stage) at enrollment among patients in the HS UNITE registry.

**Methods, Results:** Patients aged ≥12 years with active HS (defined by presence of inflammatory lesions) and under medical care were eligible to enroll in the UNITE registry. Diagnostic delay was defined as the duration between patient-reported symptom onset and HS diagnosis. Logistic regression was utilized to determine the association of diagnostic delay with the



presence of Hurley Stage II/III disease at enrollment. A multivariate analysis to adjust for potential confounders is ongoing. A total of 594 HS patients enrolled in the registry. The mean age was 36 years, 69.7% were female. The mean age at symptom onset was 23.2 years and 30.6 years at HS diagnosis. The average diagnostic delay was 7.7 years. 34.3% were diagnosed >7 years since symptom onset. 92.8% of patients had Hurley Stage II/III disease at baseline. Among patients with Hurley Stage I (n=43) and Hurley Stage II/III (n=551) at enrollment, the average diagnosis delay was  $4.1 \pm 6.7$  years and  $7.9 \pm 10.2$  years, respectively. The odds of having Hurley Stage II/III disease was significantly associated with diagnostic delay (OR 1.062 [95% CI: 1.010, 1.117]  $P=0.020$ ). For every additional year that diagnosis was delayed, the odds of progressing from Hurley Stage I to II/III increased by 6%.

**Conclusions:** These results demonstrate that a delayed diagnosis may increase the risk of disease progression and highlight the importance of early recognition and appropriate treatment at early stages of HS.

**Learning Objectives:**

1. Out of 594 patients registered in the ongoing UNITE HS-disease registry, the average diagnostic delay was 7.7 years.
2. The more diagnostic delay, the more advanced Hurley staging (OR 1.062 [95% CI: 1.010, 1.117]  $P=0.020$ ).
3. For every additional year that diagnosis was delayed, the odds of having disease that had progressed to Hurley Stage II/III increased by 6%.

**Takeaway Message:**

In the HS UNITE registry, a longer diagnostic delay was significantly associated with an increased odds of progression to Hurley Stage II/III disease.

## P3 Clinical Trial Research and Innovation

P3.01

### Efficacy of the Monoclonal anti-C5a Antibody IFX-1 in Patients with Moderate to Severe Hidradenitis Suppurativa: Initial Results of the Phase IIb Shine Study

Clinical Trial Research  
and Innovation

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**Introduction:** IFX-1 is a first-in-class monoclonal complement factor C5a antibody, which effectively and specifically blocks the biological activity of C5a. We report the interim analysis of the 16-week double-blind phase of a Phase IIb randomized, placebo-controlled, multicenter study in patients with moderate to severe hidradenitis suppurativa (HS; NCT03487276).

**Methods and Results:** 179 HS patients were enrolled in one placebo and four active dose groups. The study failed to meet the primary endpoint at week 16, a dose-dependent drug effect on the rate of HS Clinical Response (HiSCR). The placebo arm demonstrated an unusually high HiSCR rate of 47.1%. IFX-1 treatment resulted in HiSCR of 40.0% for 400mg Q4W, 51.5% for 800mg Q4W, 38.7% for 800mg Q2W, and 45.5% for 1200mg Q2W IFX-1 groups. However, the total abscess and inflammatory nodule count was reduced at week 16 with a trend to a dose dependent effect (26.5% for placebo and 32.7%, 54.6%, 44.9%, 47.7% respectively in the IFX-1 groups).

The mean decrease from baseline at week 16 of the draining fistula count was 63.2% in the high dose IFX-1 group compared to 18.0% in the placebo group;  $p=0.0359$ ), moreover the iHS4 score decreased by 51.5% in the high dose IFX-1 group compared to 19.8% in the placebo group;  $p=0.0202$ ).

IFX-1 infusions were safe and well tolerated.

**Conclusion:** IFX-1 treatment was well tolerated and associated with low immunogenicity. Although the primary endpoint was not met, additional analyses indicated a robust anti-inflammatory activity in the high dose IFX-1 treatment group across various efficacy measures. In line with its mode of action, 1200mg Q2W IFX-1 treatment lead to a strong relative reduction of draining fistulas (which cannot be detected by the HiSCR) and an overall inflammatory lesion reduction detected by the IHS-4 score. These results warrant further investigation of IFX-1 for the treatment of HS.

**Learning Objectives:**

1. Assess dose dependent efficacy of IFX-1 using HiSCR in patients with Hidradenitis Suppurativa
2. Explore additional parameters to define activity of IFX-1
3. Explore safety of IFX-1 in patients with Hidradenitis Suppurativa

**Takeaway Message:**

1. IFX-1 treatment was safe and well tolerated and associated with low immunogenicity.
2. Although the primary endpoint was not met, additional analyses indicated a robust anti-inflammatory activity in the high dose IFX-1 treatment group across various efficacy measures, such as relative reduction of draining fistulas and an overall inflammatory lesion reduction detected by the IHS-4 score.
3. These results warrant further investigation of IFX-1 for the treatment of HS.



**P3.02**

## Impact of Adalimumab on Stabilization or Sustained Improvement in Disease Activity in Moderate to Severe Hidradenitis Suppurativa: An Integrated Analysis of PIONEER Trials

*Clinical Trial Research  
and Innovation*

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**Introduction:** Patients with hidradenitis suppurativa (HS) desire sustained improvement, and lowered risk of unpredictable surges in disease activity. We analyzed the impact of weekly adalimumab (ADAew) through 36 weeks using pooled data from the phase 3 PIONEER I/II trials.

**Methods, Results:** In both trials, adults with moderate-to-severe HS for  $\geq 1$  year were randomized to 40 mg ADAew or placebo (pbo). This post hoc analysis included all patients receiving continuous ADAew (pooled PIONEER I/II) or pbo (PIONEER II) through 36 weeks. Assessments were stratified by Hurley Stage II vs III, and included (1) sustained improvement (achievement of HiSCR or  $\geq 25\%$  improvement from baseline in lesion count for  $\geq 5$  consecutive visits), (2) sustained stability (no increase from baseline in lesion count for  $\geq 5$  consecutive visits), and (3) median time to first flare (defined in this analysis as  $\geq 25\%$  increase in total abscess and inflammatory nodule [AN] count with an absolute increase of  $>2$  relative to baseline). Descriptive statistics were calculated for all analyses.

**Conclusions:** ADAew treatment was associated with (1) higher likelihood of sustained improvement vs pbo; (2) higher likelihood of sustained stability vs pbo; and (3) delayed time to disease flare vs pbo. Among patients receiving adalimumab, Hurley Stage II patients consistently had higher levels of sustained improvement and stability.

**Table 1. Outcomes Over 36 Weeks**

	Hurley Stage II		Hurley Stage III	
Endpoints	ADAew N=49	pbo N=85	ADAew N=50	pbo N=66
Sustained Improvement over $>5$ visits				
HiSCR achievement, % (n)	46.9%** (23)	23.5% (20)	38.0%*** (19)	7.6% (5)
$\geq 25\%$ improvement from BL in lesion count, % (n)				
Abscesses	79.6% (39)	63.5% (54)	64.0%* (32)	42.4% (28)
Fistulae	44.9% (22)	43.5% (37)	34.0%** (17)	13.6% (9)
Draining fistulae	77.6%* (38)	58.8% (50)	50.0% (25)	34.8% (23)
Sustained Stability over $>5$ visits (no lesion count increase from BL), % (n)				
Abscesses	81.6% (40)	68.2% (58)	78.0%*** (39)	43.9% (23)
Fistulae	77.6%* (38)	57.6% (49)	56.0% (28)	48.5% (32)
Draining fistulae	81.6%** (40)	55.3% (47)	70.0%** (35)	45.5% (30)
Time to first flare, median days [min, max] (n)	58 [29, 85] (18)	30 [28, 56] (56)	61 [29, 85]* (20)	29 [16, 56] (56)
Statistical significance: *** $P \leq 0.001$ ; ** $P \leq 0.01$ ; * $P \leq 0.05$ . Abbreviations: BL=baseline. HiSCR: $\geq 50\%$ reduction in total abscess and inflammatory lesion count with no increase in AN count relative to baseline				

### Learning Objectives:

1. Determine if adalimumab treatment is associated with sustained improvement and sustained stability.
2. Determine if adalimumab treatment is associated with delayed flare among HS patients.
3. Determine if baseline Hurley Stage is associated with adalimumab's likelihood of inducing sustained improvement, sustained stability, or delayed flare.

### Takeaway Message:

Adalimumab treatment is associated with higher likelihood of sustained control of HS, seemingly more so in Hurley Stage II than Hurley Stage III patients.

