PROGRAM

November 4-5, 2017
Hotel St. Regis, Detroit
www.hs-foundation.org

SHSA 2017
Symposium on Hidradenitis Suppurativa Advances
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Welcome from Presidents

Dear Colleagues,

We are pleased to welcome you to Detroit for the 2nd Annual Symposium on Hidradenitis Suppurativa Advances (SHSA). Following last year’s lead, we have prepared an exciting program that showcases the most recent innovations and practical challenges encountered, and solutions adapted in the field of HS.

The Program Committee, led by Dr. Michelle Lowes, have ensured the program features the most well-known cutting edge speakers in the area of HS, in addition to rising stars and researchers. SHSA 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 the efforts to treat HS in the best possible way, and spearheading HS research. We are holding an HS Ultrasound Workshop, to facilitate the use of this tool to better assess HS disease activity. We are thrilled to host the inaugural HS School, fulfilling part of our mission for improved patient education.

We hope you will find SHSA a place of networking with your colleagues. The number of publications and research on HS have risen significantly, but there is still a long way to go before fully understanding 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
Co-Chair, SHSA 2017

Dr. Marc Bourcier
President, CHSF
Co-Chair, SHSA 2017
Welcome from Program Chair

Dear Colleagues,

We are delighted you have chosen to attend the 2nd Symposium on Hidradenitis Suppurativa (SHSA) in Detroit. This builds on the very successful 1st SHSA in Toronto last year, which was the brainchild of Canadian dermatologist Dr. Afsaneh Alavi. We are thankful to the Hidradenitis Suppurativa Foundations for hosting this event along with support from the Henry Ford Department of Dermatology.

I often get asked “What is hidradenitis suppurativa?”, even by other doctors. It’s hard to believe that a disease that affects millions of people remains so hidden. HS is a painful and unforgiving disease. Living with HS can impact every daily decision and severely impair one’s quality of life.

There has been a revolution in treatments for inflammatory skin diseases. This started with psoriasis many years ago, and we now have many effective biologic treatments for psoriasis. The first biologic was recently approved for atopic dermatitis. I feel we are on the cusp of new developments for HS treatments and research. These options coupled with newer surgical and laser based options can be added to patient support services. This holistic system of care and research can dramatically improve the lives of HS patients. I am also convinced that scientific studies into understanding HS will have benefits beyond this disease, such as a platform to understand hair and sweat gland biology, the relationship between host and cutaneous microbiome, and to develop novel cutaneous treatment modalities.

We are especially excited to welcome the young medical students, dermatology fellows and residents, and post-docs to the conference. You are the future of these clinical and scientific endeavors for HS. The speakers, dermatologists, and scientists attending SHSA are part of an empathetic supportive HS community. So, meet everyone you can while you are here, and we hope you will find an area of HS you want to tackle during your career- there are many to choose from.

So, thank you for participating in the SHSA this weekend. We hope you leave inspired by our wonderful faculty, that you forge new relationships and develop fresh collaborations to keep working on behalf of those suffering with HS.

Dr. Michelle Lowes
Program Chair
Board member Hidradenitis Suppurativa Foundation
On behalf of the Scientific Committee
Planning Committee

Iltefat Hamzavi, MD, Co-Chair SHSA 2017, President HSF, Department of Dermatology, Henry Ford Hospital, Detroit, MI, USA

Marc Bourcier, MD, FRCPC, FAAD, Co-Chair SHSA 2017, President CHSF, Faculty of Medicine, Sherbrooke University, Dermatologist, Moncton, NB, Canada

Afsaneh Alavi, MD, MSc, FRCPC, Department of Dermatology, University of Toronto, Women’s College Hospital, Toronto, ON, Canada

Richard G. Bennett, MD, Department of Medicine (Dermatology), David Geffen School of Medicine, University of California Los Angeles, Los Angeles, CA, USA; Department of Dermatology, Keck School of Medicine, University of Southern California, Los Angeles, CA, USA

Steven Daveluy, MD, FAAD, Assistant Professor, Wayne State Dermatology, Detroit, MI, USA

Joslyn Sciacca Kirby, MD, Department of Dermatology, Pennsylvania State, Hershey, PA, USA

Michelle Lowes, MD, PhD, Scientific Program Manager SHSA 2017, Rockefeller University, New York, NY, USA

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

Certificate of Attendance

Delegates will receive a Certificate of Attendance upon check-in at the SHSA Registration Desk or may request one electronically.

Surveys and Feedback

We appreciate your feedback by answering the surveys after each session. This allows us to plan for future meetings. Please complete the survey, then return to the Registration Desk.
Faculty List

Afsaneh Alavi, MD, MSc, FRCPC, Department of Dermatology, University of Toronto, Women's College Hospital, Toronto, ON, Canada

Falk Bechara, Professor, Head of the Department of Dermatologic Surgery, Senior Physician, Department of Dermatology, Allergology and Venerology, Ruhr-University Bochum, Germany

Richard G. Bennett, MD, Department of Medicine (Dermatology), David Geffen School of Medicine, University of California Los Angeles, Los Angeles, CA, USA; Department of Dermatology, Keck School of Medicine, University of Southern California, Los Angeles, CA, USA

Marc Bourcier, MD, FRCPC, FAAD, Faculty of Medicine, Sherbrooke University, Moncton, NB, Canada

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

Steven Daveluy, Wayne State University Department of Dermatology, Dearborn, MI, USA

John W. Frew, Liverpool Hospital, Sydney, Australia

Amit Garg, Associate Professor, Hofstra Northwell School of Medicine, New Hyde Park, NY, USA

Iltefat Hamzavi, MD, Department of Dermatology, Henry Ford Hospital, Detroit, MI, USA

Lauren K. Hoffman, Albert Einstein College of Medicine / Montefiore Medical Center, Bronx, NY, USA

Jenny Hsiao, MD, Ronald Reagan UCLA Medical Centre, UCLA Medical Center, Santa Monica, CA, USA

Joslynn Sciacca Kirby, MD, Department of Dermatology, Pennsylvania State, Hershey, PA, USA

Hadar Lev-Tov, MD, MAS, Clinical Assistant Professor, Department of Dermatology & Cutaneous Surgery, University of Miami, Miller School of Medicine, Miami, FL, USA

Michelle Lowes, MD, PhD, Scientific Program Manager SHSA 2017, Rockefeller University, New York, NY, USA

Erin Martinez, LMSW, CST, Individual and Couples Therapy Dream Catchers Well-Being Therapy Practice, Adjunct Faculty University of Michigan, School of Social Work, Detroit, MI, USA

Robert Micheletti, MD, Assistant Professor, Department of Dermatology, Hospital of the University of Pennsylvania, Philadelphia, PA, USA

Haley Naik, MD, Assistant Professor, UCSF School of Medicine, Department of Dermatology, San Francisco, CA, USA

Aude Nassif, MD, Institut Pasteur, Centre Médical, Paris, France

Cynthia Nicholson, Wayne State University, Department of Dermatology, Detroit, MI, USA

Angie Parks-Miller, CCRP, CWCA, Clinical Research Manager, Henry Ford Hospital, Detroit, MI, USA

Zarine Patel, Hidradenitis Suppurativa Treatment Center, Division of Dermatology, Albert Einstein College of Medicine, Montefiore Medical Center, Bronx, NY, USA; Ferkauf Graduate School of Psychology, Yeshiva University, Bronx, NY, USA

Vincent Piguet, MD, PhD, FRCPC, University of Toronto & Women's College Hospital, Toronto, Canada

Mayur Ramesh, MD, Department of Internal Medicine / Infectious Diseases, Henry Ford Hospital, Detroit, MI, USA

Barry Resnik, MD, Voluntary Clinical Professor and Director, Hidradenitis Suppurativa Clinic, Miller School of Medicine Department of Dermatology and Cutaneous Surgery, University of Miami, Miami, FL, USA

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

Gregory Schultz, PhD, Institute of Wound Research & University of Florida, USA

Aamir Siddiqui, MD, Division Head, Plastic Surgery, Henry Ford Hospital, Detroit, MI, USA

Jerry Tan, MD, FRCPC, Adjunct Professor, Internal Medicine and Dermatology, Univeristy of Ontario, Windsor, ON, Canada

Ximena Wortsman, MD, FAIUM, Department of Dermatology of University of Chile & Department of Dermatology of Pontifical Catholic University of Santiago de Chile, Santiago, Chile
Sponsors

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Incyte  Innovation Pharmaceuticals Inc.  Medline
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Incyte Corporation is a Wilmington, Delaware-based biopharmaceutical company focused on the discovery, development and commercialization of proprietary therapeutics. For additional information on Incyte, please visit the Company's web site at www.incyte.com. Follow @Incyte on Twitter at https://twitter.com/Incyte.

Visit the website www.innovaderm.ca for company information.

Headquartered in Beverly, Massachusetts, Innovation Pharmaceuticals Inc. (IPI) is publicly traded under the company symbol “IPIX.” The Company is a clinical stage biopharmaceutical company developing innovative therapies, with first-in-class potential, in multiple diseases. One of its three lead drug candidates has demonstrated, in Phase 2 trials, both anti-bacterial and anti-inflammatory qualities the Company believes warrant testing in the treatment of Hidradenitis Suppurativa. For more information: http://www.ipharminc.com/new-blog/2017/5/30/hidradenitis-suppurativa-acne-inversa

Medline is a global manufacturer and distributor of medical products with patient-centered solutions, services and expertise across the continuum of care. Medline’s Advanced Wound Care and Tissue Regeneration Division provide a wide variety of innovative solutions for the burn market, including products that promote wound bed preparation and tissue regeneration.

Visit the website www.novartis.com for company information.

UCB’s ambition is to transform the lives of people living with severe diseases. We focus on neurology and immunology disorders – putting patients at the center of our world. We are Inspired by Patients. Driven by Science. UCB is continuously working to advance science and embrace new knowledge. We are leveraging scientific advances and skills in areas such as genetics, biomarkers and human biology. Patients inspire us to bring them value through cutting-edge science, innovative drugs, and practical solutions – so that they and their carers can get on with their lives.
Invited Speakers

**Falk Bechara, MD, PhD**  
Ruhr-University Bochum, Germany

**Session:** Surgical Treatment of HS  
**Date:** Sunday, November 5  
**Title:** Complex surgical situations in the perianal and genital area

Professor Falk G. Bechara is the Head of the Department of Dermatologic Surgery, and Senior Physician of the Department of Dermatology, Allergology and Venereology at the Ruhr-University Bochum, Germany. He is the Past-President of the German Society of Dermatologic Surgery (DGDC) and its current PR consultant. Prof. Bechara is coordinating the Skin Cancer Center of the Ruhr-University Bochum with focus on reconstructive dermatologic surgery. Prof. Bechara is also a Board Member of the International Society for Dermatologic Surgery (ISDS).

Prof. Bechara studied medicine at the Georg-August University Göttingen, the University Joseph-Fourier, in Grenoble, France, and at the Ruhr-University Bochum in Germany. He has received a Doctorate and Habilitation and was named Professor of Dermatology, Allergology and Venereology at the Ruhr-University of Bochum.

Professor Bechara has been the recipient of a Socrates scholarship of the European Union at the University Joseph-Fourier, Grenoble, France and a Scholarship of the Faculty of Medicine for Clinical Science on Focal Hyperhidrosis at the Ruhr-University Bochum. Prof. Bechara is currently a member of the Postdoctoral Lecture Qualification Board at the School of Medicine at the Ruhr-University Bochum.

He has published extensively in scientific journals and dermatology textbooks and is a frequent speaker both at national and international conferences.

In 2008 Prof. Bechara founded the Hidradenitis suppurativa / Acne inversa Center in Bochum, which has become one of the largest in Europe, with a focus on serious cases with demanding surgical challenges.

**Aude Nassif, MD**  
Institut Pasteur, Centre Médical, Paris, France

**Session:** Medical Treatment of HS  
**Date:** Saturday, November 4  
**Title:** TNF inhibitors in HS

Dr Aude Nassif has been working on HS for the past 10 years at the Pasteur Institute in Paris. Studying the flora isolated from HS lesions by prolonged cultures, she and Dr Olivier Join-Lambert proposed a new hypothesis of host-microbiome disease and subsequently successfully implemented a targeted antibiotherapy relying on these results. They also hypothesized that biofilms might be responsible for constant relapses in scars and with Dr Maïa Delage they developed a strategy combining antibiotherapy and surgery. With Prof. Alain Hovnanian, Dr Nassif is also interested in the genetics of HS and their team confirmed genetic heterogeneity in French HS families and in PASH patients.
Vincent Piguet, MD, PhD, FRCPC
University of Toronto & Women's College Hospital, Toronto, Canada

Session: Epidemiology, Co-morbidities
Date: Saturday, November 4
Title: Identifying the True Burden of Hidradenitis Suppurativa in the UK Population

Professor Vincent Piguet, MD, PhD, FRCP, trained at the School of Medicine, University of Geneva and graduated in 1995. He spent two years doing research in virology and immunology at the Salk Institute in San Diego, USA. He obtained his MD and PhD in 2000/2001 and his specialist certification in Dermatology & Venereology in 2004 from the Swiss Medical Association. He obtained a prestigious Fellowship from the Swiss National Science Foundation in 2003 and was subsequently promoted to Assistant and then Associate Professor at University of Geneva. In 2010 he was appointed Professor and Chair of the Department of Dermatology and Wound Healing at Cardiff University, Wales, UK and Consultant Dermatologist at the University Hospital of Wales. In 2011 he obtained UK certification in Dermatology and in 2014 became a Fellow of the Royal College of Physicians. In 2011 he was appointed Director of the Institute of Infection and Immunity, School of Medicine, Cardiff University and in 2015, Director of the Division of Infection and Immunity, School of Medicine, Cardiff University. In 2017, he was appointed as Full Professor and Department Division Director, Division of Dermatology, Department of Medicine, University of Toronto and Division Head, Division of Dermatology, Women’s College Hospital, Toronto.

Professor Piguet has authored over 145 publications in the fields of dermatology, dendritic cells, HIV, gene therapy, immunology and vaccination in a range of highly cited peer review journals such as Cell, Immunity, The Lancet, Proceedings of the National Academy of Sciences, Journal of Investigative Dermatology, Blood, and Nature Medicine. He has received numerous grants (including as principal investigator from the Human Frontier Science Program and the Bill & Melinda Gates Foundation) to further his research including in the areas of HIV, psoriasis, melanoma and immunology. Professor Piguet gave the ‘Rudi Cormane Lecture’ at the European Society for Dermatological Research (ESDR) in 2014 and has given more than 100 lectures at national and international meetings, including at the World Congress of Dermatology and HIV Keystone meetings. He received a merit award in 2014 from the Society for Arts, Science and Technology in Wales, The Welsh Livery Guild. He received an ACCEA NHS Bronze Award awarded by the Department of Health for England and Wales for outstanding services to medicine in 2014. He is on the editorial boards of several journals, including the British Journal of Dermatology and is deputy editor for the Journal of Investigative Dermatology. He is the Past-President of the European Society for Dermatological Research and past President-Elect of the European Dermatology Forum, a not for profit organization dedicated to improving the healthcare needs of dermatology patients in Europe.
Gregory Schultz  
PhD, Institute of Wound Research & University of Florida, USA

Session: Pathophysiology of HS  
Date: Saturday, November 4  
Title: Biofilm

Dr. Schultz is Professor of Obstetrics & Gynecology and Director of the Institute for Wound Research at the University of Florida. Dr. Schultz completed a PhD in Biochemistry from Oklahoma State University and Postdoctoral training in Cell Biology at Yale University. Dr. Schultz's research focuses on the molecular regulation of wound healing, with an emphasis on anti-scarring therapies and the roles of bacterial biofilms and elevated proteases in chronic wounds. Dr. Schultz has authored over 350 scientific publications that have been cited more than 16,500 times, is PI or Co-investigator on grants totaling over $35 million, is an inventor on 30 patents and a co-founder of two biotech companies. He was recognized by TIME magazine as an Innovation Leader in 2006. He served as a member of the National Pressure Ulcer Advisory Panel from 2007-2010, and served as President of the Wound Healing Society from 1999-2001.

Ximena Wortsman  
MD, FAIUM, Department of Dermatology of University of Chile & Department of Dermatology of Pontifical Catholic University of Santiago de Chile, Santiago, Chile

Session: Epidemiology, Co-morbidities  
Date: Saturday, November 4  
Title: Role of Dermatologic Ultrasound in HS

Dr. Ximena Wortsman is radiologist and Chair of the dermatologic ultrasound interest group at the American Institute of Ultrasound in Medicine (AIUM), which is the American Society of Ultrasound. She has been awarded the category of fellow member of AIUM, which is a way to recognize individuals who have substantially contributed in a most distinguished fashion to the field of ultrasound. During the last 17 years, she has been fully dedicated to the development of applications and research in dermatologic ultrasound. She has more than 125 publications, including the textbook “Dermatologic Ultrasound with Clinical and Histologic Correlations”. She is a member and active collaborator in several international scientific societies. She has been an invited speaker in more than 300 international and national meetings. She is the founder of the international group of DERMUS that gathers physicians dedicated to practicing dermatologic ultrasound and founder of the educational website www.skin-ultrasound.com. She obtained her MD degree and specialty in the University of Chile and then performed a subspecialty training in musculoskeletal ultrasound at the Musculoskeletal Radiology Division of the Henry Ford Hospital in Detroit where she knew the first high-frequency ultrasound machines that are now used for studying dermatologic pathologies. She is the medical director of the Institute for Diagnostic Imaging and Research of the Skin and Soft Tissues (www.idiep.com) and she is an adjunct associate professor at the Department of Dermatology of University of Chile and assistant professor at the Department of Dermatology of Pontifical Catholic University of Santiago de Chile. Her research comprises a wide field of applications of ultrasound in dermatology, being Hidradenitis Suppurativa one of her relevant lines of work where she has been actively involved in the sonographic early detection and characterization as well as in the creation of the first sonographic scoring of HS (SOS-HS).
## Program

### Friday, November 3, 2017

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>15:00</td>
<td>Registration Desk Open</td>
<td>Foyer</td>
</tr>
<tr>
<td>14:00</td>
<td>Ultrasound Workshop</td>
<td>Henry Ford Hospital</td>
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<tr>
<td>14:00</td>
<td>Opening</td>
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<tr>
<td>14:15</td>
<td>Basic Ultrasound Concepts</td>
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<tr>
<td>14:30</td>
<td>Why to use ultrasound for Diagnosis and Staging of HS</td>
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<tr>
<td>14:50</td>
<td>How to stage HS on Ultrasound – Live Demo with patient</td>
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<tr>
<td>15:10</td>
<td>Workshop with HS patients</td>
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<tr>
<td>16:50</td>
<td>Close</td>
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<tr>
<td>18:00</td>
<td>Patient Support Group</td>
<td>Henry Ford Hospital</td>
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<td></td>
<td>(patients and providers only)</td>
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### Learning Objectives
To learn how to utilize cutaneous ultrasound in assessing HS skin lesions (with demonstrations on HS patients)

**Notes**

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### Saturday, November 4, 2017