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Hidradenitis suppurativa (HS) is a chronic, debilitating, skin disorder. The pathogenesis is not completely elucidated; however, neutrophils are prominent in nodules, abscesses, and tunnels. A high medical need exists for new therapies in HS as only a proportion of patients respond to current treatment options including antibiotics, corticosteroids and/or TNF- $\alpha$  inhibitors. Based on the finding of elevated anaphylatoxin C5a levels in HS patients, complement inhibition is pursued as a novel therapeutic approach. C5a-receptor (C5aR) activation: 1) promotes neutrophil recruitment and localized inflammation in HS and 2) stimulates overproduction of TNF- $\alpha$  release via C5a-activated leukocytes. Importantly, while C5aR is widely regarded as driving inflammation, disruption of the second receptor for C5a, C5L2, exacerbates inflammation in several models of skin inflammation. This reveals the advantage of solely blocking C5aR in HS, leaving the beneficial C5a / C5L2 receptor pathway intact. Avacopan (CCX168) is an orally administered highly selective small molecule inhibitor of C5aR. Human PK and PD data indicate that daily clinical doses of avacopan produce continuous, >90% inhibition of C5a / C5aR-dependent blood neutrophil activation. We will discuss a Phase II clinical study design evaluating avacopan in moderate-to-severe HS (NCT03852472). This study is actively enrolling patients with clinical diagnosis of Hurley Stage II or III HS for  $\geq$  6 months, HS lesions in  $\geq$  2 distinct anatomic areas, and inadequate or loss of response to antibiotics for  $\geq$  90 days. Patients are randomized 1:1:1 to receive avacopan, 10 or 30 mg, or placebo, twice daily for 12 weeks, after which all patients continue active drug therapy for an additional 24 weeks. The primary endpoint is the proportion of patients achieving HS clinical response (HiSCR) at week 12. This study will inform on the safety and efficacy of targeted C5aR antagonism with avacopan in patients with moderate-to-severe HS.

#### Learning Objectives:

1. The AURORA trial is designed to:
2. Provide evidence of the role that complement activation plays in the clinical pathophysiology of HS.
3. Reinforce the role of neutrophils in acting through C5aR activation in the inflammatory process of HS.
4. Compare the safety and efficacy of two doses of avacopan (10 mg or 30 mg, each twice daily) compared to a placebo control in patients with HS.

#### Takeaway Message:

The AURORA trial will provide data about the clinical safety and efficacy of the oral selective C5aR antagonist avacopan in patients living with severe-to-moderate HS.

## P4 Comorbidities and Complications

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**Introduction:** Hidradenitis Suppurativa (HS) often presents with numerous comorbidities, including diabetes mellitus (DM). DM risk is approximately 1.5-3 times higher in HS individuals compared to those who do not have HS with overall prevalence up to 25%.<sup>1-3</sup> This suggests a strong association between HS and DM, which has led to recommendations to screen these at-risk patients regularly.<sup>4</sup> This study aims to determine whether screening for DM using hemoglobin A1c measurement is useful in detecting undiagnosed DM in patient with HS.

**Methods/Results:** This is a retrospective qualitative cohort study of patients who are at least 12 years of age who meet the clinical criteria for HS at the University of North Carolina Hospitals in Chapel Hill, NC. Patients were identified using an established clinical registry; data on age, demographics, clinical symptoms, HS diagnosis, Hurley stage for HS, laboratory values, and diabetes diagnosis were collected using a standard case report form. 260 sequential patients have been screened from January 2019-present, and the cohort will approach 300 by the time of presentation. Hemoglobin A1c screening will be correlated to diagnosis of diabetes in HS patients. Additionally, patient characteristics such as age and BMI will be correlated to diabetes risk to help determine if screening recommendations may be narrowed based on the presence of specific risk factors.

**Conclusion:** We predict that patients in our cohort will have high rates of diabetes. Many will have a known diagnosis documented, and screening will likely produce a meaningful number of new diagnoses of dysglycemia and/or type 2

diabetes. Additionally, we predict that there will be a positive correlation between the likelihood of diabetes onset in HS and one's age, gender, and BMI. We suspect these findings will support the utility of screening HS patients for diabetes in dermatology clinics.

#### Learning Objectives:

1. To determine if diabetes screening with hemoglobin A1c is useful for discovering undiagnosed diabetes in patients with Hidradenitis Suppurativa (HS).
2. To characterize additional risk factors that may predict the likelihood of discovering a diagnosis of diabetes for HS patients, such as BMI, age, and gender.
3. To determine if diabetes screening recommendations may be narrowed based on the presence of specific risk factors in HS patients.

#### Takeaway Message:

Hemoglobin A1c screening is useful for detecting previously undiagnosed dysglycemia/diabetes in patients with Hidradenitis Suppurativa in outpatient dermatology clinics.

**P4.03**

### Lithium Therapy Associated to Hidradenitis Suppurativa

*Comorbidities and  
Complications*

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**Introduction:** Lithium is a frequently prescribed drug for the management of bipolar disorders. Lithium is associated with the occurrence of cutaneous side effects with a prevalence of 3.4 to 45%. The most common cutaneous side effects occur at therapeutic serum levels and include acneiform eruptions, folliculitis and psoriasis. Four clinical cases have reported the onset of hidradenitis suppurativa (HS) lesions after the initiation of Lithium with a resolution after the withdrawal of the treatment. The underlying mechanisms of Lithium-induced skin reactions is not completely understood but hypothesis suggest its potential role in neutrophils chemotaxis and keratinocytes proliferation. The prevalence of bipolar disorders among HS patients is ranging among 0.7 to 4.8% and it is of major relevance to investigate the role of Lithium as trigger or aggravating factor of HS lesions.

**Methods:** We conducted a retrospective study on a large cohort of 1411 HS patients (Clinique Val d'Ouest). The aim of this work was study the prevalence of bipolar disorders and to investigate the link with the use of Lithium.

**Results:** We found that 0.6% (9/1411) were suffering from bipolar disorders (diagnosed in 3/9 before, in 1/9 simultaneously to and in 3/9 after the onset of HS respectively). The sex distribution was 2 men and 7 women (median age of 34 years old, median body mass index of 30 kg/m<sup>2</sup>). 7/9 patients were smokers. 3 patients were classified as Hurley IB, 4 as IIB and 2 as IIC. Concerning the bipolar disorder, 7/9 were treated by Lithium. 2 patients reported the development of HS lesions after the initiation of Lithium and 6 patients reported a worsening of the HS disease after the initiation of Lithium.

**Conclusions:** The diagnosis and the treatment of bipolar disorder has to be considered as a crucial point in the therapeutic management of HS patients.

#### Learning Objectives:

1. Lithium is a frequently prescribed therapy for the management of bipolar disorders.
2. The prevalence of cutaneous side effects due to Lithium therapy is ranging from 3.4 to 45%.
3. The onset of HS lesions has been reported after the initiation of Lithium therapy.

#### Takeaway Message:

1. The prevalence of bipolar disorders among HS patients is ranging among 0.7 to 4.8%.
2. The use of Lithium therapy has to be considered in the management of HS patients.
3. The role of Lithium as trigger or aggravating factor of HS disease will help to improve the understanding of the mechanisms leading to HS development.

**P4.04**

### The Prevalence of Arthropathy in Hidradenitis Suppurativa: a Systematic Review

*Comorbidities and  
Complications*

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Recent research has demonstrated that hidradenitis suppurativa may be an immune-mediated inflammatory disease affecting several body systems, including the joints. Reports have suggested that these patients are much more likely to

experience arthropathy; however, the frequency and severity of symptoms vary widely in the literature. This systematic review qualitatively explores the prevalence of reported arthralgia and diagnosed arthritis in hidradenitis suppurativa patients.

Following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) protocol, 2 online databases (Web of Science and PubMed) were searched for English-language studies reporting on arthropathy in HS patients. 17 studies were identified; 12 were excluded because percentage of patients experiencing joint pain or arthritis was not reported.

In the studies meeting inclusion criteria, patients reporting experiencing joint pain ranged from 28-71% while the prevalence of spondyloarthropathy ranged from 3.7-53%. To contextualize these broad ranges, it must be noted that there are many different causes of joint pathology, several of which have been linked to HS, and that each study used different criteria to classify patients as having arthritis. Additionally, throughout the literature, patients who reported experiencing frequent joint pain far outnumber those who reported being diagnosed with joint disease. Whether this means that the comorbidity is underrecognized and underdiagnosed or that the associated inflammation causes subclinical joint symptoms in select patients is unclear.

Further studies exploring the prevalence of joint pain and the percentage of patients meeting criteria for clinical arthropathy, diagnosed or undiagnosed, would be valuable to the understanding and treatment of hidradenitis suppurativa.

Reference	N	Study design	Method of diagnosis	Significant findings
Rosner et al (1993)	44	Screening	Clinical	47% with evidence of inflammatory arthropathy
Shlyankevich et al (2014)	1730	Retrospective case-control	Chart review	52.5% SpA
Richette et al (2014)	640	Screening	ESSG criteria	3.7% SpA 28% MSK symptoms
Schneider-Burrus et al (2016)	100	Survey and retrospective review	MRI confirmed (SpA)	39% of Hurley 2-3 with MRI SpA 71% reporting joint pain
Rondags et al (2019)	620	Survey	ASAS criteria	67% with $\geq 1$ of 4 entry criteria for SpA *87% of whom reported additional clinical SpA features
SpA = spondyloarthropathy, ESSG = European SpA Study Group, ASAS = Assessment of SpA Society				

#### Learning Objectives:

1. In previous studies analyzing presence of joint pain in HS, the prevalence reported ranged from 28-71%.
2. These studies reported a prevalence of arthropathy in HS patients anywhere from 3.7 to 53%, depending on the study design and method of diagnosis.
3. Further studies exploring the prevalence of joint pain and the percentage of patients meeting criteria for clinical arthropathy, diagnosed or undiagnosed, would be valuable to the understanding and treatment of hidradenitis suppurativa.

#### Takeaway Message:

Previous studies analyzing the presence of comorbid spondyloarthropathy in hidradenitis suppurativa disagree on the prevalence; therefore further research on this topic is warranted.

#### P4.05

### Hidradenitis Suppurativa Associated with Galli-Galli Disease: Extending the Link with Dowling-Degos Disease

*Comorbidities and Complications*

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**Introduction:** Galli-Galli disease is characterized by hyperpigmented macules and pruritic, scaly, erythematous papules distributed in flexural regions,<sup>1,2,3</sup> which may represent a histopathological variant of Dowling-Degos disease (DDD).<sup>1,2,3</sup> Histology reveals digitate elongation of the rete ridges, basal hyperpigmentation and suprabasal acantholysis.<sup>1,2,3</sup> Three causal mutations for DDD have been reported: *KRT5*, *POFUT1* and *POGLUT1*.<sup>4,5,6</sup>; with two also associated to GGD.<sup>3,7,8</sup> exposing the genetic correlations between these genodermatoses. While hidradenitis suppurativa has been reported with DDD in several cases<sup>9,10</sup>, we believe we report a first case of Hidradenitis Suppurativa occurring with Galli-Galli Disease.

**Methods/Results:** A 33 y/o F presents to the clinic complaining of a pruritic rash located in the inter- and inframammary region for several months without response to triamcinolone and a several-year history of HS. Physical exam presented

confluent symmetric hyperpigmentation from the central chest to the inframammary region (Figure 1) and confluent hyperpigmentation of the axillary vault with sinus tract formation (Figure 2). Biopsies of the right neck and right medial breast showed epidermal acanthosis, slightly elevated rete ridges, and associated acantholysis (Figures 3). These findings in the clinical context of this patient were representative of Galli-Galli disease.

**Conclusion:** Genetic mutations have been identified that relate GGD with DDD, and HS with DD. Our case presents a link between HS and GGD. While GGD and HS have been reported in association to different mutations, the *POFUT1*, *POGLUT1*, and *PSENEN* genes all relate to the Notch signaling pathway<sup>8,9,10</sup>. Although GGD is rare, this case extends an opportunity to discuss its connection to HS.

**Learning Objectives:**

1. Highlight a unique case of Galli-Galli Disease overlapping with Hidradenitis Suppurativa
2. Describe pathophysiologic links to Notch signaling pathway.
3. Educate the audience about the link between Hidradenitis Suppurativa and Galli-Galli Disease.

**Takeaway Message:**

Dowling-Degos Disease, Galli-Galli Disease and Hidradenitis Suppurativa may have overlapping pathophysiology and clinical presentation, which could explain cases where these diseases present comorbidly.

**P4.06**

**Cutaneous Squamous Cell Carcinoma in Patients with Hidradenitis Suppurativa**

*Comorbidities and Complications*

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**Background:** Cutaneous squamous cell carcinoma (SCC) may arise as an important complication of hidradenitis suppurativa (HS).

**Objective:** To find the prevalence and study the characteristics of squamous cell carcinoma (SCC) in patients with HS.

**Methods:** In this descriptive study we performed a literature search using PubMed on all English and French case reports and case series of cutaneous SCC in patients with HS from March 1999 – March 2019 and analyzed the data.

**Results:** A total of 23 studies/reports have been included in the analysis and 113 patients were identified. The patients' mean age was 54±10.58 years: the majority were men (n=94; 84%) and smokers (n=72;64%). Patients were identified as having severe HS Hurley stage III (n=107;95%), Hurley II (n= 5;5%) and Hurley stage I (n=0;0%) disease. The mean time from the date of HS diagnosis to the development of SCC was 25±11.83 years. Concomitant Crohn's disease was reported in 4/112 (4%) patients. The most common sites of lesions were gluteal and perianal (n=108; 96%), and a few female patients had vulvar SCC (n=4;4%). There were no reported SCCs in HS lesions in axillary, inframammary or back areas. The presence of HPV was noted in 9 patients (8%) using DNA and RNA in situ hybridization or by polymerase chain reaction (PCR) on paraffin-embedded tumor specimens. Distal/nodal metastases was reported in 42 patients (38%).

**Conclusion:** Cutaneous SCC is one of the most serious complications of HS. It is almost always found in the gluteal and perianal regions. While we recognize possible reporting bias, it appears that SCCs arising in HS patients may have a significant risk of developing a metastatic disease. Early screening and biopsy are highly encouraged and recommended.

**Learning Objectives:**

1. To investigate the epidemiology of cutaneous squamous cell carcinoma (SCC) in patients with hidradenitis suppurativa (HS).
2. To understand the clinical features of cutaneous SCC in patients with HS.
3. To elucidate the increased risk of cutaneous SCC metastasis in HS patients.

**Takeaway Message:**

Cutaneous squamous cell carcinoma is a serious complication of prolonged, clinically severe HS lesions almost consistently in the gluteal and perianal areas with a relatively high risk of metastasis. The long-term inflammation in non-sun-exposed areas likely triggers the development of cutaneous SCC. Thus, early disease control and regular reassessment are highly encouraged.

**P4.07**

**Depression Prevalence Prior to and Following Hidradenitis Suppurativa Diagnosis**

*Comorbidities and Complications*



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**Introduction:** Hidradenitis suppurativa (HS) profoundly impacts quality of life (1). Depression, for example, is significantly more prevalent in HS patients vs. controls (2). The timeline correlating depression with HS, however, is not well elucidated. We utilized a large clinical claims database (Arcadia.io, Burlington, MA) to investigate the temporality between HS diagnosis and concomitant depression diagnosis.

**Methods/Results:** The Arcadia.io database includes insurance claims and visit-level data from over 34,000,000 discrete lives. Men and women between 16-85 years old with  $\geq 3$  years of clinical data or enrolled in a health plan for  $\geq 12$  months in the past 18-24 months were eligible. HS and depression diagnoses were established by  $\geq 1$  coded diagnosis of HS (ICD-9:705.83, ICD-10:L73.2) and  $\geq 1$  coded diagnosis of depression (ICD-9:311, ICD-10:F33.x). Subjects were then stratified by age and sex. Depression prevalence was calculated for the entire population and compared to HS patients. Depression prevalence in the HS population was divided into two groups: (1) prevalence before or at time of HS diagnosis and (2) after HS diagnosis.

Overall depression prevalence in the general population was 10.3%, and greater in females than males. Depression prevalence in HS patients prior to or at HS diagnosis was nearly identical to the general population (10.4%) but rose sharply (20.4%) in the 3 years following HS diagnosis. Depression prevalence was higher post-HS diagnosis across all age groups and sexes.

**Conclusion:** This data suggests that the prevalence of depression dramatically increases following HS diagnosis. Whether this increase is a sequelae of the disease or a consequence of increased interaction with the health care system or both are questions that require further exploration. Nonetheless, this information may be useful in managing patients and suggests that screening and referral for depression may need to become part of the routine approach to the care of these patients.

**Learning Objectives:**

- Characterize the psychosocial ramifications of hidradenitis suppurativa
- Posit the need for depression screening among newly diagnosed HS patients

**Takeaway Message:**

- HS diagnosis is associated with a higher prevalence of depression compared to the general population
- Effective depression screening and appropriate referral following dermatologic evaluation may benefit HS patients

**References:**

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P4.08

**Continuing to Smoke Results in Slower Rates of Disease Remission in HS Patients Receiving TNFi Therapy**

*Comorbidities and Complications*

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**Background/Purpose:** Hidradenitis Suppurativa (HS) is an inflammatory disease of the apocrine sweat glands characterized by recurrent abscessing inflammation. The purpose of this study was to investigate the relationship between smoking and HS remission in a cohort of patients receiving therapy for HS.

**Methods:** This study was conducted through the Wound Etiology and Healing Study (WE-HEAL Study). Patients were categorized by smoking status at last follow up (current, never, past). Disease activity was assessed using Hurley Stage, Hidradenitis Sartorius Score (HSS), and Active Nodule (AN) Count. Remission was a binary outcome based on achieving the Hidradenitis Suppurativa Clinical Response (HiSCR). Statistical analysis was conducted using SAS version 9.4. Multivariable Cox proportional hazard model was used for analysis.