#### 07:00 – 17:00 Registration

Foyer

#### 07:00 – 08:00 Continental Breakfast

Bernard Swanson

#### 07:50 – 08:00 Conference Welcome

Wilson

- Dr. Iltefat Hamzavi, HSF
- Dr. Marc Bourcier, CHSF

#### 08:00 – 09:45 Scientific Session 1 - Epidemiology, Co-morbidities

Chair: Joslyn Kirby

**Learning Objectives:**
To understand HS, epidemiology, comorbidities, phenotypes, evaluation of quality of life, and role of cutaneous ultrasound in assessing HS skin lesions

<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Speaker</th>
</tr>
</thead>
<tbody>
<tr>
<td>08:00</td>
<td>Unmet needs and research gaps in Hidradenitis Suppurativa</td>
<td>Marc Bourcier</td>
</tr>
<tr>
<td>08:15</td>
<td>The Burden of Disease in Hidradenitis Suppurativa</td>
<td>Amit Garg</td>
</tr>
<tr>
<td>08:30</td>
<td>Phenotypes, syndromic HS, co-morbidities</td>
<td>Afsaneh Alavi</td>
</tr>
<tr>
<td>08:45</td>
<td>Identifying the True Burden of Hidradenitis Suppurativa in the UK Population</td>
<td>Vincent Piguet</td>
</tr>
<tr>
<td>09:00</td>
<td>HS QoL development and validation</td>
<td>Jerry Tan</td>
</tr>
<tr>
<td>09:15</td>
<td>Role of Dermatologic Ultrasound in HS</td>
<td>Ximena Wortsman</td>
</tr>
<tr>
<td>09:30</td>
<td>Q&amp;A Panel</td>
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</tbody>
</table>

#### 09:45 – 10:45 Oral Presentations 1 - Epidemiology, Co-morbidities

Chair: Amit Garg

<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Speaker</th>
</tr>
</thead>
<tbody>
<tr>
<td>09:45</td>
<td>Accurate Longitudinal Lesion Mapping in Hidradenitis Suppurativa: Development of a standardised mapping system for research and clinical use</td>
<td>John W. Frew</td>
</tr>
<tr>
<td>09:55</td>
<td>The Canadian population-based study of surgically managed Hidradenitis Suppurativa</td>
<td>Afsaneh Alavi</td>
</tr>
<tr>
<td>10:05</td>
<td>Effects of resilience on depression and health-related quality of life for patients with hidradenitis suppurativa</td>
<td>Melissa Butt</td>
</tr>
<tr>
<td>10:15</td>
<td>An assessment of the relative impact of skin disease vs obesity on quality of life in patients with hidradenitis suppurativa</td>
<td>Nicole Mona Golbari</td>
</tr>
<tr>
<td>10:25</td>
<td>The link between depression and inflammation in Hidradenitis Suppurativa (HS)</td>
<td>Afsaneh Alavi</td>
</tr>
<tr>
<td>10:35</td>
<td>Hidradenitis Suppurativa: The Relationship Between Pain, Depression, and Quality of Life</td>
<td>Zarine Patel</td>
</tr>
</tbody>
</table>

#### 10:45 – 11:00 Refreshment Break / Poster Viewing / Table Tops

Bernard Swanson
### Scientific Session 2 – Pathophysiology of HS
**Chair:** Afsaneh Alavi

**Learning Objectives:**
- To understand the latest research on pathophysiology of HS
- To appreciate the role of bacteria in HS

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Speaker</th>
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<tbody>
<tr>
<td>11:00</td>
<td>Pathophysiology of hidradenitis suppurativa</td>
<td>Michelle Lowes</td>
</tr>
<tr>
<td>11:15</td>
<td>Genetics of HS: A Systematic Review and Critical Evaluation of Reported Sequence Variants in Hidradenitis Suppurativa</td>
<td>John Frew</td>
</tr>
<tr>
<td>11:30</td>
<td>Update on the Role of Bacteria and the Skin Microbiome in HS</td>
<td>Haley Naik</td>
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<tr>
<td>11:45</td>
<td>Biofilms</td>
<td>Gregory Schultz</td>
</tr>
<tr>
<td>12:00</td>
<td>Debate &amp; Discussion. Bacteria are infectious pathogens in HS</td>
<td>Team For: Dr. Aude Nassif &amp; Dr. Gregory Schultz Team Against: Dr. Ramesh Mayur &amp; Dr. Haley Naik</td>
</tr>
</tbody>
</table>

### Oral Presentations 2 – Pathophysiology of HS
**Chair:** John Frew

<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Speaker</th>
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</thead>
<tbody>
<tr>
<td>13:30</td>
<td>The critical role of macrophages and alcohol in the pathogenesis of Hidradenitis Suppurativa</td>
<td>Giovanni Damiani</td>
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<tr>
<td>13:40</td>
<td>Nicastrin haploinsufficiency increases inflammatory responsiveness in keratinocytes cell lines</td>
<td>Elisha D.O. Roberson</td>
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<tr>
<td>13:50</td>
<td>Biomarkers in Hidradenitis Suppurativa</td>
<td>Lauren K. Hoffman</td>
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<tr>
<td>14:00</td>
<td>Epigenetic Alteration by DNA Hypermethylation of Genes associated with Hidradenitis Suppurativa (Acne Inversa)</td>
<td>Uppala Radhakrishna</td>
</tr>
<tr>
<td>14:10</td>
<td>Drug Induced Hidradenitis Suppurativa: A Systematic Review of Case Reports</td>
<td>John W. Frew</td>
</tr>
<tr>
<td>14:20</td>
<td>From bank to bedside: Establishment of a fresh tissue bank for hidradenitis suppurativa</td>
<td>Angel S. Byrd</td>
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</table>

### Scientific Session 3 – Medical Treatment of HS
**Chair:** Marc Bourcier

**Learning Objectives:**
To appreciate an HS treatment algorithm, wound healing options for HS, and the options and effectiveness of treating different stages of HS

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Speaker</th>
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</thead>
<tbody>
<tr>
<td>14:30</td>
<td>HS treatment algorithm (focusing on medical treatment)</td>
<td>Joslyn Kirby</td>
</tr>
<tr>
<td>14:45</td>
<td>Targeted antibiotherapy combined with surgery for remission of HS: how and why</td>
<td>Aude Nassif</td>
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<tr>
<td>15:00</td>
<td>Antibiotic stewardship in HS</td>
<td>Mayur Ramesh</td>
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<tr>
<td>15:15</td>
<td>TNF inhibitors in HS</td>
<td>Robert Micheletti</td>
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<tr>
<td>15:30</td>
<td>Hidradenitis Suppurativa in pregnancy</td>
<td>Jenny Hsiao</td>
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<tr>
<td>15:45</td>
<td>Emerging therapies in Hidradenitis Suppurativa</td>
<td>Steven Daveluy</td>
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<tr>
<td>16:00</td>
<td>Q&amp;A Panel</td>
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### Refreshment Break / Poster Viewing / Table Tops
**Bernard Swanson**
### Oral Presentations 3 – Medical Treatment of HS

**Chair: Robert Micheletti**

<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Speaker</th>
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<tr>
<td>16:30</td>
<td>The effect of chlorhexidine wash on antibacterial resistance in hidradenitis suppurativa lesions: a retrospective analysis</td>
<td>Paul Leiphart</td>
</tr>
<tr>
<td>16:40</td>
<td>Gender disparities in the onset of hidradenitis suppurativa in children</td>
<td>Amanda F. Nahhas</td>
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<tr>
<td>16:50</td>
<td>Anti-inflammatory Benefit of Levofloxacin-Metronidazole-Rifampicin in the Treatment of Hidradenitis Suppurativa</td>
<td>Lauren K. Hoffman</td>
</tr>
<tr>
<td>17:00</td>
<td>A proof of concept study of the role of topical dapsone (*) in patients with hidradenitis suppurativa</td>
<td>Eran Shavit</td>
</tr>
<tr>
<td>17:10</td>
<td>Intrallesional Triamcinolone, a Standard of Care Treatment for Acute Hidradenitis Suppurativa, Does Not Prove to Be Superior to Placebo</td>
<td>Kristen Fajgenbaum</td>
</tr>
<tr>
<td>17:20</td>
<td>A retrospective study of 39 patients with Hidradenitis Suppurativa treated with dapsone</td>
<td>Rashi Brar</td>
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</tbody>
</table>

### Case Presentations – Challenging Cases

**Chair: Jerry Tan**

<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Speaker</th>
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<tbody>
<tr>
<td>17:35</td>
<td>Parenteral Ertapenem in Hidradenitis Suppurativa</td>
<td>Taylor L. Braunberger</td>
</tr>
<tr>
<td>17:40</td>
<td>C. difficile complicating severe HS</td>
<td>Elizabeth O’Brien</td>
</tr>
<tr>
<td>17:45</td>
<td>A case of successful implementation of fractionated carbon dioxide (CO2) laser therapy to treat wound dehiscence following carbon dioxide laser excision in a patient with hidradenitis suppurativa</td>
<td>Amanda Nahhas</td>
</tr>
<tr>
<td>17:50</td>
<td>Crohn’s and HS</td>
<td>Morvarid Hessami-Booshehri</td>
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<tr>
<td>17:55</td>
<td>Q&amp;A</td>
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### Notes

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### Sunday, November 5, 2017

**07:15 – 08:15**  
HS Board Meeting *(by invitation)*  
*Private Dining*

**07:30 – 11:00**  
Registration / Poster Viewing / Table Tops  
*Foyer*

**07:30 – 08:15**  
Continental Breakfast  
*Bernard Swanson*

**08:15 – 09:45**  
**Scientific Session 4 – Management of HS**  
*Chair: Michelle Lowes*  
*Wilson*

**Learning Objectives:**
- To understand the development of the North American guidelines for management of HS, IDEOM initiatives and opportunities at NIAMS for supporting research in HS
- To learn of the recent activities of the HS Foundation

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
<th>Presenter(s)</th>
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<tbody>
<tr>
<td>08:15</td>
<td>US Evidence-based guidelines for HS treatment</td>
<td>Chris Sayed</td>
</tr>
<tr>
<td>08:30</td>
<td>Wound healing in HS</td>
<td>Hadar Lev-Tov</td>
</tr>
<tr>
<td>08:45</td>
<td>IDEOM: Development of the Core Outcome Set in Hidradenitis Suppurativa</td>
<td>Amit Garg</td>
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<tr>
<td>09:00</td>
<td>NIAMS</td>
<td>Ricardo Cibotti</td>
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<tr>
<td>09:15</td>
<td>HSF &amp; Research Roadmap</td>
<td>Michelle Lowes</td>
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<tr>
<td>09:30</td>
<td>Q&amp;A Panel</td>
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**09:45 – 10:00**  
Refreshment Break / Poster Viewing / Table Tops  
*Bernard Swanson*

**10:00 – 11:45**  
**Scientific Session 5 – Surgical Treatment of HS**  
*Chair: Iltefat Hamzavi*  
*Wilson*

**Learning Objectives:**
To understand the role of surgery and other physical treatment modalities in the management of HS

<table>
<thead>
<tr>
<th>Time</th>
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<tbody>
<tr>
<td>10:00</td>
<td>Office procedures for HS &amp; the medical dermatologist</td>
<td>Chris Sayed</td>
</tr>
<tr>
<td>10:15</td>
<td>Where Mohs surgery meets HS</td>
<td>Richard Bennett</td>
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<tr>
<td>10:30</td>
<td>Complex surgical situations in the perianal and genital area</td>
<td>Falk Bechara</td>
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<tr>
<td>10:45</td>
<td>Plastic surgery for HS</td>
<td>Aamir Siddiqui</td>
</tr>
<tr>
<td>11:00</td>
<td>Laser and Light therapies for the Treatment of Hidradenitis Suppurativa</td>
<td>Iltefat Hamzavi</td>
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<tr>
<td>11:15</td>
<td>CO2 Laser Surgery for Hidradenitis Suppurativa</td>
<td>Barry Resnik</td>
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<tr>
<td>11:30</td>
<td>Q&amp;A Panel</td>
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</table>

**11:45 – 12:15**  
**Oral Presentations 5 – Surgical Treatment of HS**  
*Chair: Chris Sayed*  
*Wilson*

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<tr>
<th>Time</th>
<th>Activity</th>
<th>Presenter(s)</th>
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<tbody>
<tr>
<td>11:45</td>
<td>Definitive surgical excision in early and complex Hidradenitis Suppurativa</td>
<td>Stephanie Goldberg</td>
</tr>
<tr>
<td>11:55</td>
<td>Results of a randomized, blinded assessment of combination therapy with IPL plus radiofrequency in hidradenitis suppurativa</td>
<td>Andreas Hafner</td>
</tr>
<tr>
<td>12:05</td>
<td>Hidradenitis Suppurativa patients can benefit from Liraglutide in order to lose weight and reduce the burden of disease</td>
<td>Sanaz Zarinebaf</td>
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</table>

**12:20 – 12:30**  
Closing Remarks  
*Wilson*
### 13:30 – 14:30  CHSF Annual General Meeting (by invitation)

Private Dining

### 13:30 – 15:45  HS School

<table>
<thead>
<tr>
<th>Topic</th>
<th>Speaker(s)</th>
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<tbody>
<tr>
<td>What causes HS?</td>
<td>Michelle Lowes</td>
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<tr>
<td>Treatment Algorithm</td>
<td>Afsaneh Alavi</td>
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<tr>
<td>Recent advances in the acute management of Hidradenitis suppurativa, pain control, and the use of local wound dressings</td>
<td>Cynthia Nicholson</td>
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<tr>
<td>Nutrition for HS</td>
<td>Lauren Hoffman</td>
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<tr>
<td>Behaviour Change and Coping Skills</td>
<td>Zarine Patel</td>
</tr>
<tr>
<td>Sexual Health, Intimacy and Chronic Illness</td>
<td>Erin Martinez</td>
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<tr>
<td>Support groups: Hope for HS</td>
<td>Angie Parks-Miller</td>
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<tr>
<td>Advocating for yourself</td>
<td>Barry Resnik</td>
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**Wilson**

### Notes

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Abstracts

Session 1: Epidemiology, Co-morbidities
Saturday, November 4, 2017

08:00 – 08:15
Unmet needs and research gaps in Hidradenitis Suppurativa
Marc Bourcier, MD, FRCPC, FAAD
Faculty of Medicine, Sherbrooke University, Moncton, NB, Canada

Hidradenitis Suppurativa received a lot of attention in the past 5 years. This is in fact due to the development of a collaborative initiative between healthcare professionals dealing with this chronic debilitating condition. The recent research’s efforts led, for the first time, to the approval of an effective therapeutic option for our patients. There is a lot to be done in various aspects of the disease. In this short lecture, I will address some of the needs and research gaps. Continuous effort is needed to keep the momentum. Hopefully the international collaboration will continue and lead to innovative therapeutic options.

08:15 – 08:30
The Burden of Disease in Hidradenitis Suppurativa
Amit Garg, MD, Joslyn S. Kirby MD, MS, MEd, Jonathan Lavian, BA, Gloria Lin, MS, Andrew Strunk, MA, Allireza Alloo, MD
1Hofstra Northwell School of Medicine, New Hyde Park, NY, USA, 2Penn State Milton S Hershey Medical Center, Hershey, PA, USA

Background: The true prevalence and incidence of Hidradenitis Suppurativa (HS) are unknown, as is the utilization of dermatology specialists in the care of HS patients.

Objective: To establish standardized overall and group-specific prevalence and incidence estimates for HS and to determine the utilization of the dermatology ambulatory encounter among HS patients in the United States.

Design: Retrospective analyses of the case cohort.

Setting: A demographically heterogeneous population-based sample of over 50 million unique patients across all US census regions.

Participants: HS patients identified using electronic health records data.

Main Outcomes: Standardized overall point prevalence and incidence for HS, as well as gender-, age-, and race-specific prevalence and incidence estimates for HS in the general US population. We also evaluated the outcome of at least one ambulatory encounter with a dermatologist.

Results:
Incidence Results: The overall incidence of HS over a 1-year period was 11.4 (95% CI 11.1-11.8) per 100,000. One-year incidence in women was 16.1 (15.5-16.6) per 100,000, more than twice that of men [6.8 (95% CI 6.5-7.2) per 100,000, p<0.0001]. Age-group specific incidence was highest among patients aged 18-29 years [22.0 (95% CI 21.0-23.2) per 100,000]. Incidence among African-Americans [30.6 (95% CI 29.1-32.2) per 100,000] was more than 2.5 times that of Caucasians [11.7 (95% CI 11.3-12.2) per 100,000, p<0.0001]. Average annual overall incidence over 10 years was 8.6 (95% CI 8.6-8.7) per 100,000.

Prevalence Results: Overall HS prevalence in the US population sample was 0.1%, or 98 per 100,000 people. The adjusted prevalence in women was 137 per 100,000 people (95% CI 136-139), more than twice that of men [58 per 100,000, 95% CI 57-59; p < 0.0001]. HS prevalence was highest among patients aged 30-39 years [172 per 100,000, 95% CI 169-275] compared with all other age groups (p < 0.0001). Adjusted HS prevalence among African Americans [296 per 100,000 people, 95% CI 291-300] and biracial patients [218 per 100,000, 95% CI 202-235] was more than three-fold and two-fold, respectively, that of Caucasians [95 per 100,000, 95% CI 94-96; p < 0.0001].

Utilization Results: Overall, 21.8% (9,170/42,020) of HS patients had at least one ambulatory encounter with a dermatologist.

Conclusions: HS is an uncommon, but not rare, disease in the United States which disproportionately affects women, young adults, as well as African American and biracial patients. Utilization of the dermatology encounter among HS patients is low.
08:30 – 08:45
Phenotypes, syndromic HS, co-morbidities
Afsaneh Alav, MD, MSc, FRCPC
Department of Dermatology, University of Toronto, Women's College Hospital, Toronto, ON, Canada

HS has a variety of phenotypes and different clinical presentations; but typically presents as recurrent, painful, deep-seated acneiform nodules and tunnels that primarily occurs in the axillary, inguinal, and anogenital regions. Multiple atypical presentations of HS have been reported in the literature. The chronic pain and disfigurement from the disease is devastating.

One of the most popular classification system for HS is based on Hurley staging. Based on the current data approximately 55% of patients have stage I, 25% stage II and 5% stage III. There are no data on how patients progress through stages of the disease, and what patients has more aggressive disease or more progressive disease.

It is believed that disease starts by occlusion of hair follicle where apocrine glands enter the hair follicle infundibulum. The blockage leads to cyst formation, colonization of the cyst by bacteria with subsequent rupture of the cyst that leads to an exuberant immune reaction. Due to immune dysregulation these patient get relapsing flares. It seems both components of abnormal pilosebaceous apparatus and aberrant immune response play role in pathogenesis of HS. HS has been reported with the occlusive disorder and also inflammatory disorders. Syndromic HS is more associated with inflammatory conditions.