**Results:** At the time of data lock, there were 132 patients in the WE-HEAL HS cohort: current smokers (21%), past smokers (18%), never smokers (61%). There was no statistically significant difference between groups in regards sex, race or baseline body mass index (BMI). Past smokers had a higher baseline pain score ( $p=0.01$ ) and current smokers tended to be slightly older ( $p=0.002$ ). There was no significant difference between the three groups in baseline disease activity. Patients who were past smokers at last follow up demonstrated significantly faster time to remission than current smokers. Never smokers also achieved faster remission than current smokers although it was not as rapid as past-smokers.

**Conclusion:** Patients with HS who continue to smoke demonstrate lower and slower rates of achieving remission those who stop smoking or never smoked.

**Learning Objectives:**

1. Understand the impact of smoking on disease activity in HS

2. Demonstrate the impact of smoking on remission rates in response to TNF inhibitors
3. Harness longitudinal observational data to counsel patients on the impacts of smoking on disease activity in HS

**Takeaway Message:**

Continuing to smoke results in slower rates of disease remission in HS patients receiving TNFi therapy

**P4.09**

**Anti-TNF Induced Lupus in a Patient with Hidradenitis Suppurativa**

*Comorbidities and Complications*

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Anti-tumor necrosis factor (TNF) agents are used to treat various inflammatory disorders, such as rheumatoid arthritis, irritable bowel disease, and hidradenitis suppurativa (HS). A known side effect of these agents is the development of autoimmunity with the formation of antinuclear antibodies and/or anti-dsDNA antibodies. Although patients sometimes develop these antibodies, they rarely exhibit clinical manifestations. If symptoms do develop, the diagnosis of anti-TNF induced lupus (ATIL) should be considered. We describe a case of adalimumab-induced lupus in a patient with hidradenitis suppurativa.

**Learning Objectives:**

1. A known side effect of anti-tumor necrosis factor (TNF) agents is the development of autoimmunity with the formation of antinuclear antibodies and/or anti-dsDNA antibodies.
2. Anti-TNF induced lupus (ATIL) typically presents as arthralgias and arthritis, hematological abnormalities, and skin involvement similar to SLE
3. Ustekinumab may be considered as an alternative treatment for patients with HS especially in patients that develop ATIL

**Takeaway Message:**

To our knowledge, there are no reported cases of adalimumab-induced lupus in a patient being treated for HS. With the recent approval by the FDA of this medication for patients with HS, it is important for clinicians to consider ATIL in their list of differential diagnoses if a patient develops new-onset arthritis or cutaneous symptoms after initiation of the drug. In such cases, coordination of care with rheumatology is essential to establish the timely diagnosis of ATIL and to optimize patient care.

## P5 Epidemiology and Health Services Research

**P5.01**

**Hidradenitis Suppurativa Odor and Drainage Scale (HODS): A Novel Method for Evaluating Odor and Drainage in Patients with Hidradenitis Suppurativa**

*Epidemiology and Health Services Research*

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**Introduction:** Hidradenitis suppurativa (HS) is characterized by recurrent painful deep nodules, tunneling, tract formation, and substantial scarring. Skin manifestations of HS such as odor and drainage can lead to stigmatization, social isolation, and low self-esteem. To assess those symptoms, we performed a systematic review to find questionnaires that evaluate odor or drainage in patient with HS. After screening 841 papers, we found out there weren't available tools for this purpose. In consideration of the foregoing, more reliable methods to measure odor and drainage in HS are required.

We propose to measure drainage and odor with a novel approach, evaluating severity and stigma of those symptoms, called Hidradenitis Suppurativa Odor and Drainage Scale (HODS)

**Methods, Results:** HODS was modeled on a similar measure method for wound odor and drainage developed by Haughton and Keast, respectively. Further, a total of five items were selected from Developing the Patient-Reported Outcomes Measurement Information System (PROMIS).

Thereafter, this version was applied in 14 patients in the HS Clinics and cognitive interview explored how patients might interpret survey items.

The results were discussed with 5 patients from the International Dermatology Outcome Measures (IDEOM) committee involving in this subject. The results from this discussion were evaluated by three dermatologists and the HODS was updated

accordingly.

The current version is a patient reported outcome questionnaire with 5 point Likert scale questions. The drainage and odor sections have 8 questions, and 7 questions respectively, which evaluate intensity of odor or drainage and how it impacts patients' daily life.

**Conclusions:** Validated tools to measure symptoms such as odor and drainage in patients with HS are absent in the literature, thereafter we developed a novel tool amply evaluated by patients and dermatologists.

**Learning Objectives:**

1. Skin manifestations of HS such as odor and drainage can lead to stigmatization, social isolation, and low self-esteem.
2. There aren't tools to measure odor and drainage in patients with HS.
3. We developed a tool to assess drainage and odor in patients with HS.

**Takeaway Message:**

Validated tools to measure symptoms such as odor and drainage in patients with HS are absent in the literature, thereafter we developed a novel tool amply evaluated by patients and dermatologists.

P5.02

**Demographics of HS Patients at Presentation May Lend  
Insight to the Natural History of HS**

*Epidemiology and  
Health Services  
Research*

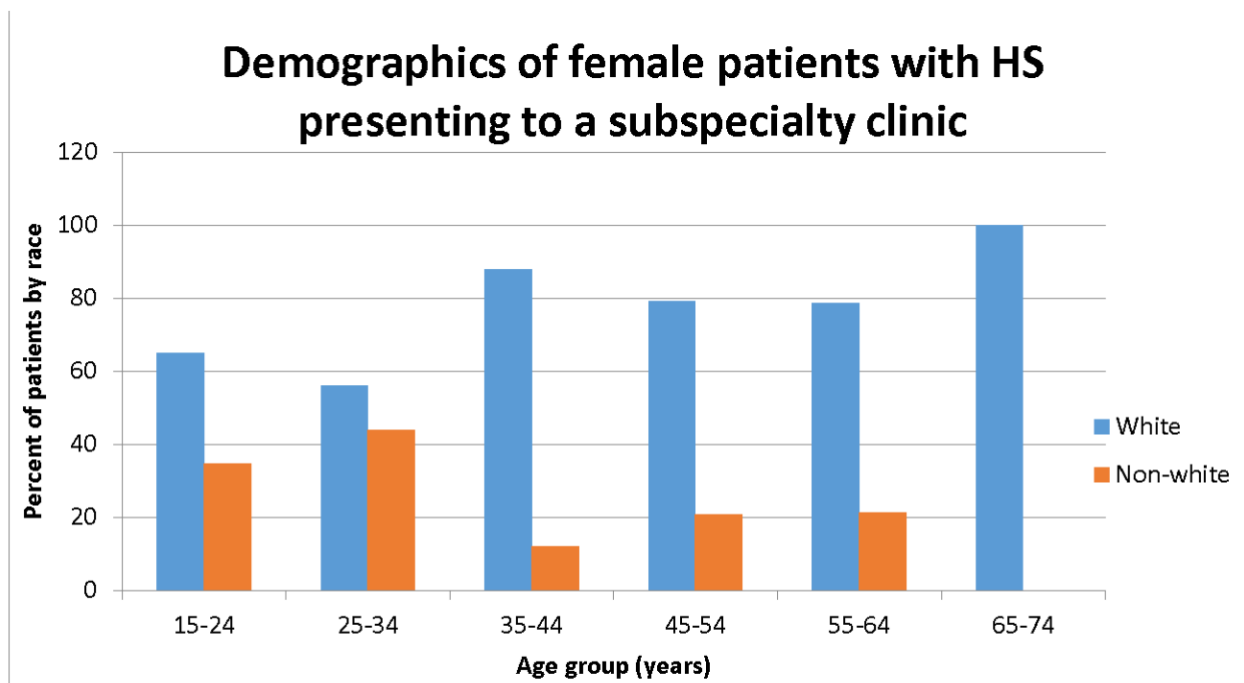
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**Introduction:** Hidradenitis suppurativa (HS) is more common among women in the United States. Multifactorial in etiology, we sought to assess whether there were any demographic differences among female patients with HS at time of presentation.

**Methods/Results:** A retrospective chart review of HS patients seen at our academic subspecialty clinic at Beth Israel Deaconess Medical Center between 2016 and 2019 was performed. 192 female patients were identified with evaluable demographic data. Patients coded as multiracial, "other," and those patients with no race reported were excluded, with 188 females included in the analysis. The demographic distribution of female patients at time of presentation to our clinic is demonstrated in Table 1.

**Conclusion:** In our sample, the racial demographic distribution between white and non-white was very different in the groups under age 34 compared to those over 35. Further, a statistically significant change in the racial distribution was observed between the 25-34 and 35-44 age groups. This finding suggests that age of onset for these groups could be different and also raises the question of whether access to care may affect the age of presentation.



**Table 1** demonstrates the demographics of female HS patients on presentation to a HS sub-specialty clinic. A chi-square test was used to compare the percent of white and non-white patients between age groups which revealed a statistically significant difference between the 25-34 and 35-44 groups ( $p=0.00079$ ) but no other groups (15-24 vs. 25-34:  $p=0.36$ , 35-44 vs. 45-54:  $p=0.34$ , 45-54 vs. 55-64:  $p=0.96$ , 55-64 vs. 65-74: null p-value).

#### Learning Objectives:

Further research on the impact of hormonal changes, i.e. puberty and menopause, on the natural history of HS is necessary to better understand the epidemiology of this disease.

#### Takeaway Message:

1. The prevalence of HS (both in general and stratified across different populations by age, sex and race) is becoming better defined
2. A better understanding of how HS presents across different populations may provide insight into the etiology and natural history of the disease

**P5.03**

#### Differences in Dermatologic Care for Hidradenitis Suppurativa Patients with and without Autism Spectrum Disorder

*Epidemiology and  
Health Services  
Research*

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**Introduction:** Many people on the autism spectrum have difficulty managing sensory input, causing overreaction to visual or tactile stimuli. This may impact the care they receive for skin conditions, such as hidradenitis suppurativa, which manifests overtly and may require topical medication.

**Methods/Results:** This is a retrospective cohort study of all-cause utilization and costs from the MarketScan® database (2012-2016). People with HS were identified based on at least one instance of ICD-9/ICD-10 code (705.23, L73.2), then assigned to a cohort with autism spectrum disorder (ASD) based on at least one instance of ICD-9/ICD-10 code (299, F84) or the cohort without ASD based on random selection of age and sex at a 10:1 ratio. Overall, 308 people with HS and ASD and 3,080 people with HS only were identified. The mean age of first HS claim was 19.39 years for ASD patients and 20.34 years for Non-ASD patients. Most patients with ASD were male (53.25% in both cohorts). The majority for both groups had at least 1 ED claim (ASD 56.17% vs Non-ASD 50.06%,  $p=0.04$ ). Patients in the ASD HS cohort had a higher mean number of ED visits (17.4 vs. 11.6,  $p=0.002$ ). The mean annual cost of ED visits per person was higher for ASD patients (\$314 vs

\$224,  $p=0.12$ ). HS patients with ASD had a higher prevalence of inpatient hospitalizations compared to those without ASD. (23.1% vs 12.7%,  $p < 0.001$ ). Hospitalizations were longer (7.6 vs. 4.7 days) and costlier per year (\$29,149 vs. \$18,290,  $p < 0.001$ ) in the ASD HS cohort. *Analysis of medication claims is underway and will investigate differences in usage of topical and systemic treatments.*

**Conclusion:** This study shows important differences in health care utilization and costs for HS patients with ASD. Data about differences in treatment are pending and will be presented pending SHSA meeting selection.

**Learning Objectives:**

1. Identify the healthcare utilization of HS patients with ASD compared to patients without ASD.
2. Characterize the epidemiology and comorbidities of HS patients with ASD compared to patients without ASD.
3. Describe the dermatologic care utilized by HS patients with ASD compared to patients without ASD.

**Takeaway Message:**

The health care sought, comorbidities experienced, and dermatologic care received by HS patients with ASD appears to display similarities as well as important differences as compared to their non-ASD counterparts.

P5.05

**Race-specific Prevalence of Hidradenitis Suppurativa: a Systematic Review**

*Epidemiology and  
Health Services  
Research*

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**Background:** Hidradenitis Suppurativa (HS) is a chronic and inflammatory disease which affects approximately 1% of the population globally. While both age and sex-specific prevalence of HS are often documented in literature, few studies have explored trends in racial predilections for HS. The objective of this study is to investigate the race-specific prevalence of HS.

**Methods/Results:** A systematic review was conducted using MEDLINE and OVID databases. The search keywords included variations of race, ethnicity, country, and Hidradenitis Suppurativa. A total of 184 articles were analyzed – 66 articles underwent full file review, and 40 articles met the inclusion criteria. Studies were included if they were written in English or French and were conducted on human participants. Exclusion criteria included meta-analyses, systematic and literature reviews, and articles that did not discuss HS, race, ethnicity or countries. The population distribution was scaled according to the 2017 United States statistics provided by the Henry J Kaiser Family Foundation, as the majority of reviewed studies fell under this demographic. Incidence rates were highest in African American populations (1.30%) and lowest in Hispanics/Latinos (0.07%). Incidence among Caucasians were intermediate (0.75%). Prevalence in other ethnic groups were very minor compared to African Americans and Caucasians (0.17% in total). For studies that recorded patient age, there were peak incidences during midlife (30-40 years). In the majority of studies, females had a higher incidence of HS (65-80%).

**Conclusion:** Overall, there was a significant difference in prevalence between populations, with highest rates in African American women. Further literature describing race-specific prevalence is needed to accurately capture the frequency of race and HS.

**Learning Objectives:**

1. Investigate race-specific prevalence of HS through the summarization and analysis of quantitative data in current literature.
2. Identify and understand trends among HS and its racial, age, and sex-specific predilections.
3. Recognize the important need to consider diversity in both clinical and research settings.

**Takeaway Message:**

This systematic review synthesized a cohort of studies exploring Hidradenitis Suppurativa and revealed an imbalanced prevalence among its various affected races. It is essential to further investigate why such differences may exist, to not only improve our understanding of HS pathophysiology, but also to aid physicians to undertake appropriate preventative measures and better manage patients with this disease.

P5.06

**Assessing Familial Risk in Patients with Hidradenitis Suppurativa**

*Epidemiology and  
Health Services  
Research*

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**Introduction:** Hidradenitis suppurativa (HS) patients report family history of HS at levels of 35-40% in previously reported cohorts, but familial risk has not been formally assessed. In our prospectively collected cohort of ~560 hidradenitis suppurativa patients at the University of North Carolina Chapel Hill, we found ~50% of patients report a first degree relative with history of disease. This information suggests a genetic contribution to hidradenitis suppurativa. The aim of this study is



to characterize familial risk in patients with HS.

**Methods/Results:** Using prospectively collected data from patient interviews, ~300 pedigrees which include first and second-degree relatives of patients with hidradenitis suppurativa, will be constructed and analyzed to assess sibling relative recurrence risk. Analysis of the first 103 pedigrees has found a sibling relative recurrence risk of 16.7x based on an estimated overall population risk of 1%.

**Conclusion:** Family history is frequently reported among patients with HS, and the observed sibling relative recurrence risk is generally much higher than for many other common diseases with genetic contributions. These results are consistent with a strong genetic component in the etiology of HS.

**Learning Objectives:**

1. Recognize the high rates of positive family history among hidradenitis suppurativa patients.
2. Understand the concept of sibling relative recurrence risks
3. Understand the risk of recurrence among family members with hidradenitis suppurativa.

**Takeaway Message:**

Among patients with HS a positive family history is frequently present, and there is a substantially increased risk among those with affected first degree relatives.

**P5.07 Characterization of 560 Patients with Hidradenitis Suppurativa Seen in a Subspecialty Hidradenitis Suppurativa Clinic**

*Epidemiology and  
Health Services  
Research*

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**Introduction:** Hidradenitis suppurativa (HS) is a chronic inflammatory skin disorder that results in recurrent malodorous, painful, and pruritic nodules, abscesses, and sinus tracts.

This study aims to characterize the demographic makeup, burden of comorbidities, and disease characteristics in a large cohort of patients seen in a subspecialty HS clinic in the southeastern United States. Comparisons in disease presentation based on demographics such as self-identified race will be examined.

**Methods/Results:** A cohort of ~560 HS patients from a registry of prospectively collected data will be analyzed descriptively from a subspecialty HS clinic at the University of North Carolina Chapel Hill Department of Dermatology. Features reported will include age of onset of hidradenitis suppurativa, delay of diagnosis, demographics, disease severity, physical exam characteristics, clinical phenotypes, comorbidities, family history, and response to treatments. Preliminary analysis shows our cohort is ~78% female and ~53% African-American, with the large majority of patients having Hurley stage II or III disease.

**Conclusion:** This cohort likely is the largest cohort of African-American patients characterized to date, and the majority of patients have advanced disease. The cohort enables patient background and disease presentation to be compared across demographic groups.

**Learning Objectives:**

1. Understand the demographic makeup of a cohort of patients with hidradenitis suppurativa in the southeast United States.
2. Understand the differences in disease and patient characteristics based on race.
3. Understand the burden of comorbidities in patients with hidradenitis suppurativa.

**Takeaway Message:**

Our large cohort of HS patients in a subspecialty clinic shows a high percentage of female and African-American patients. Differences in disease presentation among these demographic groups are highlighted.

**P5.08 A Survey of Clinicians Regarding Preferred Severity Assessment Tools for Hidradenitis Suppurativa**

*Epidemiology and  
Health Services  
Research*

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**Background:** Hidradenitis suppurativa is a relatively common, painful dermatologic condition characterized by papules, abscesses, and sinus tracts that primarily affect the axilla, groin, inguinal folds, and buttocks. To date, there are several clinical assessment tools used by clinicians to evaluate disease severity. While existing tools are used by clinicians worldwide, they each have limitations. We present a survey of clinicians regarding their preferred severity assessment tools for hidradenitis suppurativa.

**Methods:** A survey was administered to 60 physician members of the Hidradenitis Suppurativa cORe outcomes set International Collaboration (*HISTORIC*) workgroup regarding their preferences and perceived limitations of the current HS outcome tools available.