Learning Objectives:
- Discuss different phenotypes of HS
- Review the syndromic presentations of HS
- Highlight the associated comorbidities with HS

08:45 – 09:00
Identifying the True Burden of Hidradenitis Suppurativa in the UK
Vincent Piguet, MD, PhD, FRCPC
University of Toronto & Women's College Hospital, Toronto, ON, Canada

Hidradenitis suppurativa (HS) is an inflammatory skin disease producing great functional impairment which can be similar to cardiovascular disease, type 2 diabetes and renal failure. HS causes pain, purulent discharge and scarring. The prevalence of HS remains controversial, with estimates ranging from 0.05% from an analysis of patient insurance claims in the USA, to 4% when young adult women were examined in person. In order to improve our understanding of HS epidemiology and its association with comorbidities, we have performed a population-based observational and case-control study using the UK Clinical Practice Research Datalink (CPRD) linked to Hospital Episode Statistics data. Physician-diagnosed cases in CPRD were identified from specific Read codes. One problem is that patients may be misdiagnosed, a common problem for many patients with HS who often report that they are diagnosed only 5 to 10 years after the start of the condition. Therefore, we developed algorithms to identify unrecognised ‘proxy’ cases, with at least five Read code records for boils in flexural skin sites. We also undertook a validation of proxy cases with General Practitioner questionnaires to confirm criteria-diagnosed cases.

We will discuss our data based on 4,364,308 research-standard records. In this study, we believe that we have been able to get closer to a "true" epidemiology of HS in the UK population and will discuss HS associations with its co-morbidities in the UK population.

Learning Objectives:
- Discuss the epidemiology of HS
- Identify the true burden of disease of HS in the UK population
- Discuss HS and its comorbidities in the UK population
09:00 – 09:15
**HS QoL Development and Validation**

Jerry Tan, MD, FRCPC
Internal Medicine and Dermatology, University of Ontario, Windsor, ON, Canada

**Background:** Evaluation and measurement of adverse quality of life (QoL) impacts should be an important goal of HS research and management. The initial iteration of the hidradenitis suppurativa QoL measure (HS-QoL), a 53-item questionnaire, has recently been published.

**Objective:** As part of ongoing development, this study had the objectives of assessing reliability, convergent validity and item reduction of HS-QoL.

**Method:** HS patients were invited to participate from 4 participating dermatology clinics (Windsor, Ontario, Canada; Hershey Pennsylvania and New York, United States; Singapore). The study comprised online completion of the 53-item HS-QoL draft along with the DLQI, DASS-21, QLES-Q-SF and a series of demographic questions. Item reduction, reliability and correlation analysis (to assess convergent validity) were conducted. Cronbach’s alpha was used to assess correlation, with values above 0.8 considered excellent; 0.7 acceptable; and 0.6 adequate.

**Results:** Data from 53 patients were analyzed. The HS-QoL was reduced from 53 items to 44 items, resulting in a seven-subscale questionnaire. These demonstrated excellent internal consistency, except for the support subscale, which demonstrated adequate internal consistency. All subscales were related to measures of QoL, life satisfaction, and mental health - demonstrating convergent validity.

**Conclusion:** This 44-item version of HS-QoL demonstrated strong preliminary evidence of reliability and validity. A strength is assessment of both positive (i.e. social support) and negative domains, as well as previously neglected domains (i.e. sexual functioning). Further work includes collaboration with the HiStoric group to streamline development of singular QoL instrument for HS.

09:15 – 09:30
**Role of Dermatologic Ultrasound in HS**

Ximena Wortsman, MD, FAIUM
Department of Dermatology of University of Chile & Department of Dermatology of Pontifical Catholic University of Santiago de Chile, Santiago, Chile

The objectives of this lecture are to review why and when is necessary to use ultrasound in hidradenitis suppurativa (HS), the main key sonographic lesions for supporting the diagnosis of HS, the sonographic staging of HS (SOS-HS) and to perform a correlation of the clinical and sonographic findings.

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**Oral Presentations 1: Epidemiology, Co-morbidities**

Saturday, November 4, 2017

09:45 – 09:55
**Accurate Longitudinal Lesion Mapping in Hidradenitis Suppurativa: Development of a standardised mapping system for research and clinical use**

John W. Frew
Liverpool Hospital, Sydney, Australia

**Learning Objectives:**
- Current severity scales do not allow for longitudinal monitoring of individual lesions
- New insights into pathophysiology of HS mean that lack of reproducibility and control for anatomical location may lead to confounding in data
- We present a proposed lesion mapping system for HS which is applicable for future use in research and clinical contexts.

**Introduction:** Hidradenitis Suppurativa (HS) has seen a plethora of advances in the standardisation of terminology and scoring systems for the evaluation of disease severity. Current scoring systems give only a snapshot of the amount and variability of lesion types at one point in time. No reliable, replicable data exists as to the natural history of progression or spontaneous resolution of lesions. Having this information at hand would maximise accurate measurement of improvement by therapeutic interventions and further inform the natural history of the disease. This is vital in order to better inform the benefits of current and future interventions. Also, as our understanding of the pathophysiology of HS increases, we are beginning to understand the varaiations in the microbiome, cutaneous occlusion and friction across areas affected by HS. Future research will need to take these factors into account as the assessment of histology, microbiome and gene expression involve a small number of punch biopsies, with site variations possibly resulting in significant confounding.
Methods and Results:
The study aims involved the development of a lesional mapping system which could be used:

- Upon live patients and standardised photography
- Quick and simple to undertake
- Document lesions in 3 dimensions with ultrasound.
- Accurately and reliably monitor changes in lesions and disease severity
- Be potentially able to be integrated into future 3D mapping software

The process of development involved:
1) Identification of anatomical landmarks
2) Establish baseline cartesian 3D coordinates.
3) Establish and define notation
4) Validation of accuracy and reliability
5) Calculation of measurement error and the minimum detectable change (MDC).

Conclusion: We present a proposal for a standardised, valid and reliable longitudinal lesion mapping system for HS which is complementary to current severity rating systems and essential for standardised research methodologies for future studies into the pathophysiology and therapeutic efficacy of novel interventions.

09:55 – 10:05
The Canadian population-based study of surgically managed Hidradenitis Suppurativa
Morteza Bashash, Ali Mehdizadeh, Laura Rosella, Alsheh Alavi1, R. Garry Sibbald, Delaram Farzanfar, Audrey Laporte, Howard Hu
1Dalla Lana School of Public Health, University of Toronto, Toronto, ON, Canada

Introduction: Hidradenitis Suppurativa (HS) is a chronic debilitating disease with long-lasting comorbidities that impose direct and indirect cost on health care system. However, no population-based studies have addressed this condition in Canada. The main objective of current study is to evaluate the economic burden of HS in Canada, and to highlight the factors associated with higher cost by using a comprehensive population based data.

Methods and Results: International Classification of Disease (ICD-10) codes and Ontario Health Insurance Plan (OHIP) billing codes were used to identify patients in a cohort of surgically managed patients captured between April, 2002 and March, 2013 in Ontario. Total annual healthcare costs, and total cumulative costs for 10 years prior and after the index date for both cases and controls were calculated using comprehensive administrative databases from Institute for Clinical Evaluative Sciences (ICES). 559 out of 7033 patients were excluded because reviewing their established diagnosis in 10 years prior to index date indicated Hyperhidrosis, a condition that could rarely receive the same billing code for surgical removal of lesions. In addition, to unify the clinical characteristics of our data, patients with HS ICD diagnosis code who did not undergo the surgery were excluded (N=230). The Johns Hopkins Adjusted Clinical Group (ACG) Classification System is designed to group similar clinical categories for individuals who are expected to require similar levels of healthcare resources.

Conclusion: This is a large cohort of the entire population of Ontario residents with a diagnosis of severe HS. This cohort represents the ethnically diverse province of Ontario; therefore, findings may be generalizable to populations in many other regions.

10:05 – 10:15
Effects of resilience on depression and health-related quality of life for patients with hidradenitis suppurativa Coping with Hidradenitis
Melissa Butt, MPH
Dept. of Dermatology - Penn State Hershey Medical Center, Hersey, PA, USA

Learning Objectives:
1. Review statistics on depression and anxiety amongst patients with HS.
2. Identify how coping strategies can affect QOL.
3. Learn which coping strategies are associated with better QOL.

Hidradenitis suppurativa (HS) is a chronic, painful inflammatory skin condition affecting an estimated 0.053-4.1% of the population. Severity varies among patients, and studies indicate that severity is correlated with worsening health-related
quality of life (HRQOL). Additionally, depression is a frequent comorbidity, affecting approximately 38-48% of HS patients and may be related to chronic HS pain. However, little information is available on how coping strategies can mitigate the effects of HS and depression on QOL. This objective of this study was to investigate coping strategies used by patients with HS and their associations with QOL. This was a multi-institutional cross-sectional survey of HS patients at four international sites. The survey included a demographics section that tracked patient-reported disease severity and locations, the Brief COPE, the Hospital Anxiety and Depression Scale (HADS), and the Dermatology Life Quality Index (DLQI). Coping methods from the Brief COPE were grouped into categories: problem-oriented, avoidant, socially-supported, and emotion-focused. Disease severity had statistically significant associations with anxiety, depression, and QOL. As HS severity increased, anxiety, depression, and QOL worsened. Additionally, those with impaired QOL used problem-oriented (OR=2.5; p-value: 0.0016) and avoidant (OR=3.5; p-value: 0.0005) coping methods more often than those with unimpaired QOL. Overall, HS patients suffer from negative psychological outcomes (depression, anxiety) and impaired QOL. These outcomes are impacted by the severity of the disease. Coping styles such as problem-focused and avoidant styles are utilized more by those with a lower QOL, suggesting that coping style plays an active role in HS QOL. Thus, future research should focus on 1) coping styles associated with a higher QOL and 2) teaching HS patients positive coping styles with the goal of increasing QOL.

10:15 – 10:25
An assessment of the relative impact of skin disease vs obesity on quality of life in patients with hidradenitis suppurativa
Nicole Mona Golbari1,2, MA Storer2, ML Porter2, AB Kimball1
1Stony Brook School of Medicine, Stony Brook, NY, US, 2Department of Dermatology, Beth Israel Deaconess Medical Center, Boston, MA, USA

Learning Objectives:
Obesity carries an additional burden for HS patients, but their skin disease is more debilitating, particularly in ability to work or study and ability to maintain personal relationships.

Introduction: Hidradenitis suppurativa (HS) is a chronic inflammatory disease strongly associated with metabolic syndrome and obesity. Obese patients with skin diseases experience more psychosocial comorbidities than their non-obese counterparts. However, the relative impairment caused by skin disease versus weight in obese patients with HS has not been reported.

Methods: Subjects were adult HS patients with a body mass index (BMI) ≥ 30. Subjects completed six questions derived from the Dermatology Life Quality Index (DLQI) relevant to both conditions: personal distress, daily activities, relationships, leisure, and work/school. Responses were scored on a five-point Likert scale (0-4). Higher responses correlated with a poorer quality of life (QoL).

Results: 31 patients participated in the study. Mean BMI was 39.1. The Hurley Stage distribution was I: 3%, II: 58%, III: 39%. The mean total impact for HS versus weight was 16.5 vs. 10.3 (maximum of 24), respectively. When comparing individual questions relevant to HS versus weight, QoL scores were all significantly higher for skin disease (Figure 1). However, in the morbidly obese (BMI>40) patients (n=11) there was no significant difference in QoL scores except for in the ability to work/study (p=.002) and problems in relationships (p=.003), in which HS disease conferred a significantly greater impact.

Conclusion: This preliminary work using questions from the DLQI (Figure 1) suggests that in obese patients with HS, skin disease confers a greater impact on quality of life than obesity.

10:25 – 10:35
The link between depression and inflammation in Hidradenitis Suppurativa (HS)
Delaram Farzanfar, Yekta Dowlati, Alsaleh Alavi
University Health Network, University of Toronto, Toronto, ON, Canada

Learning Objectives: To determine whether previous studies have investigated the role of inflammation in the psychological burden of HS and to identify an important gap in the literature for further research

Introduction: The prevalence of affective disorders such as depression and anxiety is particularly high in autoimmune diseases including inflammatory dermatological conditions such as Hidradenitis Suppurativa (HS). A dysregulated immune system response has been linked to precipitation or worsening of depression in vulnerable individuals; however, the extent to which the underlying inflammatory process in HS contributes to mood disorders and a subsequent decline in quality of life in HS patients has not been previously studied.

Methods and Results: A literature review spanning across the fields of psychology, neuroscience and dermatology was conducted to gather evidence for the role of inflammation in precipitation of affective disorders in HS patients specifically. There is ample evidence for elevated levels of circulating cytokines such as Interleukin-6 (IL-6) and Tumor Necrosis Factor

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With upper follicular occlusion, abundant apocrine gland secretions can accumulate and form perifollicular cysts. The trapped protease pathogeneic subclinical event. The abnormalities could include loss of function mutations in components the multi-system. Abnormalities in the pilosebaceous there are important pathogenic contributions from the pilosebaceous suppurative lesions in apocrine gland.

The pathogenesis of hidradenitis suppurativa is not well understood. The clinical distribution of inflammatory nodules and suppurative lesions in apocrine gland-bearing skin along with comorbidities and systemic disease associations suggest that there are important pathogenic contributions from the pilosebaceous-apocrine unit and the cutaneous and systemic immune system. Abnormalities in the pilosebaceous-apocrine unit could lead to follicular occlusion, which is considered to be an early pathogeneic subclinical event. The abnormalities could include loss of function mutations in components the multi-scaffold protease gamma-secretase gene, altered apocrine gland receptor sensitivity, variations in apocrine gland composition due to ABCC11 polymorphisms, missing sweat gland proteins, and changes in the anatomy of the hair follicle infundibular region. With upper follicular occlusion, abundant apocrine gland secretions can accumulate and form perifollicular cysts. The trapped

Conclusion: Further research is necessary to better understand the varying contribution of uncontrolled inflammatory processes and psychosocial factors arising from living with a chronic disfiguring skin disorder in relation to the development of affective disorders and quality of life outcomes in HS patients.

10:35 – 10:45
Hidradenitis Suppurativa: The Relationship Between Pain, Depression, and Quality of Life
Zarine S. Patel, MA1, 2, Elizabeth K. Seng, PhD1,3, Steven R. Cohen, MD, MPH1, Michelle A. Lowes, MB,BS, PhD1
1Hidradenitis Suppurativa Treatment Center, Division of Dermatology, Albert Einstein College of Medicine, Montefiore Medical Center, Bronx, NY, USA; 2Ferkauf Graduate School of Psychology, Yeshiva University, Bronx, NY, USA; 3Saul R. Korey Department of Neurology, Albert Einstein College of Medicine, Bronx, NY, USA

Learning Objectives:
Pain and depression are core components of HS and should be included in the comprehensive and multidisciplinary treatment of the condition.

Introduction: Pain and distress are central to the patient experience of Hidradenitis suppurativa (HS), however few studies have specifically examined the impact of pain and depression on quality of life (QoL).

Methods and Results: In an ongoing AbbVie-sponsored QoL study, over 200 well-characterized patients at our treatment center have completed validated questionnaires, including measures of depression (Beck Depression Inventory; BDI-II), health-related patient outcomes (RAND 36-Item Healthy Survey; SF-36), and quality of life (Dermatology Life Quality Index; DLQI).

Patients who completed the surveys (n=201) were predominantly women (73.6%), African American (48.8%), and had a mean age of 38.1 (SD=13.4). 32.3% were Hurley stage I, 27.9% were Hurley stage II, and 39.8% were Hurley stage III. The average BDI-II score was 13.0 (SD=10.9) indicating mild depression. The average SF-36 score on the pain subscale was 45.9 (SD=29.2) demonstrating below average health status related to bodily pain and pain interference. The average DLQI score was 15.3 (SD=8.4) representing a very large negative impact on patients' lives.

Higher DLQI scores were strongly associated with lower SF-36 pain subscale scores (r=-.70, n=194, p < .001). Higher DLQI scores were strongly associated with higher BDI-II scores (r=.56, n=194, p < .001). Higher BDI-II scores were strongly associated with lower SF-36 pain subscale scores (r=-.52, n=194, p < .001). For each of the Hurley stages, there was a statistically significant difference in SF-36 pain subscale scores [F, (2, 195) = 18.7, p < .001], BDI-II scores [F, (2, 193) = 6.3, p < .005], and DLQI scores [F, (2, 198) = 21.3, p < .001]. These scores indicate that poor QoL is associated with the severity of bodily pain and interference, as well as the severity of depressive symptoms that patients experience.

Conclusion: Pain and depression are central to the poor QoL associated with HS.

Session 2: Pathophysiology of HS
Saturday, November 4, 2017

11:00 – 11:15
Pathophysiology of hidradenitis suppurativa
Michelle A. Lowes
Rockefeller University, New York, NY, USA, Hidradenitis Suppurativa Foundation

The pathogenesis of hidradenitis suppurativa is not well understood. The clinical distribution of inflammatory nodules and suppurative lesions in apocrine gland-bearing skin along with comorbidities and systemic disease associations suggest that there are important pathogenic contributions from the pilosebaceous-apocrine unit and the cutaneous and systemic immune system. Abnormalities in the pilosebaceous-apocrine unit could lead to follicular occlusion, which is considered to be an early pathogeneic subclinical event. The abnormalities could include loss of function mutations in components the multi-scaffold protease gamma-secretase gene, altered apocrine gland receptor sensitivity, variations in apocrine gland composition due to ABCC11 polymorphisms, missing sweat gland proteins, and changes in the anatomy of the hair follicle infundibular region. With upper follicular occlusion, abundant apocrine gland secretions can accumulate and form perifollicular cysts. The trapped
Commensal bacteria can act on these apocrine secretions, and initiate an exuberant cutaneous suppurative response, bursting onto the surface of the skin or laterally into the dermis. Bacteria in the dermal tunnels can form biofilms, which initiate a persistent inflammatory process that is inadequate to remove the biofilms. The resultant chronic cutaneous suppurative inflammation then recruits the systemic immune system. The primary cytokine signature of HS is not yet known. However, IL-6 is a cytokine that may explain some of the systemic manifestations of HS, including acute phase reactants, immunoglobulins, neutrophilia, fever, as well as pain, depression and inflammatory arthritis. Obesity and stress, exacerbating factors for HS, may also contribute as adipocytes can release IL-6, and cortisol can also increase IL-6. This is a unifying hypothesis to integrate cutaneous and systemic inflammation in HS, but further studies are needed to evaluate this concept.

11:15 – 11:30
Genetics of HS: A Systemic Review and Critical Evaluation of Reported Sequence Variants in Hidradenitis Suppurativa
John W. Frew
Liverpool Hospital, Sydney, Australia

Introduction: Hidradenitis Suppurativa / Acne Inversa (HS/AI) is a severe chronic inflammatory disorder characterised by recurrent painful deep seated nodules with a predilection to the apocrine bearing areas of skin. A minority of cases of HS/AI are due to mutations in the gamma secretase complex. Contention exists surrounding the pathogenicity of sequence variants and their effects upon Notch signalling.

Method/Results: This systematic review was registered with PROSPERO (CRD42016041425) and was conducted in line with the PRISMA statement. Eligibility criteria for this review included published case reports, case series and reviews which identified sequence variants or protein/functional studies from patients with HS/AI. 62 articles reporting a total of 41 sequence variants (heterozygous missense (9 variants), splice site (9 variants), insertion resulting in frameshift (1 variant), Premature Termination Codons (19 variants), promoter region PSTPIP1 (3 variants)) with 18 associated protein/functional studies. The American College of Medical Genetics (ACMG) standards and guidelines on the interpretation of sequence variants were applied to each identified variant to assess evidence for pathogenicity. 23 variants were assessed as likely pathogenic, 17 were of uncertain significance and 1 benign.

Conclusion: The large number of variants of ‘uncertain significance’ is largely due to the variable number of functional studies. Four studies used Notch as a proxy for gamma secretase function with conclusions of non-pathogenicity based upon the assumption of Notch signalling as the sole pathogenic process. The role of Notch independent signalling mechanisms requires further research. Limitations to this study include identification of variants of Mendelian inheritance and not complex polygenic traits.

Learning Objectives

- To appreciate the genetic heterogeneity of Hidradenitis Suppurativa
- To understand the need for further functional studies into gamma secretase variants
- To appreciate the possibility of Notch-Independent mechanisms in the pathogenesis of HS

11:30 – 11:45
Update on the Role of Bacteria and the Skin Microbiome in HS
Haley Naik, MD
UCSF School of Medicine, Department of Dermatology, San Francisco, CA, USA

Microbes are believed to play an important role in initiating and perpetuating HS. While conventional culture-based methods have been used to identify microorganisms in HS lesions, they have failed to isolate organisms in 50% of HS lesions because less than 1% of bacterial species are cultivatable under standard laboratory conditions. In recent years, culture-free, sequence-based genomic approaches have been able to provide a comprehensive and unbiased assessment of the diverse microorganisms existing on the skin and mucosal surfaces in health and disease. This talk will review what is known about microbial diversity in HS, and discuss the role of dysbiosis in HS pathogenesis and management.

11:45 – 12:00
Biofilms in Hidradenitis Suppurativa
Gregory Schultz, PhD
Institute of Wound Research & University of Florida, USA

Hidradenitis suppurativa (HS) is a chronic inflammatory disease of the skin that results in a relapsing course of painful draining sinuses and abscesses. HS occurs most frequently in the apocrine gland–bearing regions of the body (axillary, inguinal and anogenital areas). It is usually treated by antibiotics and/or surgery. HS is likely to result from multiple pathologies that may include a genetic component in some cases. However, recent data strongly indicates that bacterial biofilms play a major role in stimulating the chronic inflammation that characterizes acute and chronic HS lesions. These
include histological detection of biofilm bacteria structures in a high percentage of chronic lesions (67%) and perilesional (75%) samples, especially in association with hair follicles and sinus tracts, high tolerance of bacteria in HS lesions to oral antibiotics and antiseptics, and abundant inflammatory cells. These characteristics are similar to 18 other clinical pathological conditions that are well established to be due to bacterial biofilms.

**Oral Presentations 2: Pathophysiology of HS**

Saturday, November 4, 2017

13:30 – 13:40

**The critical role of macrophages and alcohol in the pathogenesis of Hidradenitis Suppurativa**

*Giovanni Damiani¹*, Elena Pezzolo, Ilaria Coati, Nicola Milanesi, Simone Ribero, Michela Iannone, Stefano Veraldi, Emilio Berti

¹Young Dermatologists Italian Network (YDIN), GISED giovani, Bergamo, Italy; ²Dipartimento di Fisiopatologia Medico-Chirurgica e dei Trapiantì, Università degli Studi di Milano, Unità Operativa di Dermatologia, IRCCS Fondazione Ca’ Granda, Ospedale maggiore Policlinico, Milano, Italy

**Learning objectives:**

1. Despite of alcohol abuse is not prevalent in HS patients, alcohol use may trigger inflammation and the appearance of new lesions in susceptible patients with HS.
2. Alcohol may play a pivotal role in polarize and activate macrophages infiltrating dermis of early HS lesions, activate the inflammasome and dysregulate lymphopoiesis, as suggested in other inflammatory diseases.

**Introduction:** Hidradenitis suppurativa (HS) is a chronic autoinflammatory disease, characterized by a dysregulated immune response to skin flora that lead to a macrophages and neutrophils early infiltration of derma. Despite of alcohol-abuse is not signaled in HS patients, in literature also a chronic alcohol exposure is a demonstrated mechanism that cause immune dysfunction by polarizing and triggering macrophages infiltration. So far, our objective is to study the role of alcohol in HS patients’ life with a multicenter prospective observational study.

**Methods:** HS patients with different severity scores were randomly enrolled in a 3-months prospective observational study. Physicians’ assessments were performed at T0 and at T1, after 3 months. Patients had to complete at T0 and at T1 two questionnaires, namely AUDIT (Alcohol Use Disorders Identification Test), DLQI (Dermatological quality of Life Index), and physicians had to complete ADDI (Autoinflammatory Disease damage Index) and Sartorius score. A diary of daily alcohol consumption and presence of new lesions was given to each patient. All data were analyzed with linear statistics and artificial neural networks.

**Results:** Patients with higher AUDIT index are young patients (18-45 years old), with low ADDI, Sartorius mild to moderate, various DLQI from mild to severe. They globally showed a higher rate of new lesions.

**Conclusions:** The role of alcohol in HS remains still unclear, however in susceptible patients could trigger and/or maintain immune dysregulation by acting on macrophage polarization.

13:40 – 13:50

**Nicastrin haploinsufficiency increases inflammatory responsiveness in keratinocytes cell lines**

*Elisha D.O. Roberson*

Departments of Medicine & Genetics, Division of Rheumatology, Washington University, St. Louis, MO, USA

**Learning Objectives:** Greater understanding of the cellular effects of NCSTN mutation types observed in familial HS.

**Introduction:** In some rare families with autosomal dominant hidradenitis suppurativa (HS), causative mutations in components of the gamma-secretase complex have been previously identified. The most prevalent mechanism is heterozygous loss-of-function in nicastrin (NCSTN). We sought to characterize the effects of NCSTN haploinsufficiency in vitro using human cells lines depleted either by shRNA knockdown or CRISPR/Cas9 genome-editing.

**Methods and Results:** We developed shRNA knockdown constructs for NCSTN and tested their effects in both HEK293 embryonic kidney cells and HEK001 immortalized keratinocytes. After selecting for the knockdown construct and confirming the decrease in NCSTN levels, we performed whole-transcriptome profiling using Illumina beadarrays. We characterized cellular proliferation by non-radioactive assays, and cytokine responsiveness using transcription factor-
responsive luciferase constructs. We also genome-engineered HEK293 lines with partial or complete loss of NCSTN, as well as a fluorescence-tagged NCSTN line.

In HEK001 immortalized keratinocytes, haploinsufficiency of NCSTN increases inflammatory responsiveness and decreases the expression of cell-cycle related genes. The most significantly enriched functional categories for increased genes were Interferon alpha/beta signaling (REAC:909733) and response to type I interferon (GO:0034340). In contrast, genes significantly decreased were enriched for Mitotic Prometaphase (REAC:68877) and chromosome segregation (GO:0007059). We confirmed differences in proliferation that present only after contact inhibition.

HEK293 knockdown cells had significantly increased fluorescence from an NFkB reporter at baseline and after stimulation with interferon-gamma, but not after stimulation with TNF. However, the HEK293 genome-edited lines only exhibited increased response to TNF stimulation.

Conclusion: While families with NCSTN loss-of-function are rare, the effects of such loss can be characterized in vitro. Importantly, the effects of NCSTN loss are cell-type specific. Evidence for increased inflammatory responsiveness suggests HS may be a classical autoimmune/inflammatory disease. This highlights the need for greater study of affected human tissues, and dissection of cell-type specific circuits controlled by the gamma-secretase complex.

13:50 – 14:00
Biomarkers in Hidradenitis Suppurativa
Lauren K. Hoffman, L Tomalin, O Lukatskaya, M Suarez-Farinas, MA Lowes
Albert Einstein College of Medicine, Bronx, NY, USA

Learning Objectives:
To understand the current state of knowledge of serum biomarkers in HS.

No diagnostic test exists for Hidradenitis Suppurativa (HS), nor have biomarkers been identified that reliably describe disease activity. First, the current literature on biomarkers in HS was reviewed to compile a list of published candidate biomarkers, including how these biomarkers related to disease activity. Second, serum multiplex proteomic data, provided by the investigators of an anti-IL-12/23 (ustekinumab) treatment study of HS patients (Blok et al, BJD, 2016), was re-analyzed to determine the proteomic disease signature and response to treatment.

Published serum biomarkers ESR, CRP, sIL-2R, TNF, IL-6, IL-17, IL-32, S100A8/A9, lipocalin (LCN2), chitinase-3-like protein (YKL-40), MMP8, IgA, IgE, IgG were increased in HS compared to normal individuals. ESR, CRP, sIL-2R, IL-17, IL-6, YKL-40, MMP8, IgA and IgG were also elevated in advanced HS. LTA4H, FSH, HCG and LH were decreased in HS, as was hemoglobin, which also correlated with disease activity. The proteomic data (SOMAscan, 1129 proteins) in patients with HS (F:M 13:4, age range 20-53 years, Hurley stage II n=13, stage III n=4) was compared to healthy volunteers (n=10).

The re-analysis of proteomic data utilized mixed effect models with random intercept, significantly expressed proteins were >1.5-fold change and FDR <0.05. In this new analysis, upregulated proteins included C5a, energy-producing proteins (GAPDH, PKM2, and adenylate kinase), and nuclear transport proteins (RAN and importin b1). Downregulated genes included complement proteins (C3b, C4b, C3bi, C3), and the T cell receptor ICOS. Treatment with anti-IL-12/23 did not resolve the HS disease proteomic signature in responders (>30% improvement in modified Sartorius scale, n=14), and there was little overlap between the HS disease proteomic signature and the proteins that changed with treatment.

This HS disease proteomic signature should be evaluated in relation to disease activity and in future clinical trials.


14:00 – 14:10
Epigenetic Alteration by DNA Hypermethylation of Genes associated with Hidradenitis Suppurativa (Acne Inversa)
Uppala Radhakrishna
Department of Obstetrics and Gynecology, Oakland University- William Beaumont School of Medicine, Royal Oak, MI, USA

Introduction: Hidradenitis suppurativa/Acne inversa is a chronic inflammatory disease due to cutaneous folliculocclusion. It is characterized by painful nodules arising from the hair follicle. Histologically, pre-clinical lesions appear as comedo-like lesions. The disease has a prevalence of 1 to 4% in the general population. There is no known cure or consistently effective remedy currently available. Patients develop a variety of significant comorbidities with an increased mortality risk. It results from a combination of genetic and environmental factors and is influenced negatively by obesity. HS displays genetic heterogeneity and may be traced to specific γ-secretase gene mutations in some families, whilst these gene mutations are not present in other sporadic case

Methods and Results: To identify DNA methylation biomarkers for the detection of HS, a genome-wide DNA methylation scan using the Infinium HumanMethylation450 BeadChip array (Illumina) was performed in a cohort of 24 HS subjects
previously excluded from γ-secretase mutations and 24 controls. We identified significant CpG hypermethylation (at least 2.0-fold) at 304 sites in 304 genes in HS subjects (false discovery rate (FDR) ≤0.00001). No hypomethylation was detected. These 304 CpG sites have a receiver operating curve area under the curve (ROC AUC) ≥0.75 and for HS detection. A total of 23 cytosine loci had excellent accuracy (AUC ≥ 0.90) for the detection of HS. Analysis of the GDAC FIREHOSE database indicated that the methylation differences correlated with differences in gene expression. Ingenuity Pathway Analysis (IPA) revealed the involvement of multiple signaling pathways including the Notch pathway implicated in the development of skin and other cancers, wound healing, immunological processes, cell cycle regulation and apoptosis, and the formation of channel proteins that are required for skin development and growth.

Conclusion: The study provided insights into the pathogenesis of HS and generated novel and accurate putative biomarkers for HS detection.

14:10 – 14:20
Drug Induced Hidradenitis Suppurativa: A Systemic Review of Case Reports
John W. Frew
Liverpool Hospital, Sydney, Australia

Learning Objectives:
- To appreciate that rare reports of drug-induced HS exist.
- To identify innate immune cellular pathways involved in these cases which may give insight into the pathophysiology of HS.
- To understand that evaluation of drug-induced HS using the Naranjo criteria suggest a possible drug-induced cause for disease, however the contribution of drug is likely minor compared to other well-established precipitants.

Introduction: Hidradenitis Suppurativa (HS) is a severe chronic inflammatory disorder characterised by recurrent painful deep-seated nodules with a predilection to the apocrine bearing areas of skin. Rare reports of drug induced HS exist, however it is unclear whether the implicated medications function via common deregulatory mechanisms.

Methods and Results: This systematic review was registered with PROSPERO (CRD42016051943) and was conducted in line with the MOOSE guidelines. Eligibility criteria for this review included published case reports and case series of drug induced HS regardless of age, gender, ethnicity or implicated drug. All cases were evaluated using the Naranjo criteria. 18 publications reporting 48 individual case reports of HS/AI were identified. The most common implicated drugs included Adalimumab (17 cases), Infliximab (9 cases), lithium (4 cases), Etanercept (4 cases), Rituximab (2 cases), Vemurafenib (2 cases), Tocilizumab (1 case). The average Naranjo score was 2.79 (Range 1-3 SD= 0.54) corresponding to a ‘possible’ probability of drug induced aetiology. Thirty of the forty-eight cases (62.5%) included data pertaining to obesity, family history, smoking and other risk factors. Of these 30 cases, 29 (96.7%) had a prior history of HS (n=3), an underlying family history (n=2), was an active smoker (n=16) was classified as overweight or obese (n=18), or an underlying inflammatory condition with known correlation with HS (n=25).

Conclusion: The overall evidence for drug-induced HS is low. The majority of cases had an alternative explanation for the development of HS based upon known risk factors apart from the suggested medication. Commonalities of the implicated medications include mechanisms involving Toll-like receptor pathways. This will be an important avenue for future research into the pathophysiology of HS.

14:20 – 14:30
From bank to bedside: Establishment of a fresh tissue bank for hidradenitis suppurativa
Ginette A. Okoye¹, Angel S. Byrd¹, Michelle L. Kerns¹, Carmelo Carmona-Rivera², Philip M. Carlucci², Julie A. Caffrey², Stephen M. Milner³, Justin M. Sacks⁴, Oluseyi Aliu⁴, Lloyd S. Miller¹, Mariana J. Kaplan²
¹Department of Dermatology, Johns Hopkins University School of Medicine and Bayview Medical Center, Baltimore, MD, USA; ²Systemic Autoimmunity Branch, National Institutes of Arthritis and Musculoskeletal and Skin Diseases, National Institutes of Health, Bethesda, MD, USA; ³Department of Plastic and Reconstructive Surgery, Johns Hopkins University Medical Center, Burn Unit, Bayview Campus, Baltimore, MD, USA; ⁴Department of Plastic and Reconstructive Surgery, Johns Hopkins University School of Medicine, Baltimore, MD, USA

Learning Objectives: Following this presentation the attendee should be able to:
1. Discuss the presentation of hidradenitis suppurativa (HS)
2. Understand the process of establishment of a fresh tissue bank
3. Identify basic science approaches to studying and understanding HS
Introduction: Hidradenitis suppurativa (HS), also known as acne inversa, is an incapacitating skin disorder of the axillae, groin, anogenital area, and other intertriginous areas. The disease manifests as abscesses and boils resulting in fistulas and tissue scarring as it progresses. Although HS is becoming more common, with an estimated prevalence of 0.053-4%, the etiology is unknown. Surgical resection of affected areas is often the best responsive treatment. We sought to establish a fresh tissue bank to study the role of the host immune response in HS.

Methods and Results: Using the Johns Hopkins University School of Medicine approved IRB protocols for discarded tissue and biospecimen collection, tissue resections from a total of 3 different body sites from 9 HS patients who underwent scheduled surgeries have been collected. In addition, we have collected biospecimens including blood, plasma, serum as well as HS fibroblasts. After surgical resection, each patient had a tissue section that (1) was placed in optimal cutting temperature compound for cryosectioning and immunohistological analysis, (2) was homogenized and analyzed for specific protein regulation, (3) underwent simultaneous RNA extraction and purification, and (4) was saved for future reference. All biospecimens have been properly stored at -80°C using a de-identifiable label. When indicated, blood was drawn and specific cellular subsets and behaviors were analyzed. We observed specific HS cellular functions, established cytokine profiles, determined mRNA expression, and cultured monocytes/macrophages and fibroblasts. Our overall analyzes indicate a chronic immune response in HS compared to normal controls.

Conclusion: To our knowledge, this is the first initiation of a fresh tissue bank for HS. These efforts will allow for further assessment of immunopathological mechanisms to better understand HS disease pathogenesis. Ultimately, providing means to monitor disease improvement or progression and promoting the development of new potential therapeutic targets to help patients suffering from this debilitating disease.

Session 3: Medical Treatment of HS
Saturday, November 4, 2017

14:30 – 14:45
HS treatment algorithm (focusing on medical treatment)
Josyn Kirby
Department of Dermatology, Pennsylvania State, Hershey, PA, USA

This session will discuss the foundational approach to treatment of hidradenitis suppurativa. This includes a stage-based approach to therapy that utilizes multimodal therapy, meaning a combination of medical and surgical approaches. The sessions will also highlight the association of hidradenitis suppurativa with other comorbid conditions and adverse effects of medications.

14:45 – 15:00
Targeted antibiotherapy combined with surgery for remission of HS: how and why
Aude Nassif
Institut Pasteur, Centre Médical, Paris, France

Introduction: Hidradenitis suppurativa (HS) is a therapeutic challenge. Various antibiotherapies have been used with different levels of improvement, but there was no report of remission. We report microbiology results in HS lesions and the retrospective and prospective efficacy of targeted antibiotics.

Methods/Results: We first prospectively studied bacteriology of HS lesions by prolonged cultures and metagenomics and isolated different profiles according to Hurley severity score. After stopping systemic NSAIDs and steroids, we targeted the antibiotherapy according to the isolated flora and Hurley staging. We observed remissions. However, relapses were the rule without maintenance treatment. With a light maintenance treatment, relapses are observed only in scars, implying that biofilm persistence might explain these. Since no medical treatment is currently efficient on biofilms, in order to avoid regular use of potent antibiotics for relapses and risk of appearance of resistances to antibiotics, we presently perform surgery on each scar that relapses twice or more within 6 months after remission. Surgery is performed after cooling down the flare with targeted antibiotics. This antibio-surgical combination seems to obtain sustained remissions.

Conclusions: Targeted antibiotherapy can obtain remission in HS, but following relapses demonstrate the need for surgery. Moderate and severe HS seem to need a continuous light maintenance treatment. These data need a confirmation by randomized controlled trials. In the future, medications targeted towards the genetic anomaly should help to spare the use of antibiotics.

Learning objectives:
1. To know the microbiology of HS lesions, which correlates with Hurley stage and guides the choice of antibiotics
2. To know which patients can be treated with antibiotics or not and what can be expected from appropriate antibiotic therapy in HS according to Hurley staging (including secondary prophylaxis of flares after clinical remission)
3. To know when and how surgery must be used in patients treated by antibiotics to limit their inappropriate use.