**Results:** Of 60 HISTORIC members surveyed, 63% (males 68%; females 32%). By far the most commonly used tool for clinical practice was Hurley staging (88%). In clinical practice, ~25-40% of surveyed clinicians were using the Modified Sartorius, HiSCR, abscess/nodule count, and HS-PGA. Providers favored 'simple/easy/clear' assessments that were 'fast/convenient/practical' and 'dynamic' in response to treatment. Twelve percent of clinicians did not like that their preferred system was time-consuming, and 9% did not like the counting of lesions. For clinical trials, HiSCR was favored by 30% of physicians (n=6), while the most commonly used assessments were reported to be Hurley Staging, HiSCR, and Modified Sartorius respectively. Clinicians similarly preferred assessments that were 'fast/convenient/practical', with 'precision and response to treatment' ranked relatively higher than tools for clinical practice. Notably, 36% of clinicians did not like that their preferred system for clinical trials was time-consuming, and 43% did not like the counting of lesions.

**Conclusion:** The survey results reflect a community of providers that are not yet satisfied with the current HS assessment tools. Notably, physicians dislike that existing assessments include counting lesions and are time-consuming to conduct. The preferences gathered could highlight future directions for severity assessment tool development.

#### **Learning Objectives:**

1. To highlight current clinician preferences for severity assessment tools used to evaluate hidradenitis suppurativa.
2. To demonstrate a need for continued improvement of severity assessment tools for hidradenitis suppurativa
3. To guide future development of hidradenitis suppurativa severity assessment tools

#### **Takeaway Message:**

Current severity assessment tools for hidradenitis suppurativa have limitations that should continue to be addressed.

P5.09

### **Opioid and Benzodiazepine Co-Use in Privately Insured Hidradenitis Suppurativa Patients**

*Epidemiology and  
Health Services  
Research*

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The U.S. is facing an opioid epidemic. Many studies have identified that depression and anxiety in opioid users puts them at a statistically significant higher risk of overdose or overdose death.<sup>1,2</sup> Concomitant use of opioids and benzodiazepines has a 5-fold increased risk of opiate-related overdose.<sup>3</sup> The hidradenitis suppurativa (HS) patient population has been identified to have an increased risk for psychiatric disorders, such as anxiety and depression.<sup>4</sup> The purpose of this study is to identify the prevalence of opioid and benzodiazepine co-use in patients suffering from HS, as a risk factor for overdose death.<sup>5</sup>

A retrospective cross-sectional study of the MarketScan claims database is being conducted. The database includes completed claims for people with commercial private insurance. People with medical claims for HS as well as control populations (randomly selected with a 10:1 ratio) will be included and evaluated for the incidence of opioids, benzodiazepines, and the co-occurrence of opioid and benzodiazepine medications. For 2012 to 2016 there are 19,836 people with HS that had 177,807 prescription claims for opioids, benzodiazepines, or both. Of the prescriptions, 71% (126,898/177,807) were for opiates and 29% (50,909/177,807) were for benzodiazepines. Importantly 56% (11,066/19,836) of the patients received both benzodiazepines and opioids during the study. This group of patients also had a higher proportion used of these medications as they received 63% (112,467/177,807) of prescriptions. More patients received an opioid as their first prescription compared to those who received a benzodiazepine as their first prescription (83% vs. 17%).

This study is limited to a subset of people in the US and with private insurance. The results of this study will be important for those treating HS since the combination of opioids and benzodiazepines pose a danger to the patient. Identifying concurrent use of benzodiazepines and opioids is critical to assuring patient safety.

#### **Learning Objectives:**

- Prevalence of opioid and benzodiazepine co-use.
- Incidence of opioid prescriptions.

- Incidence of benzodiazepine prescriptions.

#### Takeaway Message:

The concomitant use of opioids and benzodiazepines is prevalent in the HS population and poses a great risk for patient safety.

## P6 Medical Treatments and Wound Care

**P6.01**

### Excellent Response to Treatment in Hidradenitis Suppurativa Patient Treated with Guselkumab

*Medical Treatments  
and Wound Care*

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Hidradenitis suppurativa (HS) is a chronic, recurrent, and devastating inflammatory skin disorder characterized by painful nodules and draining sinus tracts with consequent scarring. Patients with HS are often undertreated as there are inadequate effective therapies available. Biologic agents are promising therapeutic options used in the management of many inflammatory conditions, more recently including the treatment of HS.

This report describes a 53 year old Canadian male with a long-standing history of HS, Hurley stage III. Despite receiving numerous traditional treatments, the patient continued to present with multiple inflammatory and/or draining lesions and pain. After failing adalimumab, ustekinumab, and infliximab, the patient was treated with 100mg of guselkumab at 0, 4 and 8 weeks, with an exceptional and rapid response from 32 inflammatory and/or draining lesions at baseline, to a single active lesion at 12 weeks. To our knowledge, this is the first reported Canadian HS patient treated with guselkumab.

#### Learning Objectives:

1. Appreciate the challenges faced by patients and their treating physicians compounded by lack of effective treatment options.
2. Understand the utility of biologic agents in the treatment of HS.
3. Recognize the importance of patient quality of life when deciding clinical management.

#### Takeaway Message:

Guselkumab may be a promising treatment option for the clinical management of HS patients who have failed prior intervention, including multiple biologic agents.

**P6.02**

### Remission of Severe Hidradenitis Suppurativa and Pyoderma Gangrenosum with Targeted Antibiotherapy

*Medical Treatments  
and Wound Care*

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**Introduction:** Pyoderma gangrenosum (PG) and hidradenitis suppurativa (HS) are both therapeutic challenges.

We report the remission of a Hurley stage 3 HS and a PG obtained with an antibiotherapy targeted against bacteria isolated from HS lesions.

**Case report:** A 29 year-old smoker female patient suffered from sporadic HS for the past 17 years and from PG for the past 3 years. There was no rheumatologic nor gastro-intestinal inflammatory diseases in her family. Her past medical history was significant for overweight (up to 153kg), which disappeared after a by-pass performed in 2018, without any improvement on HS and PG, as well as stopping tobacco for 18 months.

Her disease began at 12, in buttocks, then inguinal folds and subsequently in axillae and breast, with spontaneous remission between 2013 and 2016, but clear worsening for the past 3 years, with extension in anal cleft and appearance of PG in lower thighs, pubis and right leg.

Past treatments included short courses of pristinamycin, cyclins or amoxicillin+clavulanic acid without any efficacy. Absence of rheumatologic, intestinal, psoriasis and severe acne symptoms excluded a syndromic HS.

She presented with Hurley 3 lesions in anal cleft and Hurley 2 in both groins and left axilla. She also suffered from thighs, leg and pubic PG in large and small plaques.

NSAIDs regularly used for headaches and HS pain were stopped and ertapenem was started for 6 weeks, then continued

with linezolid for 6 weeks. PG and HS were in remission at 12 weeks and consolidated with rifampin+ moxifloxacin+ metronidazole for 3 weeks, then with rifampin+ moxifloxacin for 6 weeks.

Blood cytokines dosages, lesions microbiology (metagenomics+cultures) and a genetic study were performed.

**Conclusion:** Remission of severe HS and PG can be obtained using targeted antibiotics. Randomized controlled studies with follow-up are warranted to confirm these interesting results.

**Learning Objectives:**

1. Targeted antibiotherapy used for HS and PG
2. Microbiology of HS and PG lesions
3. Blood cytokines modification under targeted antibiotherapy in HS and PG

**Takeaway Message:**

A targeted antibiotherapy may obtain remission in severe HS and PG. Prospective studies and long-term follow-up are warranted to confirm these interesting results.

**P6.03**

**Short-lived Efficacy of Ertapenem for Refractory Hidradenitis Suppurativa**

*Medical Treatments  
and Wound Care*

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**Introduction:** Although previous studies have reported clinical improvement of refractory hidradenitis suppurativa (HS) using intravenous (IV) ertapenem, the sustained efficacy of this broad-spectrum antibiotic has yet to be elucidated.

**Methods:** We conducted an IRB-approved retrospective chart review of HS patients at the Montefiore/Einstein HS Treatment Center who completed a six-week course of IV ertapenem therapy. Patient demographics (age, gender), disease severity (HS-Physician Global Assessment [HS-PGA]), and Numerical Rating Scale (NRS) pain scores were documented at pre-, during-, and post-treatment visits. Wilcoxon tests were performed to determine the relationship between pre- and during-treatment clinical markers and pre- and post-treatment clinical markers.

**Results:** Among the patients meeting our inclusion criteria for ertapenem therapy (n=7), mean age was  $33.4 \pm 9.61$ ; five were males. While there were significant reductions of mean HS-PGA (pre-: 4.86 vs during-: 3.14,  $p=0.031$ ) and mean NRS pain scores (pre-: 7.14 vs. during-: 1.14,  $p=0.016$ ) during ertapenem treatment, these measures returned to pre-treatment baseline following the completion of therapy (HS-PGA (pre-: 4.86 vs. post-: 3.43,  $p=0.063$ ) and NRS pain scores (pre-: 7.14 vs. post-: 5.43,  $p=0.250$ ).