15:00 – 15:15
**Antibiotic stewardship in HS**
*Mayur Ramesh*
Department of Internal Medicine / Infectious Diseases, Henry Ford Hospital, Detroit, MI, USA

The role of antibiotics in the management of HS is not well established. Learning objectives from this talk includes:
1. Potential role of bacteria in the pathogenesis of HS
2. Role of microbiota and biofilms in HS
3. Rationale use of antibiotics in the management of HS
4. Potential adverse effects of long term antibiotic use in HS

15:15 – 15:30
**TNF inhibitors in HS**
*Robert Micheletti*
Department of Dermatology, Hospital of the University of Pennsylvania, Philadelphia, PA, USA

- abstract not available at time of printing -

15:30 – 15:45
**Hidradenitis Suppurativa in pregnancy**
*Jenny Hsiao, MD*
Ronald Reagan UCLA Medical Centre, UCLA Medical Center, Santa Monica, CA, USA

Hidradenitis suppurativa (HS) commonly affects women of childbearing age, therefore it is important for practitioners to be familiar with management of HS during pregnancy. Lifestyle modifications should be discussed with patients, including smoking cessation and weight management (encouraging appropriate weight gain) during pregnancy. Medical therapeutics that can be tried include certain topical and oral antibiotics, metformin, and biologics like adalimumab, infliximab, ustekinumab, and anakinra. Other treatment considerations include zinc supplementation and intralesional steroid injections. Hormone-based treatments like spironolactone are contraindicated and should be avoided. Procedural interventions including excisions with local anesthesia, laser therapy, and cryoinsufflation may also be considered. Close attention should be paid to the pregnant patient’s overall well-being, as pregnancy can exacerbate conditions that have a higher incidence in HS patients, including mood disorders and metabolic syndrome.

15:45 – 16:00
**Emerging therapies in Hidradenitis Suppurativa**
*Steven Daveluy*
Wayne State University Department of Dermatology, Dearborn, MI, USA

Recent insights into the pathophysiology of hidradenitis suppurativa have led to the development of new medical therapies that address the inflammatory pathways involved in the disease. This ultimately led to the FDA approval of the first medication indicated for the treatment of hidradenitis, the TNF-α inhibitor adalimumab. I will discuss emerging therapies for hidradenitis and review the inflammatory pathways through which they act, including IL-1, IL-12/32, IL-17 and PDE4.
The effect of chlorhexidine wash on antibacterial resistance in hidradenitis suppurativa lesions: a retrospective analysis

Paul Leiphart
Penn State College of Medicine, Hersey, PA, USA

**Learning Objective:**
To examine if the use of chlorhexidine can reduce antimicrobial resistance in HS lesions.

Antibiotics are commonly used in the treatment for hidradenitis suppurativa (HS). There is increasing concern for antibacterial resistance. We sought to examine the effect of antimicrobial washes on the frequency of antibiotic resistance in HS lesions. A cross-sectional analysis was done on patients with HS at Penn State Health from 2005 to 2017. Table 1 shows that patients using a concomitant chlorhexidine wash while taking antibiotics did have lower rates of resistance to macrolides (33.33% vs 50.00%), clindamycin (0.00% vs 20.00%), cephalosporins (13.33% vs 44.44%), fluoroquinolones (0.00% vs 5.71%), aminoglycosides (0.00% vs 5.71%), and daptomycin (0.00% vs 10.00%) than patients who were taking antibiotics without a concomitant chlorhexidine wash. However, none of the differences in the patterns of antibacterial resistance were statistically significant, regardless of the antibiotic class. The number of patients that were identified with HS who had wound and/or tissue cultures with antibacterial susceptibilities was limited. Antibiotic therapy in HS might be increasing the number of resistant organisms in HS lesions. Using a concomitant chlorhexidine cleanser might decrease the rates of antibiotic resistance in HS lesions, however we did not detect a significant difference in the patterns of antibiotic resistance with or without the use of a concomitant chlorhexidine cleanser.

Table 1. Patterns of Antibiotic Resistance by Antibiotic class for all samples and by use of concomitant antibacterial cleanser

<table>
<thead>
<tr>
<th>Antibiotic class</th>
<th>All samples</th>
<th>Concomitant Cleanser</th>
<th>No Concomitant Cleanser</th>
</tr>
</thead>
<tbody>
<tr>
<td>Penicillins</td>
<td>75/165 (45.45%)</td>
<td>13/25 (52.00%)</td>
<td>29/56 (51.79%)</td>
</tr>
<tr>
<td>Macrolides</td>
<td>12/27 (44.44%)</td>
<td>1/3 (33.33%)</td>
<td>5/10 (50.00%)</td>
</tr>
<tr>
<td>Clindamycin</td>
<td>6/27 (22.22%)</td>
<td>0/3 (0.00%)</td>
<td>2/10 (20.00%)</td>
</tr>
<tr>
<td>Cephalosporins</td>
<td>13/67 (19.40%)</td>
<td>2/15 (13.33%)</td>
<td>8/18 (44.44%)</td>
</tr>
<tr>
<td>Tetracycline</td>
<td>6/33 (18.18%)</td>
<td>1/5 (20.00%)</td>
<td>2/11 (18.18%)</td>
</tr>
<tr>
<td>Fluoroquinolones</td>
<td>10/101 (9.90%)</td>
<td>0/15 (0.00%)</td>
<td>2/35 (5.71%)</td>
</tr>
<tr>
<td>Aminoglycosides</td>
<td>2/47 (4.26%)</td>
<td>0/9 (0.00%)</td>
<td>2/35 (5.71%)</td>
</tr>
<tr>
<td>Daptomycin</td>
<td>1/27 (3.70%)</td>
<td>0/3 (0.00%)</td>
<td>1/10 (10.00%)</td>
</tr>
<tr>
<td>Carbapenems</td>
<td>0/16 (0.00%)</td>
<td>0/6 (0.00%)</td>
<td>0/5 (0.00%)</td>
</tr>
<tr>
<td>Linezolid</td>
<td>0/27 (0.00%)</td>
<td>0/3 (0.00%)</td>
<td>0/10 (0.00%)</td>
</tr>
<tr>
<td>Quinupristin/Dalfo</td>
<td>0/27 (0.00%)</td>
<td>0/3 (0.00%)</td>
<td>0/10 (0.00%)</td>
</tr>
<tr>
<td>Rifampin</td>
<td>0/27 (0.00%)</td>
<td>0/3 (0.00%)</td>
<td>0/10 (0.00%)</td>
</tr>
<tr>
<td>Trimeth-Sulfamethoxazole</td>
<td>0/32 (0.00%)</td>
<td>0/5 (0.00%)</td>
<td>0/11 (0.00%)</td>
</tr>
<tr>
<td>Vancomycin</td>
<td>0/24 (0.00%)</td>
<td>0/3 (0.00%)</td>
<td>0/8 (0.00%)</td>
</tr>
</tbody>
</table>

*No results had p-value ≤ 0.05

Gender disparities in the onset of hidradenitis suppurativa in children

Amanda F. Nahhas1, Cynthia L. Nicholson, M.D.2, Angela Parks-Miller, Lauren Gold3, Iltefat Hamzavi1
1; 2. Wayne State University, Department of Dermatology, Detroit, MI, USA

**Learning objectives:** Early recognition of HS is key and gender predilection to pre- and post-pubertal timing of HS onset is an additional piece of information which may facilitate early recognition and treatment of HS in children and prevent subsequent disease progression.

**Introduction:** Hidradenitis suppurativa (HS) is a chronic, relapsing and remitting inflammatory disorder of the hair follicle characterized by painful, recurrent abscess formation with predilection to intertriginous skin folds. Progression of disease can lead to sinus tract formation, scarring, contractures, and malodorous drainage causing significant psychosocial distress. Onset of HS typically occurs between age 20 and 24 years old, however, HS can have onset in childhood.1 Hormone imbalances are thought to play a more significant role in childhood-onset HS in comparison to adults.1,4
Methods: A retrospective chart review was performed at Henry Ford Hospital over an 18-month period. Of the 93 patients under the age of 18 with history of HS, a total of 33 patients (10 males and 23 females) were selected for inclusion in this study based on available documentation of age of pubertal onset or pre-pubertal status. Included patients were divided into two groups based on timing of HS onset: prepubescent (n=12, females=5, males=7) and postpubescent (n=21, females=18, males=3). Hurley staging, used to classify disease severity, and family history of HS were also documented and compared between groups.

Results: The results of the gender comparison among the 33 patients included in the study indicate that pediatric patients with postpubescent HS onset were more likely to be female (85.7% female versus 14.3% male after puberty compared with 41.7% female and 58.3% male before puberty, p = 0.016). Statistical significance was not detected for the Hurley staging comparison (p = 0.147) or the family history of HS comparison (p = 0.470).

Conclusions: These results indicate that children who develop HS after puberty are more likely to be female. Hurley staging and family history of HS do not appear to have significant differences when compared between prepubescent and postpubescent children with HS.

References

16:50 – 17:00

Anti-inflammatory Benefit of Levofoxacin-Metronidazole-Rifampicin in the Treatment of Hidradenitis Suppurativa

Lauren K. Hoffman, YS Soliman, and SR Cohen
1Albert Einstein College of Medicine/ Montefiore Medical Center, Bronx, NY, USA

Learning Objectives:
To understand the efficacy and mechanism of triple antibiotic therapy (levofloxacin, metronidazole, and rifampicin) in the treatment of HS.

Numerous studies have reported the efficacy of antibiotics in the treatment of hidradenitis suppurativa (HS), but the question of whether antibiotics target microbial or inflammatory factors remains uncertain. Mechanisms for the anti-inflammatory properties of clindamycin and rifampicin have been proposed; however, less information exists for another commonly used antibiotic regimen, levofloxacin, metronidazole, and rifampicin. We conducted a retrospective chart review of 19 patients attending the Einstein/Montefiore HS Treatment Center who received this triple antibiotic regimen for at least 6 months. Demographics, disease severity, and quality of life data were compiled. The patients in our cohort included 15 patients with Hurley stage III, 3 with stage II, and 1 with stage I. The duration of treatment ranged from 6 to 24 months. In 13 of 19 patients, bacterial cultures of affected skin were obtained. Twelve patients (92%) grew normal skin flora. Nearly half of the patients experienced an improvement in pain and drainage, while 17 patients (89%) reported fewer HS flares. Quality of life measures, including Dermatology Life Quality Index, were also significantly decreased at 6 months of treatment. Our results affirm significant improvement of both clinical and psychological measures in HS patients treated with levofloxacin, metronidazole, and rifampicin. The target of these antibiotics remains unclear given the observation of uniformly normal skin flora. Improved symptoms in the absence of overt bacterial pathogens suggest the efficacy of antibiotics relates to anti-inflammatory rather than antimicrobial effects.

17:00 – 17:10

A proof of concept study of the role of topical dapsone (†) in patients with hidradenitis suppurativa.

Afsaneh Alavi MD FRCPC, Jeannine A. Archer MD, Dalal Almutairi MD, Sharon A. Whitty MSc MB BCh BAO, Monica Grewal MB BCh BAO, Divine Joyce Briones RPN, Eran Shavit
1Women's College Hospital, Division of Dermatology, University of Toronto, Canada

Hidradenitis Suppurativa (HS) is an inflammatory neutrophilic disorder presenting with recurrent painful deep nodules, tunneling, tract formation and significant scarring. The severity of disease correlates to reduced patient quality of life (QoL) (1). Current HS treatments are limited in benefit and produce variable results (2). The literature suffers from lack of
evidence on topical therapy of HS and the current guideline recommend use of topical clindamycin. However; there is a growing evidence on bacterial resistant in these patients.

Topical dapsone is an FDA approved drug for acne, which inhibits neutrophilic infiltration, reducing the inflammatory burden of the skin (3). The benefit of dapsone for short-term reduction in the number of lesions has been reported in mild HS by experts, however there is no study on the role of topical dapsone in HS (4). In addition, to the lower risk of bacterial resistance the benefit of topical dapsone for improving pain and lesion count in patients with HS has yet to be explored.

Methodology: The aim of the study was to determine if topical dapsone (aczone 5% gel) applied to HS lesions pain and lesion count. A retrospective search produced 29 subjects with HS who were treated with aczone. Demographics included patients from 13-60yrs, and a ratio of F:M = 4:1. Length of HS diagnosis to aczone use ranged from months to 25 yrs. lesions located in the axilla, groin or sub-mammary regions. Patient satisfaction questionnaires and Dermatology Quality of Life Questionnaires (DLQI) were administered in follow-up.

Results: Current results from patients with a recent diagnosis and low Hurley Scores indicate Aczone gel was beneficial for reducing pain and itching, without adverse reaction.

Conclusion: This is a preliminary study as recruitment is on-going. The initial results point to improved itching and pain in these patients. There is a need for randomized trial comparing the effect of topical dapsone as a topical therapy for HS with placebo or standard treatment.

(*) – VALLIANT®

References:

17:10 – 17:20
Intralesional Triamcinolone, a Standard of Care Treatment for Acute Hidradenitis Supparativa, Does Not Prove to Be Superior to Placebo

Kristen D. Faijenbaum, Dr. Chris J. Sayed,
University of North Carolina at Chapel Hill School of Medicine, Chapel Hill, NC, USA

Intro: Hidradenitis suppurativa (HS) is a chronic, inflammatory skin disease that presents with painful and recurrent nodules, abscesses, and sinus tracts that are in primarily intertriginous locations. The pain, discomfort, pruritus, and malodor associated with HS often have a significant negative impact on patients’ professional, personal, and social lives.

Limited clinical trial data exists regarding the management of acute exacerbations. Clinical experience and a single cohort study suggests that intralesional triamcinolone may be useful, but its effectiveness had not been extensively assessed. Intralesional steroid injections are commonly used for other localized inflammatory skin diseases, so the assumption is often made that it is beneficial for the treatment of acute HS lesions. This study aims to assess the efficacy of intralesional triamcinolone at resolving lesions and decreasing pain during acute flares.

Methods/Results: This is a randomized, double-blind, placebo-controlled trial comparing intralesional triamcinolone 10mg/ml, triamcinolone 40mg/ml, and normal saline as a placebo control. Up to three lesions could be treated in each patient identified as having HS with each lesion being individually randomized to a treatment group. Subjects were asked to log their pain scores and days to resolution of lesions on a standardized survey over a fourteen-day period, as well as their overall satisfaction with the injections at day fourteen. Self-reported outcomes were analyzed using P-Values and 95% Confidence Intervals. There were no significant differences in days to lesion clearance, day 5 pain reduction compared to baseline, or patient satisfaction.

Conclusion: Contrary to our expectations and standard of care practices, this research demonstrates no significant difference between normal saline, intralesional triamcinolone 10mg/ml, and triamcinolone 40mg/ml in treating acute HS lesions. Performing these injections may be exposing patients to the pain of needle sticks, effects of steroids, and unnecessary monetary costs without benefit.
A retrospective study of 39 patients with Hidradenitis Suppurativa treated with dapsone

Rashie Brar, Rosielle Lanzini, Hermenio Lima
Division of Dermatology, McMaster, Hamilton, ON, Canada

Background: Hidradenitis Suppurativa (HS) is a chronic inflammatory condition, which has undergone recent modifications in its etiology, pathogenesis, and treatment. Dapsone; a drug widely used in pustular dermatosis, has low evidence level as primary therapy because of the lack of study. We present here our experience with dapsone as a single treatment or in combination with other medications in a cohort of HS patients.

Objective: To evaluate the effectiveness and adverse effects of dapsone as a single treatment or in combination with other therapies for HS treatment.

Methods: A retrospective review of HS patient’s file was performed at the Dermatology division from McMaster University Medical School between 2010 to 2017. Clinical improvement such Hidradenitis Suppurativa Clinical Response (HiSCR) or physician global assessment (PGA), and adverse registered the attending physician were collected. Descriptive analysis was done using JMP®.

Results: Fifty-nine HS patients were identified in follow-up using systemic treatment. From these patients, 61% (n=36) were female and they had 38.1-year-old mean age when started the treatment. Dapsone with a minimum dose of 100 mg daily has been used in 39 patients (66.1%). Dapsone was used as monotherapy in 56.4% (n=22) patients. Dapsone was used in combination with adalimumab in 41% (n=16) patients and one patient (2.6%) with isotretinoin. Dapsone as a single treatment or in combination with other therapies has shown improvement in all patients of HS when used for over 6 months. Dapsone was removed and replaced by adalimumab monotherapy in 12.8% (n=5) of the patients because of side-effects. Conclusion: These results showed a significant effect of dapsone on HS as single therapy or in combination with other therapies in the largest cohort of patients to our knowledge. Thus, dapsone as HS treatment modality needs more studies, as it can be harnessed as important contributor to this disease treatment protocols.

Case Presentations – Challenging Cases
Saturday, November 4, 2017

17:35 – 17:40
Parenteral Ertapenem in Hidradenitis Suppurativa

Taylor L. Braunberger M.D. 1, Iltefat H. Hamzavi M.D. 1
1 Department of Dermatology, Henry Ford Hospital, Detroit, MI, USA

Introduction: Hidradenitis suppurativa (HS), an inflammatory disease characterized by recurrent abscesses, draining sinus tracts, and scarring, has few effective treatments. Though the pathophysiology of HS is not fully understood, bacterial colonization and biofilms are thought to play a role. A recent study found that ertapenem and antibiotic consolidation treatment effectively treated severe HS. We describe a case of HS successfully treated with ertapenem.

Case:
A 55-year-old African American male with a history of Hurley stage III HS was admitted for a disease flare after missing a dose of infliximab. On skin examination, the left axilla, buttocks, gluteal cleft, and right scrotum demonstrated multiple scarred, tender, nodules and sinus tracts as well as ulcerative skin lesions with purulent, malodorous drainage. Percutaneous ertapenem therapy was initiated, and the patient was restarted on infliximab. After 3 weeks of ertapenem therapy, the patient reported dramatic improvement in his HS. On skin examination, the left axilla and bilateral medial buttocks demonstrated scarring, scant drainage, and minimal erythema.

Discussion:
Limited effective treatments for HS exist. Treatment presents significant frustration to both the patient and the provider. This case demonstrates the successful use of IV ertapenem in a patient with severe, refractory HS who presented with a flare in his disease. This antibiotic was well tolerated and rapidly improved the patient’s drainage and pain. Prior to starting ertapenem treatment, clinicians must consider the risks of this antibiotic and the time required by patients who must undergo daily 30 minute infusions. The choice of ertapenem should be limited to those with severe disease refractory to other treatments.

Conclusion:
Our case highlights the use of ertapenem as an option for patients who have severe, refractory HS. Large, prospective randomized controlled studies are necessary determine the efficacy of ertapenem in HS.
Learning objectives:
- To determine the role of biofilms and bacterial colonization in HS.
- To understand the efficacy of ertapenem in hidradenitis suppurativa.
- To understand the role of ertapenem in HS.

17:40 – 17:50
C. difficile complicating severe HS
Elizabeth O’Brien

33 yo African American male with no risk factors developed severe HS in the axillae and groins in his late teens. Gradual progression including face, and neck, with associated anemia, and has failed topical, intalesional and systemic therapy including antibiotics, retinoids, colchicine, adalimumab. Developed c. difficile while on doxycycline and adalimumab, presenting with rectal bleeding and normal colonoscopy. Currently on infliximab with poor control of disease.

Presented for discussion of resistance to therapy and risk of C. diff with prolonged antibiotic therapy. D. diff not previously reported with doxycycline or adalimumab, and may have protective effect according to literature.

17:50 – 17:55
A case of successful implementation of fractionated carbon dioxide (CO2) laser therapy to treat wound dehiscence following carbon dioxide laser excision in a patient with hidradenitis suppurativa
Amanda F. Nahhas, D.O.¹, Iltefat H. Hamzavi, M.D.¹
¹Henry Ford Hospital, Department of Dermatology, Detroit, MI, USA

A 46-year old female with history of left axillary stage 3 hidradenitis suppurativa (HS), recently treated with carbon dioxide (CO2) excision, presented with concerns that her healed wound was opening. She reported onset 3 months prior in association with repetitive friction from her undergarments. On exam, the posterior aspect of the scar had separated revealing healthy granulation tissue. Two deep fractional ablative CO2 (FCO2) procedures were performed on the left axilla using the following settings: 50 mJ of pulse energy with a treatment density of 5% (targeting the central and peripheral scar edges) then 40 mJ of pulse energy and a treatment density of 5% (targeting the central scar) three months later. Both procedures were tolerated well and without adverse events. After two months, the wound had healed and improvements in range of motion and Vancouver Scar Scale assessments were observed. Six months later, a soft, linear scar was noted on palpation.

This case demonstrates application of FCO2 in dehiscent HS wounds following CO2 laser excision. High tension in treated areas can increase susceptibility to pain, contracture, and wound dehiscence, ultimately prolonging time to healing. The FCO2 technique uses heat to create microscopic columns of tissue injury within areas of healthy tissue which then serve as a reservoir of cells and growth factors for wound healing.¹ Deep FCO2 has the added advantage of reducing the tension surrounding edges of an ulcer, while also promoting increases in type III collagen, which improve scar appearance and reduce contracture.¹ FCO2 laser has previously been shown to reduce scar contractures associated with CO2 excision.¹ FCO2 laser also appears to be an effective treatment option to reduce tension, improve healing, and increase local range of motion in dehiscent HS wounds following CO2 excision, though more studies are needed to examine this effect.

References:

17:20 – 17:30
Crohn’s and HS
Morvarid Hessami-Booshehri
Canada

A 40 year old man with both Crohn's and HS both on perianal area. My challenge is I started Humira and he improved but now lesions recurred and it sounds more Crohn's related. Is the dose of Humira for HS under dose for Crohn's treatment. Shall we check drug levels in these cases?
Session 4: Management of HS  
Sunday, November 5, 2017

08:15 – 08:30
US Evidence-based guidelines for HS treatment  
Christopher Sayed  
Department of Dermatology, University of North Carolina School of Medicine, Chapel Hill, NC, USA

Learning Objectives:
1. Understand how evidence is graded using the SORT criteria  
2. Understand the process used in developing HS clinical management guidelines  
3. Discuss recommendations that have come out of the committee at the current time

While reviews and European Guidelines exist for the management of HS, there are no clinical guidelines that currently exist to provide evidence-based recommendations to practicing clinicians that manage HS in North America. Through a joint effort of the United States HS Foundation and Canadian HS Foundation a committee comprised of North American experts has been systematically reviewing and grading the evidence using the SORT criteria over the last year. The purpose of this discussion is to outline how we have organized the review and graded the relevant evidence in the literature thus far. Our aim is to publish clinical guidelines in the first half of 2018 so this will provide an early look at our proposed recommendations.

08:30 – 08:45
Wound Healing in HS  
Hadar Lev-Tov, MD, MAS  
Department of Dermatology & Cutaneous Surgery, University of Miami, Miller School of Medicine, Miami, FL, USA

The daily management of hidradenitis suppurativa involves wound care and is key to treatment success and patient satisfaction. This presentation will provide a practical overview of the tools available for management of drainage and wounds associated with HS.

08:45 – 09:00
DEOM: Development of the Core Outcome Set in Hidradenitis Suppurativa  
Amit Garg, MD1, Linnea Thorlacius, MD2, John R. Ingram, MD, FRCP3, Bente Villumsen, MSc4, Gregor B.E. Jemec, MD, DMSc2, on behalf of the Hidradenitis SuppurativaCore outcomes set International Collaboration (HISTORIC)
1Department of Dermatology, Hofstra Northwell School of Medicine, New Hyde Park, New York, USA, 2Department of Dermatology, Zealand University Hospital, Roskilde; Health Sciences Faculty, University of Copenhagen, Denmark, 3Institute of Infection & Immunity, University Hospital of Wales, Heath Park, Cardiff, UK, 4The Patients’ Association HS Denmark, Denmark

Background: Outcome measures in hidradenitis suppurativa (HS) are markedly heterogeneous. Over 30 instruments with limited validation have been used across 12 randomized trials in HS. A diverse and non-controlled use of outcome measures limits the ability to synthesize outcomes and may increase the outcome reporting bias.

Objectives: To achieve global multi-stakeholder consensus on a Core Domain Set, a minimum standard of what to measure in clinical trials for HS.

Methods: Six stakeholder groups participated in an international Delphi process which included five e-Delphi rounds and four face-to-face consensus meetings to reach consensus on the final COS.

Results: A total of 41 patients and 52 HCPs from 19 countries and four continents participated in the consensus process which yielded a final Core Domain Set which included the following: pain, physical signs, HS specific quality of life, global assessment and progression of course.

Conclusions: This study reports a Core Domain Set for HS trials based on a rigorous international consensus process. Routine adoption of the Core Domains in future HS trials should ensure that outcomes of importance to both patients and other relevant stakeholders will be collected and will facilitate comparison of outcomes across trials.
09:00 – 09:15
NIAMS
Ricardo Cibotti, PhD
Immunobiology and Immune Diseases of Skin Program, National Institute of Arthritis and Musculoskeletal and Skin Diseases, National Institute of Health, USA

The basic, translational and clinical research areas supported by the ‘Skin Immunology and Diseases’ Program at the National Institute of Arthritis Musculoskeletal and Skin Diseases will be presented and discussed. Further, an analysis showing the number of NIH grants versus prevalence of immune mediated skin diseases will be discussed as well. The rational for supporting Hidradenitis Suppurativa as a huge public health unmet need will be also discussed. Finally, the NIH funding opportunities in support of Hidradenitis Suppurativa basic, translational and clinical research will be presented.

09:15 – 09:30
Hidradenitis Suppurativa Foundation & Research Roadmap
Michelle Lowes, MD, PhD
Rockefeller University, New York, NY, USA

The Hidradenitis Suppurativa Foundation (HSF) is a small not-for-profit organization whose mission is to advocate for those with HS by supporting patient care, promoting physicians and patient education, and encouraging research into HS. The history and past accomplishments of the HSF will be briefly reviewed. We are continuing to grow, and now have a part-time executive director, a national coordinator of advocacy and support, as well as a patient representative.

Some of our current activities will be highlighted.

- To encourage patients to find doctors who specialize in taking care of those with HS, the provider network has been updated on our HSF website, and a process developed to add new HS physicians and surgeons.
- Hosting an annual Symposium on HS Advance (SHSA) with the Canadian HS Foundation will bring together local and international HS physicians, surgeons and investigators to hear the most up-to-date research in HS epidemiology, pathogenesis and treatment. This will also foster great opportunities for future collaborations.
- The first HS School will be presented at SHSA this year, a 2 hour educational session specifically for patients and their families.
- An HSF committee is developing the first North American HS Management Guidelines.
- The Danby HSF Research Grant Program was started in 2016, and the first award made this year.
- Members of the HSF participated in the International Dermatology Outcome Measures (IDEOM) meeting in Washington this year.
- Attendance at NIAMS Outreach and Education Meeting will help raise awareness of HS and improve opportunities for research funding.
- An HS Research Roadmap is being developed, to provide a platform for high-quality collaborative studies.

Session 5: Surgical Treatment of HS
Sunday, November 5, 2017

10:00 – 10:15
Office procedures for HS & the medical dermatologist
Christopher Sayed, MD
Department of Dermatology, University of North Carolina School of Medicine, Chapel Hill, NC, USA

Learning objectives:
1. Understand how to prepare for surgical cases of HS in the outpatient setting
2. Learn how to approach and perform unroofing and excisional procedures for HS in the clinical setting
3. Recognize the limits of what can be performed in a clinic setting and when to refer to surgical colleagues

Hidradenitis suppurativa (HS) is unlike many other inflammatory dermatologic diseases in that optimal management often includes surgical intervention. While many dermatologists are comfortable with the medical management of HS, most are not comfortable performing office-based surgical procedures beyond incision and drainage or intralesional triamcinolone. Surgical specialists are often needed for extensive disease, but in Hurley II and less severe Hurley III patients there is a much larger potential role for outpatient procedures in the dermatology office. This approach is likely able to limit patient hospitalization, recovery times, and extent of surgery in many cases. The goal of this discussion is to familiarize the audience with methods to prepare for surgical procedures in HS patients with a focus on unroofing and excisional procedures in an office-based setting. Ideally, the audience will gain comfort approaching appropriate surgical procedures for HS patients without the need for referral in select cases.
10:15 – 10:30
Where Mohs surgery meets HS
Richard Bennett, MD
Department of Medicine (Dermatology), David Geffen School of Medicine, University of California Los Angeles, Los Angeles, CA, USA; Department of Dermatology, Keck School of Medicine, University of Southern California, Los Angeles, CA, USA
- abstract not available at time of printing –

10:30 – 10:45
Complex surgical situations in the perianal and genital area
Falk Bechara
Head of the Department of Dermatologic Surgery, Senior Physician, Department of Dermatology, Allergology and Venereology, Ruhr-University Bochum, Germany
- abstract not available at time of printing –

10:45 – 11:00
Plastic Surgery for Hidradenitis Suppurativa
Aamir Siddiqui, MD
Division Head, Plastic Surgery, Henry Ford Hospital, Detroit, MI, USA

Introduction: A multidisciplinary approach to hidradenitis suppurativa treatment provides patients with access to all treatment options. For those not sufficient controlled with medical management, surgery can offer an opportunity for definitive resolution. We present our treatment paradigm and results in this setting.

A modified reconstructive ladder model was applied as the treatment algorithm. Briefly, simpler treatments are offered for cases at high risk for dehiscence due to active infection, excessive tension or poor healing potential. More complex reconstruction was reserved for cases with inactive disease, localized areas of involvement and low risk for dehiscence. Patients included in the study were all enrolled in the hidradenitis suppurativa multidisciplinary clinic and were followed for at least 1 year after surgery.

Findings: 254 patients included in a 3-year retrospective review. Of the patients followed during the interval 98% required a surgical procedure. Patient's typically required multiple procedures over the interval with an average of 3.2 procedures performed per patient. The majority of the patients underwent ablative procedures (Excision alone or Irrigation and Debridement) often at multiple times and sites. Reconstructive efforts were undertaken in 17% of procedures and represented skin grafts or local flaps for coverage. For patients undergoing surgery while maintaining participation in the multidisciplinary clinic, 87% were healed at 1-year post surgery whereas patients who did not maintain follow-up at the MDC were only healed in 45%. Patients undergoing reconstruction had a rate of healing of 68%. The rate of healing did not significantly change with increasing Hurley score. There was a trend towards decreased healing rate with active drainage and current biological regimen.

Conclusion: Participation in a multidisciplinary program for hidradenitis suppurativa achieves maximum disease control and therefore improved surgical outcome. Similar healing rates are found regardless of Hurley score.
11:00 – 11:15
Lasers and Light Therapies for the Treatment of Hidradenitis Suppurativa
Iltefat Hamzavi, MD, Melissa Levoska, Cynthian Nicholson
Department of Dermatology, Henry Ford Hospital, Detroit, MI, USA

Light and laser therapies have been utilized in the field of dermatology to treat a variety of skin conditions, but more recently were studied in the management of HS. Usually performed as outpatient procedures with a low risk of complications, they offer several advantages to traditional cold knife surgical procedures. This presentation will review the various light- and laser-based treatments studied in HS and compare their efficacy. Studies performed were few in number and often limited by small patient samples. In addition, outcome measures are not standardized which makes comparison difficult. The Henry Ford experience with these technologies will also be reviewed. The use of tumescent anesthesia for pain control prior to laser surgery will also be reviewed. Light- and laser-based therapies are promising treatment options for patients with refractory HS.

11:15 - 11:30
CO2 Laser Surgery for Hidradenitis Suppurativa
Barry Resnik, MD
University of Miami School of Medicine, Miami, FL, USA

Introduction: The natural history of Hidradenitis Suppurativa (HS) if not aborted by treatment, almost always ends with scarred plaques containing numerous fistulae and sinuses. The plaques, which we can think of as ant-farms, because of their convoluted internal tunnels, will remain a source of infection, pain and leakage forever.

En bloc excision with closure has been the surgery of choice for most non-dermatologic surgeons. It can have significant morbidity because of the large amount of tissue removed, and has a high recurrence rate.

CO2 laser excision of involved skin with border control for hidden sinuses and fistulae allows us to address only the involved anatomy and significantly reduce recurrence. The healing process is simple, and much less painful than a flare of the disease, and the resulting scars are cosmetically pleasing. Best of all, if all “ant-farms” are removed, there exists the very real possibility of stopping medical therapy.

Oral Presentations 5: Surgical Treatment of HS
Sunday, November 5, 2017

11:45 - 11:55
Definitive surgical excision in early and complex Hidradenitis Suppurativa
Stephanie R. Goldberg
Virginia Commonwealth University School of Medicine, Department of Surgery, Richmond, VA, USA

Learning Objectives:
To understand the role and timing of definitive surgical excision in the management of patient with HS and to understand morbidity associated with resection of advanced disease.

Introduction: The role of surgical intervention in hidradenitis suppurativa (HS) has not yet been fully elucidated. Many physicians with a poor understanding of HS unknowingly utilize incision and drainage even in the absence of bacterial superinfection to temporarily relieve pressure and pain but this often results chronic non-healing wounds that worsen quality of life. Surgical excision has largely been reserved for complex disease. We have taken a liberal approach to surgical excision in the setting of focal disease.

Methods and Results: Patients are referred to our center both with new diagnoses and long-term disease. Most patients present with isolated axillary and/or with pubic and perineal disease extending to the labia, scrotum, or rectum. After extensive discussions regarding goals of care, we devise a surgical plan with a curative intent. In the axillary areas, advanced disease is often associated with significant scarring extending into the axillary contents. These patients can develop extremity edema, neuropathic pain, and may require complex wound care followed by split thickness skin graft instead of primary closure. In the perineal and perianal area, advanced disease often extends up to, but not including the sphincters, and requires a diverting ostomy for wound healing. Many of these patients have concomitant peri-anal fistulae. Post-operatively, these patients may develop perianal stricturing after skin graft requiring long term ostomy. None of the patients undergoing complete excision have developed recurrence and all report an immediate absence of their “hidradenitis pain” immediately upon excision.
Conclusions: Surgical excision and reconstruction of advanced HS is challenging. Patients may benefit from early surgical excision in focal areas where there is minimal scarring to decrease morbidity associated with excision including extremity edema and permanent ostomy. We believe in an aggressive surgical approach to isolated areas of hidradenitis.

11:55 - 12:05
Results of a randomized, blinded assessment of combination therapy with IPL plus radiofrequency in hidradenitis suppurativa

Esther von Stebut, Sophia Wilden1, Marina Friis, Andrea Tuettenberg, Stephan Grabbe, Andreas Hafner2

1 Dept. of Dermatology, University Medical Center, Johannes Gutenberg-University, Mainz, Germany, 2 Research and Development, Lenicura GmbH, Wiesbaden, Germany

Learning Objectives:
A combined application of IPL plus RF appears to be an effective treatment option for patients with mild to moderate HS, who are exactly those patients, whose disease severity does not necessarily justify treatment with anti-TNFα and hence do not have access to other approved treatment options.

Introduction: Several small studies and case reports have shown clinical benefit from treatment with radiofrequency (RF) or intense pulsed light (IPL) in acne vulgaris and hidradenitis suppurativa (HS). In the NICE study (non-invasive combination therapy of IPL and RF in acng inversa) using the Laiight® therapy developed by LENICŪRA GmbH, we investigated the effect of a combination of IPL plus RF for the treatment of HS.

Methods: In the monocentric, prospective, blinded cross-over study, patients were enrolled between 7/2014 and 3/2016. After an observation period of 3 months, all patients were randomized in a 1:1:1 fashion to one of the following treatment arms: 1. IPL plus RF, 2. IPL only and 3. RF only. All treatments were applied for 12 weeks. Thereafter, all patients received another course of 12 weeks of full IPL+RF treatment (cross-over). Biweekly treatment was applied to all body areas affected by HS. Every 3 months, disease activity as well as quality of life was documented.

Results: A total of 47 patients were enrolled. The group, receiving treatment with IPL plus RF showed best treatment results, followed by those receiving RF only for the first 3 months. The overall improvements of the combination therapy in a modified Sartorius and a disease activity score was 20 and 16%, respectively. In addition, the DLQI improved from 16,1 to 8,9 points (-45%). Patients with Hurley grade I/II clearly benefitted more from this treatment modality as compared to patients with more severe disease (Hurley grade III).

Conclusion: The combined application of IPL with RF appears to represent a possible effective therapeutic option in hS, especially for Hurley I/II patients. Additional studies with larger patient cohorts are required to confirm our findings and to gain insights into possible mechanisms of action.

12:05 - 12:15
Hidradenitis Suppurativa patients can benefit from Liraglutide in order to lose weight and reduce the burden of disease

Sanaz Zarinebaf MD, CCPF1, Afsaneh Alavi MD FRCPCC2

1 York Dermatology Centre, Toronto, ON, Canada, 2 University of Toronto, York Dermatology Centre, Toronto, ON, Canada

Hidradenitis Suppurativa (HS) is a challenging dermatological condition with strong link to obesity and smoking. Metabolic syndrome is associated with more than 40% of cases diagnosed with HS. Weight loss is one of the important components of HS management.

Methodology: The aim of the pilot study was to show the use of Liraglutide in the weight loss program in patients with HS. The patients were evaluated clinically by lesion count, and weight loss. Liraglutide is a new medication approved by FDA and health Canada for weight loss. Its trade name is Saxenda. Liraglutide is an acylated human Glucagon-Like Peptide-1 (GLP-1) receptor agonist with 97% amino acid sequence homology to endogenous human GLP-1(7-37). Liraglutide binds to and activates the GLP-1 receptor, a cell-surface receptor coupled to adenyllyl cyclase activation through the stimulatory G-protein, Gs. The weight loss effect of Liraglutide is considered to be mediated by decreased appetite and food intake.

Results: The study tested Liraglutide for weight loss in patients with HS. Five patients have received Saxenda for the past 4 months and have experienced anywhere between 5-10 percent weight loss. Our patients with HS are tolerating this medication well and have also incorporated a low caloric diet and exercise into their lifestyle. patients started with 0.6 mg daily and each week increase the dose by 0.6 mg to a maximum dose of 3 mg daily. Patients report satiety and reduction of caloric intake. They also report reduced preoccupation with food intake.

Conclusion: Saxenda is a safe and effective adjunctive therapy for weight loss in patients with HS.

References:
What causes HS?
Michelle Lowes, MD, PhD
Rockefeller University, New York, NY, USA

The goal of this talk is to present the most up-to-date information about the causes of HS.

This presentation will discuss what is known to address the following questions:

• Why does HS happen where it does?
• How do individual HS “lesions” develop?
• How and why do doctors describe the stages of HS?
• Why does the inflammation persist?
• Is HS inherited?
• Is there a test to diagnose HS?

There are many myths about HS and we will also be explaining what HS is NOT.