**Conclusion:** Dramatic improvement in clinical outcome measures during ertapenem treatment is consistent with the findings of other studies. Nonetheless, the improvement of HS-PGA and NRS pain scores during treatment was short-lived, leading to recurrent disease within one-month of ertapenem cessation. Additional studies are needed to determine if ertapenem therapy can be optimized to sustain clinical improvement.

**Learning Objectives:**

1. The recurrence of disease activity and pain severity after completion of a six-week course of IV ertapenem therapy should be considered when prescribing this antibiotic to HS patients.
2. HS patients receiving IV ertapenem should be counseled appropriately regarding the possible recurrence of active disease after cessation of therapy.
3. The risks and benefits of long-term IV ertapenem therapy should be considered when determining the ideal length of treatment.

**Takeaway Message:**

Based on the results of this case series, the transient efficacy associated with a six-week course of ertapenem suggests that the therapeutic benefit may be limited to the period of treatment.

**P6.04**

**Increased Doses of Adalimumab are Safe and Associated with Improved Clinical Outcomes in Hidradenitis Suppurativa**

*Medical Treatments  
and Wound Care*

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Hidradenitis suppurativa (HS) is a prevalent and debilitating chronic inflammatory disease with few uniformly effective treatments. TNF-inhibitor adalimumab is the only FDA-approved drug for HS; however, adalimumab dosing for HS is static rather than weight-based. We retrospectively evaluated the effectiveness of adalimumab 40mg weekly (ADA40) versus adalimumab 80mg weekly (ADA80) in a longitudinal cohort of rigorously-phenotyped HS patients.

We conducted a single-center retrospective chart review of HS patients between August 2016 and June 2019. We collected data on age, sex, race, comorbidities, medications, and disease severity (Hurley staging and Physician Global Assessment (PGA)). We present descriptive characteristics as proportions and medians and IQRs. Seven of 213 total HS patients were prescribed ADA80 (median age 31 years (IQR 23.5, 37); female 3, Black 3, White 1, Asian 1, multiracial 2; median BMI 32.9 (IQR 24.4, 38.9)). All patients had disease refractory to oral (100%) and topical (42.8%) antibiotics and topical antiseptics

(85.7%). Median follow-up duration on ADA40 prior to dose escalation was 11.5 months (9, 16.5), and on ADA80 was 4 months (3.5, 6.3). In 3 patients for whom pre-adalimumab data was available, no change in disease severity was observed at ADA40 (baseline: median Hurley 3 (2.5, 3), median PGA 3 (2, 3); ADA40: Hurley 3 (2, 3), PGA 3 (2.5, 3)). One-point reductions in Hurley (2 (2, 3)) and PGA (2 (1.5, 2)) scores were observed across all patients on ADA80. Adalimumab served as a bridge to wide local excision for 3 patients: 1 during both ADA40 and ADA80, and 2 during ADA80 only. No adverse events were reported on ADA40. One patient developed candida balanitis on ADA80.

We report improved HS severity on ADA80 compared to baseline and ADA40. Increased adalimumab dose may be associated with improved outcomes for overweight and obese patients with moderate-to-severe HS.

#### Learning Objectives:

1. Understand that current adalimumab dosing for HS is static, and does not take into account patient weight.
2. Compare the effectiveness of adalimumab 40mg weekly to adalimumab 80mg weekly for treating hidradenitis suppurativa in overweight and obese patients.
3. Recognize that few adverse events occurred in HS patients on adalimumab 80mg.

#### Takeaway Message:

Increased adalimumab dose may be associated with improved outcomes for overweight and obese patients with moderate-to-severe HS.

## P7 Surgical and Interventional Treatments

<b>P7.01</b>	<b>Carbon Dioxide Laser Excision for Hidradenitis Suppurativa Patients: a Comparison of Patients with Regards to History of Diabetes Mellitus and Smoking</b>	<i>Surgical and Interventional Treatments</i>
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**Background:** Hidradenitis suppurativa (HS) is often refractory to standard medical and surgical interventions.

**Objectives:** We characterized the efficacy and safety of carbon dioxide (CO<sub>2</sub>) laser excision for the treatment of recalcitrant hidradenitis suppurativa (HS) in patients who smoke and have diabetes mellitus (DM).

**Methods:** On initial data pull, 72 patients were identified. This number was reduced to 38 patients by including HS patients with all data points at Henry Ford Hospital who underwent CO<sub>2</sub> laser excision between August 2014 to May 2017. Data were obtained from medical charts including healing and recurrence rates, complications, smoking status, and history of diabetes mellitus.

**Results:** The average age at the time of the procedure was 37.5 years and mean BMI was 34.9. In total, 3 patients had recurrence at a mean of 6 months following the procedure. Post-operative complications included: infection (n=2), contracture (n=2), dehiscence (n=2), and paresthesias (n=1). Patients with dehiscence were not smokers or diabetics. Twelve patients were smokers, and 26 patients were non-smokers. The mean healing time in both smokers and nonsmokers was 6 months. Nine patients had a history of DM, and 29 patients were not diabetic. The mean healing time was not significantly prolonged in diabetics when compared to non-diabetics and was 7.3 months and 5.4 months respectively.

**Conclusion:** While our cohort exhibited a recurrence rate of 7.9% following CO<sub>2</sub> laser excision, others have reported recurrence rates of 1.1%<sup>1</sup> and 29.3%.<sup>2</sup> In 2009, one study found post-operative healing time following CO<sub>2</sub> excision to be 8.8 weeks<sup>1</sup>, but our average healing time was prolonged in comparison. Both smokers and non-smokers demonstrated similar healing time, recurrence rates, and post-operative complications. Patients with DM had prolonged healing times when compared to those without DM. Our study identifies important characteristics that clinicians should consider when assessing HS patients for CO<sub>2</sub> laser excision.

#### Learning Objectives:

1. Carbon dioxide excision in HS appears efficacious for the treatment of severe, refractory disease.
2. Smoking does not appear to be a contraindication to the procedure. When compared to smokers, smokers and non-smokers exhibited similar wound healing time, recurrence rates, and post-operative complications
3. Caution is advised when treating patients with HS and DM as we found prolonged healing times in our diabetic cohort when compared to those without diabetes mellitus, albeit not statistically significant.

#### Takeaway Message:

Carbon dioxide excision in HS appears efficacious for the treatment of severe, refractory disease.



# Conflict of Interest Disclosures

The Symposium on Hidradenitis Suppurativa Advances requires all Speakers and Committee Members to declare their conflicts of interest in relation to their presentation(s). Following is a list of disclosures received at time of printing.