• HS is NOT a primary infection.
• HS NOT due to poor hygiene.
• HS is NOT contagious.
• HS is NOT due to something that you did.

Treatment Algorithm
Afsaneh Alav, MD, MSc, FRCPG
Department of Dermatology, University of Toronto, Women’s College Hospital, Toronto,ON, Canada

Although there is no one medication that is used to treat Hidradenitis suppurativa (HS), new treatments target the numerous pathways involved in the disease and have made a significant difference in the management of HS. Antibiotics and immunosuppressive agents such as biologics, in addition to surgery are the mainstay of treatment. However, associated diseases also need to be managed to decrease the impact of HS. Many patients with HS have related conditions like arthritis, depression, or Crohn’s disease, which require investigation and management. Weight loss and lifestyle changes are also important factors to be considered.

Recent advances in the acute management of Hidradenitis Suppurativa, pain control, and the use of local wound dressings
Cynthia Nicholson
Wayne State University, Department of Dermatology, Detroit, MI, USA

Hidradenitis Suppurativa (HS) is a chronic and recurrent inflammatory condition associated with severe psychosocial implications. Treatment of recurrent drainage, episodes of inflammation, and pain requires multidisciplinary management. Although there is no cure for HS, acute flares can be treated with intralesional, oral, topical, intravenous, and surgical treatments. Appropriate usage of dressings can reduce bothersome drainage and odor, while promoting wound healing. Acute and chronic pain which frequently plague the lives of patients with HS can interfere with activities of daily living, interpersonal relationships, and negatively impact mental health. Optimal management of acute and chronic pain can require topical and oral treatments and often a consultation with a pain specialist. Patients often seek treatment in an emergency department in the event of an acute flare. Surgical management including the local deroofing procedure combined with oral antibiotics can be important in obtaining control of the disease symptoms. Most importantly, appropriate follow up with an HS specialist can help prevent or reduce the frequency of flares. This presentation aims to expand upon the management of acute flares, wound dressings, pain control, and the role of the emergency medicine department in the treatment of HS.
Nutrition for HS
Lauren Hoffman
Albert Einstein College of Medicine/ Montefiore Medical Center, Bronx, NY, USA

This talk will focus on the role of nutrition in Hidradenitis Suppurativa (HS). Obesity and the metabolic syndrome (a group of
diseases that include diabetes and high cholesterol) are frequently reported to be associated with HS. Being overweight
can have a large role in making HS symptoms worse, due to friction in skin folds, body inflammation, and it may affect the
bacteria on the skin surface. Understanding these relationships could help to better manage HS symptoms.

A few studies have reported that there was improvement in HS after weight loss by any method (such as via diet or
surgery). There are many personal reports on the benefits of specific diets on reducing HS symptoms, such as the paleo
diet or the anti-inflammatory diet. Keeping a food diary may help to identify specific foods that trigger HS symptoms. Some
nutritional supplements are also suggested to help, such as taking zinc or turmeric. These diets will be compared to the
current 2015 USDA Dietary Guidelines for Americans.

Behaviour Change and Coping Skills
Zarine S. Patel, M.A.1,2; Elizabeth K. Seng, Ph.D.1,3; Michelle A. Lowes, MB.BS, Ph.D.1
1Hidradenitis Suppurativa Treatment Center, Division of Dermatology, Albert Einstein College of Medicine, Montefiore Medical
Center, Bronx, NY, USA; 2Ferkauf Graduate School of Psychology, Yeshiva University, Bronx, NY, USA; 3Saul R. Korey
Department of Neurology, Albert Einstein College of Medicine, Bronx, NY, USA

Introduction: Living with a chronic illness can be challenging for you and your family. Hidradenitis suppurativa (HS) is a
painful and distressing skin disease that can have a significant impact on your quality of life. Increasingly, researchers and
clinicians are examining changes you can make to improve your health, and how this can impact the overall management
of HS.

Topic Details: Smoking cessation and healthy eating habits have been identified as behaviors that may help manage HS.
It can be difficult to make changes in these behaviors and many find it helpful to start with a decisional balance chart, and
then to set a SMART goal. A decisional balance chart helps to identify the advantages and disadvantages of changing or
not changing a behavior. SMART goals help to set goals that are “Specific, Measurable, Action-oriented, Realistic, and
Timely.” These are goals that you can set with a family member, or together with your provider. Below is an example of
questions to ask to set a SMART goal:

Specific: What do I want to change?
Measurable: How will I know that I am making this change?
Action-Oriented: What behavior do I want to change?
Realistic: How realistic is it that I can change this behavior?
Timely: When do I want to change?

Hidradenitis suppurativa can be stressful for both you and your family members. There are different ways to cope with a
chronic illness that include seeking out support (social and emotional) and working to manage the things that are within
your control.

Conclusion: Setting SMART goals are an important first step to making health behavior changes and coping with a
chronic illness.

Sexual Health, Intimacy and Chronic Illness
Erin Martinez, LMSW
Dream Catchers Therapy Practice, Dearborn, MI, USA

Introduction: Sexual health and the diagnosis of sexual dysfunction are considered from a biological, psychological and
social experience. The oral presentation seeks to define sexual dysfunction from a biopsychosocial approach and discuss
the influence of Hidradenitis Suppurativa on sexual functioning. Sexual Dysfunction is defined in the Diagnostic Statistical
Manual of Mental Disorders as “the various ways in which an individual is unable to participate in a sexual relationship as
he/she would wish” including lack or loss of sexual desire, sexual aversion disorder, failure of genital response (erectile
dysfunction, rapid ejaculation, poor vaginal lubrication), orgasmic dysfunction, nonorganic vaginismus, nonorganic
dyspareunia and excessive sexual drive. The presentation will broadly define sexual dysfunction and the influence sexual
health/sexual dysfunction has on mental health and interpersonal relationships will be briefly explored. Examples of
treatment interventions will be offered. The benefits of treating the whole person and navigating communication about
mental and sexual functioning in brief patient-practitioner encounters will be explored.
Methods: The information presented will focus on the work of researcher and practitioner, Rosemary Basson and the Female Sexual Response Cycle. Basson’s conclusions encourage individuals to consider a diversity of motivations for engagement in acts of sexuality, pleasure and intimacy. For individuals with chronic health issues, such as HS, the typical experience of desire, arousal, orgasm and refractory period is often unavailable. The application of Basson’s work, allows for consideration into new entry points into sexual engagement and the consideration of emotional and social motivations.

The information presented will utilize the research of Daniela Wittman. Daniela Wittmann, PhD, MSW is Assistant Professor in the University of Michigan’s Department of Urology. She is a psychotherapist, educator and researcher. She is an AASECT certified sex therapist and sex therapy supervisor. Dr. Wittmann has published on sexual issues in prostate and bladder cancer. Her research focus is on developing and testing interventions that support couples’ sexual recovery after cancer. Her work on sexual health and chronic illness offers crucial information for individuals with HS.

Conclusion: The World Health Organization described Sexual health as “a state of physical, emotional, mental and social well-being in relation to sexuality . . . Sexual health can also be influenced by mental health, acute and chronic illnesses, and violence. Addressing sexual health at the individual, family, community or health system level requires integrated interventions by trained health providers and a functioning referral system.” This presentation will address sexual health and functioning as a basic human right and part of overall health and well-being. An understanding of the problems that may exist and brief examples of interventions that can be applied will be offered. Resources for additional information and support will be provided.

Attendees will receive information on useful interventions to address sexual dysfunctions often experienced by individuals with HS. These interventions will include how partners can be a support in addressing sexual health and intimacy difficulties. Information on help seeking and accessing resources will be provided.

Learning Objectives:
1. The presentation will define sexual dysfunction as a biological, psychological and social experience.
2. The presentation will demonstrate the influence of sexual dysfunction on mental health and interpersonal relationships.
3. The presentation will provide examples of common interventions used for individuals with HS and sexual dysfunction.
4. The presentation will provide resources for additional information and support.

Support groups: Hope for HS
Angie Parks-Miller
Wayne State University, Department of Dermatology, Detroit, MI, USA
- abstract not available at time of printing -

Be Your Best Advocate
Barry Resnik, MD
University of Miami School of Medicine, Miami, FL, USA
The path of a patient suffering from Hidradenitis Suppurativa (HS) may sometimes feel like train trip through the Netherworld. As difficult as treatment may be, it seems illogical that getting accurately diagnosed may be more difficult. Find out what your doctor should be asking you on your first visit. Learn how to best to advocate for you or your loved one, on issues from alternative treatments to FMLE to getting a Handicapped sticker.
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**Poster Abstracts**

**Poster # 1**  
**Characterizing Inpatient Hospitalizations for Hidradenitis Suppurativa in the United States**  
*Epidemiology*

*Laura Anzaldi¹, Ginette Okoye²*  
¹John Hopkins Medicine – School of Medicine, ²John Hopkins Medicine – Department of Dermatology, Baltimore, MD, USA

**Introduction:** Hidradenitis suppurativa (HS) is a chronic inflammatory disease of the hair follicles that leads to painful, draining abscesses primarily in the intertriginous and ano-genital regions of the skin. Patients with severe disease sometimes require inpatient hospitalization for medical management or surgery. We aim to characterize the patterns of inpatient hospitalizations in hidradenitis suppurativa in the United States.

**Method/Results:** We performed a retrospective observational study using years 1999-2014 of the Healthcare Cost and Utilization Project Nationwide Inpatient Sample (NIS) database, a representative sample of all-payer inpatient discharges in the United States. Hospitalizations of patients with HS were identified and discharge weights were used to transform sample counts into national estimates. We analyzed demographic data, geographic distribution, and associated diagnoses and procedures.

There were an estimated 168,372 discharges of patients with HS between 1999-2014, but we focused on the 49,388 hospitalizations that identified HS as the primary diagnosis driving the admission. The rate of primary HS hospitalizations increased from 0.80 per 100,000 US residents in 1999 to 1.27 in 2014. The female-to-male ratio was 1.4:1. The age group with the most primary HS hospitalizations was 35-50 years. Black patients accounted for almost half (47%) of primary HS discharges. Patients from zip codes with the lowest quartile for income accounted for 41% of HS hospitalizations. Nearly one third (29%) of HS discharges were from the South Atlantic census division, while the New England division and the Mountain division each only accounted for 3% of HS discharges. Hypertension and tobacco use disorder were the most common associated diagnoses.

**Conclusion:** The rate of inpatient hospitalizations for HS in the United States is increasing over time. More research is needed to study the apparent racial, geographic and socioeconomic disparities of patients hospitalized for HS.

**Learning Objectives:**
- Recognize that there is an increasing incidence of inpatient hospitalizations for hidradenitis suppurativa in the United States
- Consider the impact of sociodemographic variables (race, income, geography) on the rates of inpatient hospitalizations for hidradenitis suppurativa

**Poster # 2**  
**Coping With Hidradenitis**  
*Comorbidities and QOL*

*Melissa Butt, MPH*  
Department of Dermatology – Penn State Hershey Medical Center, Hershey, PA, USA

Hidradenitis suppurativa (HS) is a chronic, painful inflammatory skin condition affecting an estimated 0.053-4.1% of the population. Severity varies among patients, and studies indicate that severity is correlated with worsening health-related quality of life (HRQOL). Additionally, depression is a frequent comorbidity, affecting approximately 38-48% of HS patients and may be related to chronic HS pain. However, little information is available on how coping strategies can mitigate the effects of HS and depression on QOL. This objective of this study was to investigate coping strategies used by patients with HS and their associations with QOL. This was a multi-institutional cross-sectional survey of HS patients at four international sites. The survey included a demographics section that tracked patient-reported disease severity and locations, the Brief COPE, the Hospital Anxiety and Depression Scale (HADS), and the Dermatology Life Quality Index (DLQI). Coping methods from the Brief COPE were grouped into categories: problem-oriented, avoidant, socially-supported, and emotion-focused. Disease severity had statistically significant associations with anxiety, depression, and QOL. As HS severity increased, anxiety, depression, and QOL worsened. Additionally, those with impaired QOL used problem-oriented (OR=2.5; p-value: 0.0016) and avoidant (OR=3.5; p-value: 0.0005) coping methods more often than those with unimpaired QOL. Overall, HS patients suffer from negative psychological outcomes (depression, anxiety) and impaired QOL. These outcomes are impacted by the severity of the disease. Coping styles such as problem-focused and avoidant styles are utilized more by those with a lower QOL, suggesting that coping style plays an active role in HS QOL.
Thus, future research should focus on 1) coping styles associated with a higher QOL and 2) teaching HS patients positive coping styles with the goal of increasing QOL.

**Learning Objectives:**
1. Review statistics on depression and anxiety amongst patients with HS.
2. Identify how coping strategies can affect QOL.
3. Learn which coping strategies are associated with better QOL.

**Poster #3  Scarred for Life: Results from the Hidradenitis Suppurativa Patient Experience (HSPE) Survey**

**Comorbidities and QoL**

_Helen Crawford², Jennifer A Pereira PhD¹, Susan Quach MSc¹, Kathryn Andrews-Clay BSc², Maria Goguen³, Raed Alhusayen MBBS, MSCE, FRCPÇ⁴_

¹JRL Research & Consulting Inc., ²Canadian Skin Patient Alliance, ³HS Aware, ⁴Sunnybrook Health Sciences Centre, Toronto, ON, Canada

**Introduction:** Hidradenitis suppurativa (HS) is a devastating skin condition with a detrimental impact on quality of life. Characterized by boils in the folds of skin, and resulting in pain, chronic lesional discharge and unpleasant odour, HS affects over 1% of North Americans. A comprehensive examination of the patient experience was conducted to track future progress in improving care for individuals with HS.

**Methods/Results:** In January 2017, we conducted an online survey of Canadians and Americans with HS. Survey questions focused on the journey to diagnosis, healthcare encounters, costs of therapies to manage symptoms, and quality of life. We engaged HS-related patient advocacy groups, physician groups, and social media groups to disseminate the survey. One-hundred and sixty-seven individuals with a formal or self-diagnosis of HS completed the survey. Thirty-percent were Canadians, 95.8% were female and mean age was 36 years. The average amount of time from symptom to diagnosis was 9 years. During this period, 79% of patients made at least four visits to family physicians for HS symptoms, and 53% visited 10 or more times. Additionally, 30% made more than 10 ER visits. Respondents had three misdiagnoses on average, the most common being skin infection, ingrown hair and sexually-transmitted infection. The majority (69%) were dissatisfied or extremely dissatisfied with their healthcare experience en route to diagnosis, but this number decreased to 36% once HS was accurately diagnosed. Respondents turned to online support groups and websites (95.3%) rather than physicians (35%) for information about HS. They struggle with many aspects of their disease, most commonly the lack of awareness among physicians, and management of depression and anxiety.

**Conclusions:** There is much room to improve the lives of those with HS including greater awareness of this condition among healthcare providers, and support for the psychological impact of HS.

**Learning Objectives:**
- To increase awareness and education of HS among healthcare providers most likely to encounter patients with this condition, in order to identify ways of shortening the journey to diagnosis
- To increase awareness of the need to systematically offer resources and social support to patients with HS, to help manage the tremendous psychosocial impact of the disease

**Poster #4  Association Between Anemia and Hidradenitis Suppurativa: A Retrospective Chart Review**

**Comorbidities and QoL**

_Christina Huang¹ Dalal Almutairi², Afsaneh Alavi²_

¹Queen's University, Kingston, ON, Canada; ²Department of Dermatology, University of Toronto, Toronto, ON, Canada

**Introduction:** Hidradenitis Suppurativa (HS) is a chronic inflammatory skin condition with a prevalence of 1-4%. HS can burden the patient, physician, and the health care system. Anemia in HS may be related to both inflammation and iron deficiency. Anemia of inflammation has been associated with Crohn’s disease, rheumatoid arthritis, psoriasis, and other inflammatory diseases. However, little is known in regards to anemia in HS. The purpose of this study was to determine the haemoglobin (HGB) levels of HS patients as a marker of anemia and compare them to the general population.
Methods/Results:
This retrospective chart review evaluated the relationship between HGB level and HS. All patients diagnosed with HS over the past 18 months with adequate blood work records within 6 months of diagnosis were included. Patient demographics, disease severity and duration, and blood work results were extracted for analysis. Data were analyzed descriptively and compared with the general population.

Of the 58 patients included, 34 (58.6%) were female. The average age and disease duration was 35.4 +/- 14.2 and 8.16 +/- 7.2 years. Five (8.6%), 31 (53.4%), and 22 (37.9%) patients were classified as Hurley Stage I, II, and III, respectively. The overall haemoglobin and ferritin levels were 135 +/- 24.7 g/dL and 104.6 +/- 100.4 mg/mL. Females were younger (32.3 vs. 39.7, p= 0.05), had shorter disease duration (6.5 vs. 10.8, p=0.03), and demonstrated lower levels of haemoglobin (128.5 vs. 144.4, p = 0.02) and ferritin (58.8 vs. 150.4 , p=0.16) as compared to male counterparts. HGB levels were not significantly different between Hurley stages (p= 67).

Conclusions:
HGB levels were found to be lower than the general population, suggesting that HS patients may be at higher risk for developing anemia of inflammation. Physicians should be aware that anemia could complicate HS, making it more difficult to manage.

Poster # 5
Assessment of the burden of hidradenitis suppurativa using willingness-to-pay stated preferences

Comorbidities and QoL

Haley B. Naik, MD MHS*c, Mia Sisic, MA, Jerry Tan, MD, Joslyn Kirby, MD, Mary-Margaret Chren, MD.
1 University of California, San Francisco, Department of Dermatology, San Francisco, CA, USA

Hidradenitis suppurativa (HS) is associated with significant impacts on physical and psychological well-being due to pain, shame, and isolation, leading to profound suffering and despair in this patient population. We piloted a novel application of willingness-to-pay (WTP) to measure the impact of hidradenitis suppurativa on health-related quality of life (HR-QOL). In a cross-sectional sample of 60 adults with physician-confirmed HS from 2 medical centers, we administered a survey assessing demographic and disease characteristics, quality of life using the Dermatology Life Quality Index (DLQI), willingness to pay preferences for HS cure and disease control, and bother domains. Participants were divided into 3 annual income categories (group 1: <$40,000, n=16; group 2: $40,000-$100,000, n=24; group 3: $>100,000, n=20. The mean age of participants was 42.4 years (SD 13.0). Median annual household income of all participants was $70,000 (IQR $15,000, $125,000). The majority of participants were either employed full-time (47%) or on disability/sick leave (27%). Participants reported mild to severe disease on a 0-10 scale across all income groups (median HS severity 1: 5.5; 2: 6.0; 3: 4.0). Participants reported moderate to very large effect on quality of life by DLQI (median DLQI score 1: 10.0; 2: 13.0; 3: 8.0). Across income groups, participants had greater WTP as percent of annual income for disease cure (1: 47.2%; 2: 3.3%; 3: 2.0%) than control (1: 0.6%; 2: 0.1%; 3: 0.2%). Participants reported that the most bothersome aspects of HS were related to physical discomfort (43.3%) and intimacy (33.3%). WTP is a unique tool for assessing the disease impact on individual QOL, and can potentially be used as a measure of HR-QOL for HS.

Learning objective:
To discuss a novel modality, willingness-to-pay preferences, for evaluating the impact of hidradenitis suppurativa on quality of life using.