Ahmad, Serene	I DO NOT have a financial or in kind relationship to disclose
Alavi, Afsaneh	Speakers Bureau, Consulting fees: AbbVie, Galderma, Janssen, LEO Pharma, Novartis, Sanofi, Valeant
Amah, Adaugo	I DO NOT have a financial or in kind relationship to disclose
Babbush, Kayla M.	I DO NOT have a financial or in kind relationship to disclose
Batarse, Bassam	I DO NOT have a financial or in kind relationship to disclose
Bechara, Falk	<i>Form not received</i>
Benhadou, Farida	I DO NOT have a financial or in kind relationship to disclose
Berry, Katherine	I DO NOT have a financial or in kind relationship to disclose
Bouazzi, Dorra	I DO NOT have a financial or in kind relationship to disclose
Braunberger, Taylor L.	I DO NOT have a financial or in kind relationship to disclose
Butt, Melissa	I DO NOT have a financial or in kind relationship to disclose
Cao, Yonghao	AbbVie, Inc.: I am a full time employee and stock option holder in AbbVie, Inc.
Cibotti, Ricardo	<i>Form not received</i>
Coutts, Patricia	Speakers Bureau (AbbVie); Consulting fees: Essity, Cardinal Health Care, Wounds Canada
Dailey, Rhonda	I DO NOT have a financial or in kind relationship to disclose
Daveluy, Steven	Speakers Bureau/Consulting fees: AbbVie; Grant research: InflaRx, Pfizer
Del Marmol, Veronique	I DO NOT have a financial or in kind relationship to disclose
Delorme, Isabelle	Speakers bureau, consulting fees, Grant reserach
Dempsey, Alison	I DO NOT have a financial or in kind relationship to disclose
Elkin, Kenneth	I DO NOT have a financial or in kind relationship to disclose
Fakhoury, Joseph W.	I DO NOT have a financial or in kind relationship to disclose
Flood, Kelsey	Abbvie: I received fellowship funding that was paid directly to my institution. Janssen: I received fellowship funding that was paid directly to my institution. National Psoriasis Foundation: I received fellowship funding that was paid directly to my institution.
Fort, Robert	I DO NOT have a financial or in kind relationship to disclose
Frew, John W.	I DO NOT have a financial or in kind relationship to disclose
Garg, Amit	Consulting fees: Asana, AbbVie, Pfizer; Grant: UCB, National Psoriasis Foundation, AbbVie
George, Ralph	Consulting fees: AbbVie
Ghias, Mondana H.	I DO NOT have a financial or in kind relationship to disclose
Giamarellos-Bourboulis, Evangelos J.	<i>Form not received</i>
Gierbolini, Athena	I DO NOT have a financial or in kind relationship to disclose
Goldberg, Stephanie	I DO NOT have a financial or in kind relationship to disclose
Grand, David	<i>Form not received</i>
Guilbault, Sandra	<i>Form not received</i>
Gulliver, Susanne	I DO NOT have a financial or in kind relationship to disclose
Hamzavi, Iltefat	Consulting fees, Grant research (various -contact Secretariat for list)
Hazen, Paul	<i>Form not received</i>
Henderson, Paul	I DO NOT have a financial or in kind relationship to disclose
Hereford, Brittainy	I DO NOT have a financial or in kind relationship to disclose
Hsiao, Jennifer L.	I DO NOT have a financial or in kind relationship to disclose
Ingram, John	Consulting fees: UCB, Novartis; Royalty: HiSCR Instrument; Other: Editor of BJD
Jemec, Gregor	<i>Form not received</i>
Jfri, Abdulhadi H.	I DO NOT have a financial or in kind relationship to disclose
Join-Lambert, Olivier	I DO NOT have a financial or in kind relationship to disclose
Kam, Sarah	I DO NOT have a financial or in kind relationship to disclose
Kaur, Nirmal	<i>Form not received</i>
Kimball, Alexa B.	AbbVie: Received honoraria as a consultant; Received grants as a clinical-trials investigator; Received fellowship funding Janssen: Received honoraria as a consultant; Received grants as a clinical-trials investigator; Received fellowship funding Lilly: Received honoraria as a consultant; Received grants as a clinical-trials investigator Novartis: Received honoraria as a consultant; Received grants as a clinical-trials investigator Pfizer: Received honoraria as a consultant; Received grants as a clinical-trials investigator UCB: Received honoraria as a consultant; Received grants as a clinical-trials investigator
Kirby, Joslyn S.	AbbVie: AbbVie Ad Board; AbbVie Speaker's Bureau ChemoCentryx: Consultant Incyte: Consultant; Funded research UCB: Consultant

Kitts, Sarah	I DO NOT have a financial or in kind relationship to disclose
Kremer, Michael	I DO NOT have a financial or in kind relationship to disclose
Leiphart, Paul A.	I DO NOT have a financial or in kind relationship to disclose
Lev-Tov, Hadar	Grant: BSN Medical
Lowes, Michelle	Consulting fees: AbbVie, Janssen, Almiral, BSN, Incyte
Lyons, Alexis B.	Lenicura, General Electric: Equipment received by institution
Mariottoni, Paula	<i>Form not received</i>
Martinez, Erin	I DO NOT have a financial or in kind relationship to disclose
Martins, Deborah	I DO NOT have a financial or in kind relationship to disclose
Marzano, Angelo V.	I DO NOT have a financial or in kind relationship to disclose
McBride, Olivia	<i>Form not received</i>
McKenzie, Shanice A.	I DO NOT have a financial or in kind relationship to disclose
McLean, Donna	Windsor Clinical Research Inc.: As an employee, I receive a salary in my role as research associate for conducting research projects. University of Colorado: Pfizer Inc.: This project is funded by the 2017 Advancing Science Through Pfizer-Investigator Research Exchange (ASPIRE) Dermatology Research Award. This funding constitutes the Investigator-Initiated Research Support ("IIR Support") for this project. Basis of Support: This IIR Support is not conditioned on any pre-existing or future business relationship between Pfizer and either the Coordinating Investigator or the Institution conducting the study. It is also not conditioned on any business or other decisions the Coordinating Investigator or Institution has made, or may make, relating to Pfizer or Pfizer products.
Melendez Gonzalez, Maria del Mar	I DO NOT have a financial or in kind relationship to disclose
Metpally, Raghu P.	I DO NOT have a financial or in kind relationship to disclose
Meyer, Thomas	I DO NOT have a financial or in kind relationship to disclose
Miller, Angela	Consulting fees: AbbVie
Molnar, Jack	I DO NOT have a financial or in kind relationship to disclose
Moloney, Suzanne	HidraMed Solutions: I am the founder and CEO of a company called HidraMed Solutions who have developed an adhesive free wound dressing system for people living with Hidradenitis Suppurativa. We are in the process of commercialising the product.
Morss, Peyton C.	I DO NOT have a financial or in kind relationship to disclose
Naik, Haley	Consulting fees: 23andme; Grant: AbbVie; Other: HS Foundation Board Member
Nakadar, Saqib	I DO NOT have a financial or in kind relationship to disclose
Nassif, Aude S.	Novartis: Meeting expenses
Navrazhina, Kristina	I DO NOT have a financial or in kind relationship to disclose
Nosrati, Avigdor	I DO NOT have a financial or in kind relationship to disclose
O'Brien, Elizabeth	Speakers Bureau / Consulting Fees: AbbVie; Grant: Galderma
Orenstein, Lauren	Frontline Medical Communications: lecture honorarium MedEd Consulting: consultant fee Huron Consulting group: consultant fee NIH K12: Building Interdisciplinary Research Careers in Women's Health - NIH Award number K12HD085850
Pacific, Kristen P.	I DO NOT have a financial or in kind relationship to disclose
Patel, Zarine	I DO NOT have a financial or in kind relationship to disclose
Paul, Maia	I DO NOT have a financial or in kind relationship to disclose
Petukhova, Lynn	I DO NOT have a financial or in kind relationship to disclose
Piguet, Vincent	Consulting fees: Pfizer, AbbVie, Janssen, UCB, Novartis, Almirall, Celgene; Grant: AbbVie, Bausch Health, Celgene, Janssen, LEO, Eli Lilly, NAOS, Novartis, Pfizer, PFDC, Sanofi
Prens, Lisette	I DO NOT have a financial or in kind relationship to disclose
Price, Kyla	<i>Form not received</i>
Racanelli, Elysia	I DO NOT have a financial or in kind relationship to disclose
Rhambatlal, Pranita	I DO NOT have a financial or in kind relationship to disclose
Rosales Santillan, Monica	I DO NOT have a financial or in kind relationship to disclose
Sachdeva, Muskaan	I DO NOT have a financial or in kind relationship to disclose
Saiyed, Nazia	I DO NOT have a financial or in kind relationship to disclose
Savage, Kevin T.	I DO NOT have a financial or in kind relationship to disclose
Sayed, Christopher	Speakers Bureau: AbbVie, Novartis; Consulting fees: InflaRx, AbbVie; Grant: InflaRx, UCB
Shanmugam, Victoria	AbbVie: Investigator Initiated Study: Collagen Biomarkers in Scleroderma.
Shaver, Rob L.	I DO NOT have a financial or in kind relationship to disclose
Shi, Vivian Y.	AbbVie: Consultant on Humira; Speaker Bureau on Humira and SkiRiz; Principal investigator for AbbVie trial
Shipman, William D.	I DO NOT have a financial or in kind relationship to disclose
Shultz, Ashley	I DO NOT have a financial or in kind relationship to disclose
Shumaker, Cassidy	I DO NOT have a financial or in kind relationship to disclose

Turk, Dilara	I DO NOT have a financial or in kind relationship to disclose
van Straalen, Kelsey R.	Abbvie: Money went to Erasmus University Medical Center, not to me personally.
Vedangi, Aaren	I DO NOT have a financial or in kind relationship to disclose
Williams, Jazzmin C.	I DO NOT have a financial or in kind relationship to disclose
Wolk, Kerstin	Consulting fees: Novartis; Grant: Novartis, Sanofi, AbbVie, Janssen, Flexopharm, Celgene
Wong, Se Mang (Simon)	Advisory Board / Consultant; Speaker; Research Grant (Various - contact Secretariat for list)
Wright, Shari	I DO NOT have a financial or in kind relationship to disclose
Yannuzzi, Christine	I DO NOT have a financial or in kind relationship to disclose
Zouboulis, Christos C.	Consulting fees: AbbVie, Almirall, Celgene, Galderma, GSK, Idorsia, InflaRx, PPM, Novartis, Sobi, UCB; Grant: AOTI, AstraZeneca, Celgene, Dr. Reddy's, InflaRx, Novartis, UCB

## Off-Label Use

The following is a list of presenters that intend to make therapeutic recommendation for a medication, product or device that has not received regulatory approval (i.e. "off-label" or "unapproved" use).

- Alavi, Afsaneh
- Benhadou, Farida
- Daveluy, Steven
- Hamzai, Iltefat
- Ingram, John
- Kirby, Joslyn S.
- Lev-Tov, Hadar
- Lowes, Michelle
- Nassif, Aude S.
- Orenstein, Lauren
- Williams, Jazzmin C.
- Wong, Se Mang (Simon)



## Symposium on Hidradenitis Suppurativa Advances

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