Poster # 6
The In-Hospital Financial Burden of Hidradenitis Suppurativa in Patients with Inflammatory Bowel Disease

Epidemiology

Alvaro J. Ramos-Rodriguez MD*, Ali Khan MD, Lauren Bonomo MS, Dmitriy Timerman MD and Alejandro Lemor MD
1Icahn School of Medicine at Mount Sinai West, Department of Medicine, New York, NY, USA

Introduction: Hidradenitis suppurativa (HS) is a chronic inflammatory disease. It is strongly associated with inflammatory bowel disease (IBD). In this study, we sought to explore the in-hospital financial burden of HS in patients with IBD.

Methods: This was a retrospective cohort study using the National Inpatient Sample (NIS) for the years 2008 through 2014. All patients with ICD-9 CM codes for any diagnosis of IBD from 2008 to 2014 across the U.S. were included. There were no exclusion criteria. Patients with IBD were classified as having HS using ICD-9 CM code 705.83. The financial burden was measured by resource utilization which included median hospital length of stay (LOS), imaging and bedside procedures (e.g., abdominal CT-scan, incision and drainage) and mean hospitalization costs.
Results: A total of 3,079,332 admissions with IBD were included, of which 4,369 had concurrent HS. When comparing patients with HS-IBD versus IBD-only group, we found that patients with co-existent HS-IBD displayed increased additional hospital length of stay (4 days vs. 5 days, p<0.001), additional total hospitalization costs ($12,237 vs. $13,272, p=0.013; mean additional costs: $1,035) and underwent more incision and drainage procedures (0.7% vs. 10.8%, p<0.001). Additionally, more patients with IBD-HS were insured by Medicare and Medicaid (61% vs 47.7%, p<0.001).

Conclusion: We conclude that there is a significant increase in hospital financial burden in patients with IBD and co-existent HS compared to those with IBD only.

Table 1. Financial Burden of HS on Patients with IBD

<table>
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<tr>
<th>Inflammatory Bowel Disease (IBD)</th>
<th>P-Value</th>
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<tr>
<td></td>
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<tr>
<td><strong>Number of Patients (n)</strong></td>
<td></td>
</tr>
<tr>
<td>IBD-only</td>
<td>3,079,332</td>
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<tr>
<td>IBD-HS</td>
<td>4,369</td>
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<tr>
<td><strong>Resource Utilization</strong></td>
<td></td>
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<tr>
<td>Median length of stay (days)</td>
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<tr>
<td>Interquartile Range (IQR)</td>
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<tr>
<td>4 (2-7)</td>
<td>5 (4-8)</td>
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<tr>
<td>Length of Stay ≥ 5 days</td>
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<tr>
<td>41.5%</td>
<td>49.8%</td>
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<tr>
<td>Abdominal CT-Scan</td>
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<tr>
<td>2.2%</td>
<td>1.5%</td>
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<tr>
<td>Incision and Drainage</td>
<td></td>
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<tr>
<td>0.7%</td>
<td>10.8%</td>
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<tr>
<td>Mean Hospital Costs - USD$</td>
<td></td>
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<tr>
<td>$12,237</td>
<td>$13,272</td>
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<tr>
<td><strong>Median household income (%)</strong></td>
<td></td>
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<tr>
<td>0 - 25th</td>
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<tr>
<td>22.8%</td>
<td>43.2%</td>
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<td>26th - 50th</td>
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<td>25.1%</td>
<td>25.0%</td>
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<td>51th - 75th</td>
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<tr>
<td>25.7%</td>
<td>19.1%</td>
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<td>76th - 100th</td>
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<tr>
<td>26.4%</td>
<td>12.7%</td>
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<td><strong>Primary Payer</strong></td>
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<tr>
<td>Medicare/Medicaid</td>
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<tr>
<td>47.7%</td>
<td>61.0%</td>
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<tr>
<td>Private Insurance</td>
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</tr>
<tr>
<td>43.4%</td>
<td>29.3%</td>
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<tr>
<td>Self-pay/ Other</td>
<td></td>
</tr>
<tr>
<td>8.8%</td>
<td>9.7%</td>
</tr>
</tbody>
</table>

Learning Objective:
In this study, we found that hidradenitis suppurativa (HS) adds a financial burden to patients with inflammatory bowel disease (IBD). The learning point is to closely monitor and treat promptly patients with IBD and co-existent HS to prevent this increased in-hospital financial burden.
and of African-American race (46.8% vs 10%; p <0.001). Also, IBD-HS patients were more likely to be smokers (39.4% vs. 22.5%; p<0.001), obese (15.6% vs. 6.5%; p=0.001), and have diabetes mellitus (18.5% vs. 13.5%; p<0.001), depression (15.9% vs. 13.3%; p=0.020), and anemia (29.7% vs. 22.0%; p<0.001).

**Conclusion:** We conclude that HS had significant impact on baseline demographics and comorbidities in patients with IBD suggestive of a more severe disease course that can be potentially disabling. For this reason, the importance of a thorough dermatological exam in patients with IBD cannot be understated.

**Learning Objective:**
In this study, we found that patients with co-existent inflammatory bowel disease (IBD) and hidradenitis suppurativa (HS) had significantly more comorbidities than patients with IBD only. The learning point is to perform thorough skin examinations in all patients with IBD in order to detect HS early in the disease course and prevent development of these comorbidities.

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**Poster # 8  IV Ertapenem Use in Advanced Hidradenitis Suppurativa**

**Taylor L. Braunberger MD¹, Angela Parks-Miller CCRP, CWCA², Mayur S. Ramesh MD², Iltefat H. Hamzavi MD³**

¹ Department of Dermatology, Henry Ford Hospital, Detroit, MI, USA; ² Division of Infectious Disease, Henry Ford Hospital, Detroit, MI, USA

**Introduction:** Hidradenitis suppurativa (HS), an inflammatory disease characterized by recurrent abscesses, draining sinus tracts, and scarring, has limited effective treatments.[1] Though the pathophysiology of HS is not fully understood, bacterial colonization and biofilms are thought to play a role.[1] A recent study found that ertapenem and antibiotic consolidation treatment effectively treated severe HS.[2] There is a paucity of knowledge on the mechanism of action of ertapenem in HS. Our study aims to further investigate the utility of IV ertapenem in severe, refractory HS.

**Method/Results:**
This retrospective chart review and phone interview included 23 Hurley stage II or III patients treated with IV ertapenem between May 2013 and July 2015. Patient demographics, clinical features, antibiotic side effects, PICC line complications, and treatment response were extracted from medical charts. All patients were refractory to treatment with Hurley stage II or III disease (n=23). Patients had a mean age of 44.4 years with an average BMI of 34.6. Parenteral ertapenem was administered an average of 62.1 days. All patients who responded to our telephone interview (n=22) reported clinical response to treatment. Quality of life improved in 93.8% of patients (n=15) responding to our phone survey. Twenty three patients relapsed 2 to 22 weeks following completion of IV ertapenem. Treatment complications included diarrhea (n=4), PICC line thrombosis (n=3), vaginitis (n=3), *Clostridium difficile* colitis (n=1), and elevated transaminases (n=1).

**Conclusion:** Our results demonstrate patient reported improvement in HS with parenteral ertapenem followed by relapse upon antibiotic cessation. We propose the use of IV ertapenem to bridge patients until definitive surgical treatment. This well tolerated antibiotic rapidly improves advanced HS and may be effective in treating HS flares. Larger, prospective randomized controlled studies with improved outcome measures are needed to verify treatment results and to further elucidate the role of ertapenem in HS.

**Learning objectives:**
- To understand the role of biofilms and bacterial colonization in HS.
- To demonstrate the efficacy of ertapenem in hidradenitis suppurativa.
- To understand the adverse effects associated with the use of ertapenem in HS.

**References:**
**Poster # 9**

<table>
<thead>
<tr>
<th><strong>Hidradenitis suppurativa with SAPHO syndrome</strong></th>
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<tbody>
<tr>
<td><strong>maintained effectively with adalimumab, methotrexate and intralesional corticosteroid injections</strong></td>
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</table>

**Comorbidities and QoL**

**Erika L. Crowley**, **Ashley C. O’Toole**, **Melinda J. Gooderham**

1SKiN Centre for Dermatology, Peterborough, ON, Canada; 2Trent University, Peterborough, ON, Canada; 3Queen’s University, Kingston, ON, Canada; 4Probity Medical Research, Waterloo, ON, Canada

**Introduction:** Hidradenitis suppurativa (HS) and synovitis, acne, pustulosis, hyperostosis, osteitis (SAPHO) syndrome are chronic, debilitating diseases that cause severe impairment to the quality of life of patients. HS involves apocrine gland-bearing skin inflammation and SAPHO syndrome involves a variety of inflammatory bone disorders. Although HS often presents with multiple comorbidities, co-presentation in a single patient is rare.

**Method/Results:** The present case reports a 40-year-old man with HS and associated SAPHO syndrome and reviews relevant literature. The patient's history includes facial and back acne vulgaris, degenerative disc disease, congenital spinal stenosis, shoulder and neck osteoarthritis, depression, hypertension, obesity, diabetes, and smoking. After initial HS diagnosis at age 32, he had little response from topical or oral antibiotics. Intralesional corticosteroid (ILC) injections were effective at treating localized inflammatory lesions but insufficient to stabilize the HS. A loading dose of adalimumab 80mg, followed by weekly 40mg adalimumab injections and local excision of a persistent HS lesion, finally led to stabilization. He was referred to Rheumatology and diagnosed with SAPHO syndrome at age 38 because his back pain, previously diagnosed as mechanical, improved dramatically upon adalimumab initiation. Methotrexate was added. He currently maintains control of both diseases with adalimumab 40mg weekly, methotrexate 20mg weekly and ILC as needed, however ILC requirements have decreased dramatically. Successful lifestyle changes include weight loss, smoking cessation, and increased control over depression.

**Conclusions:** HS with SAPHO syndrome is rare and literature regarding therapy for this combination is scarce but growing in recent years. Both respond well to anti-inflammatory agents, such as anti-tumour necrosis factor (TNF) adalimumab or anti-rheumatic methotrexate. ILC can provide rapid relief to localized areas of inflammation. Concurrent adalimumab, methotrexate, and ILC treatments were successful in maintaining a severe case of HS-SAPHO-syndrome. Further studies beyond the scope of an isolated case-based review could yield more definitive treatment plans.

**Learning Objectives:**

1. To highlight the complex nature of hidradenitis suppurativa and the potential for rare comorbidities like SAPHO syndrome.
2. To report the management plan of a severe HS case that was associated with SAPHO syndrome, emphasizing the safety and efficacy of adalimumab, methotrexate and intralesional corticosteroid injections.

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**Poster # 10**

<table>
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<tr>
<th><strong>Hydroxychloroquine for the Treatment of Hidradenitis Suppurativa: A Case Report</strong></th>
</tr>
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</table>

**Medical Treatment**

**Elena Gonzalez Brant, Tim Patton**

University of Pittsburgh, Pittsburgh, PA, USA

**Learning Objectives:** Hydroxychloroquine may be an effective therapy for HS. Consider hydroxychloroquine for patients who have early disease, have failed multiple therapies or refuse injectable medications.

**Introduction:** Hidradenitis suppurativa (HS) is a debilitating and mutilating disease that involves the development of recurrent, painful nodules in intertriginous areas that become inflamed, form abscesses, and develop chronic fistula tracts. HS has been associated with high body mass index, smoking, genetic predisposition and the metabolic syndrome. Immune dysregulation likely plays a role in disease development, as increased levels of IL-12, IL-17, IL-23, TNFα, IL-10 and IL-1β are expressed in lesional skin of HS patients, and IL-17 levels are elevated in patient serum. Many therapies have been used to treat HS, from topical antibiotics to radical surgeries, but all have limited efficacy.

Hydroxychloroquine has been used for over 70 years in the treatment of autoimmune disease. Evidence suggests that hydroxychloroquine has an effect on inflammation through decreasing levels of TNFα and Th-17 cytokines (including IL-6, IL-17, and IL-22). Additionally, hydroxychloroquine has been shown to improve lipid metabolism and serum glucose, and to decrease cardiovascular events. It has a relatively benign safety profile, with reversible retinopathy being the most concerning side effect.
**Methods and Results:** We present the case of a 39-year-old African American man with Hurley stage III HS. He had already failed topical antibiotics, oral doxycycline, minocycline, amoxicillin/clavulanic acid and cefalexin. He had previously undergone wide surgical excision of his bilateral axillae. Treatment with isotretinoin and clindamycin/ritampin were contraindicated. He declined treatment with Adalimumab. Given the limited side effect profile of hydroxychloroquine and its potential to improve HS through the mechanisms outlined above, the patient was started on hydroxychloroquine 200mg twice daily. After 3 months he endorsed improvement in his pain and drainage and his Physician Global Assessment score improved from severe to moderate.

**Conclusion:** We want to alert the community to the possible benefit of hydroxychloroquine as a treatment for HS.

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**Poster # 11**

**The synergistic effects of combining adalimumab and infliximab in patients with severe, recurrent hidradenitis suppurativa**

**Rayaan Kaakati, Tarannum Jaleel, MD**
Duke University Medical Center, Department of Dermatology, Durham, NC, USA

Hidradenitis Suppurativa (HS) is a debilitating skin disease defined by chronic follicular occlusion with a vicious cycle of healing and scarring of apocrine glands that tends to affect the axillary, inframammary, groin, perianal areas of females to males in a 3:1 ratio. The goal is to maximize medical therapy to decrease the disease burden of HS. We report 2 cases of patients with long-standing HS who became refractory to medical treatment including Tumor Necrosis Factor-alpha (TNF-alpha) inhibitor monotherapy; however, with the use of two TNF alpha inhibitors concurrently, specifically infliximab and adalimumab, a reduction in lesion frequency with decreased symptoms as well as an increase in quality of life was observed. We propose that the synergistic effects of these two TNF-alpha inhibitors are acting as “medical bridges” in controlling the patient’s symptoms.

**Learning Objective:**
Consider treatment with two tumor necrosis factor-alpha Inhibitors, specifically adalimumab and infliximab for patients with severe, recurrent hidradenitis suppurativa refractory to Tumor Necrosis Factor-alpha monotherapy

**References**
1. “Hidradenitis Suppurativa: Current Views on Epidemiology, Pathogenesis, and Pathophysiology.”

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**Poster # 12**

**High-dose isotretinoin for the treatment of hidradenitis suppurativa**

**Yssra Soliman¹; Lauren Hoffman; Anthony Guzman; Steven Cohen²**
¹Albert Einstein College of Medicine and Montefiore Medical Center, Division of Dermatology, Bronx, NY, USA; ²Montefiore Medical Center, Division of Dermatology, Bronx, NY, USA

**Introduction:** Few studies have been published on the effects of high-dose isotretinoin for hidradenitis suppurativa (HS). Given high rates of remission in acne patients, we postulate high-dose isotretinoin will have similar success in Hurley stage I patients.

**Methods:** A retrospective chart review of patients treated at the Einstein/Montefiore Hidradenitis Suppurativa Treatment Center (HSTC) was conducted. Patient demographics, clinical improvement, and adverse events were analyzed.

**Results:** Sixteen patients treated with high-dose isotretinoin were enrolled. Patients included 15 females and 1 male with a mean age 24.9 years, mean BMI 29.94 kg/m², and mean duration of HS 8.25 years. Twelve patients were classified as Hurley stage I, 1 as stage II, 3 as stage III. All patients with advanced HS had concomitant severe cystic acne.

The average maximum dose of isotretinoin was 1.48 mg/kg daily. Physician-reported clinical improvement was 86.67% at month 1 (n=15), 100% at months 2 (n=14), 3 (n=8), 4 (n=5), 5 (n=3), 6 (n=2) and 7 (n=2). Most patients reported symptomatic improvement each month (Figure 1). Currently, 1 patient is in remission, 1 completed treatment and went on to undergo surgery, 10 are continuing treatment, 2 were lost to follow-up and 2 discontinued due to side effects, including dryness, arthralgias and pyogenic granuloma-like lesions.

**Conclusion:** Preliminary data shows robust evidence of remission with high-dose isotretinoin for the treatment of early stage HS.
Adalimumab Efficacy in Hidradenitis Suppurativa Patients is Sustained at Least Three Years with Weekly Dosing: Results from a Phase 3 Open-Label Extension Study (PIONEER)

Christos C Zouboulis,1 Martin M Okun,2 Robert Gniadecki,3 Peter A Foley,4 Charles Lynde,5 Jamie Weisman,6 Piyalal Karunaratne,2 David A Williams2

1Departments of Dermatology, Venereology, Allergology and Immunology, Dessau Medical Center, Brandenburg Medical School Theodor Fontane, Dessau, Germany; 2AbbVie Inc, North Chicago, IL, USA; 3Bispebjerg Hospital, Copenhagen, Denmark; 4Department of Medicine (Dermatology), The University of Melbourne, St Vincent’s Hospital Melbourne, Skin & Cancer Foundation Inc, and Probity Medical Research, Carlton, Australia; 5The Lynde Centre for Dermatology and Probity Medical Research, Markham, ON, Canada; 6Advanced Medical Research, PC, Atlanta, GA, USA

Introduction: To determine the long-term safety/efficacy of originator-adalimumab (ADA) in moderate-to-severe hidradenitis suppurativa (HS), an open-label extension (OLE) trial (NCT01635764) of the PIONEER I and II phase-3 trials of ADA treatment in patients (pts) with moderate-to-severe HS was conducted.

Methods/Results: Upon entry into the OLE, all pts received ADA 40mg weekly (ADAew). Safety/efficacy were analyzed for pts who received continuous 40mg ADAew in Periods A and B of PIONEER I or II and entered OLE. Primary outcome measure was Hidradenitis Suppurativa Clinical Response (HiSCR), defined as ≥50% reduction in abscess and inflammatory nodule (AN) count with no increase in abscess count and no increase in draining fistula count relative to baseline (BL) (Table 1). Last-observation-carried-forward was used to handle missing values. Adverse events (AEs) were reported by 86.4% (76/88) in the ADAew Population; serious AEs by 13.6% (12/88); serious infections by 3.4% (3/88), which included pneumonia (n=2) and cellulitis of right leg (n=1).

Conclusions: Data from the PIONEER OLE confirm that HS pts receiving weekly ADA treatment maintained long-term response, demonstrated by HiSCR rate of 52.3% at week 168, and by a clinically meaningful decrease in DLQI at week 72 of −6.5. The safety profile of long-term weekly ADA therapy in this study was consistent to the known ADA safety profile and no new safety risks were identified.
Table 1.

<table>
<thead>
<tr>
<th>ADAew Population N=88</th>
<th>Week 72</th>
<th>Week 120</th>
<th>Week 168</th>
</tr>
</thead>
<tbody>
<tr>
<td>HiSCR (%)</td>
<td>-</td>
<td>56.8</td>
<td>52.3</td>
</tr>
<tr>
<td>AN counta (% [±SD])</td>
<td>-</td>
<td>-37.8 (84.36)</td>
<td>-32.8 (86.29)</td>
</tr>
<tr>
<td>Draining fistulasa (% [±SD])</td>
<td>-</td>
<td>-29.4 (102.85)</td>
<td>-28.1 (110.70)</td>
</tr>
<tr>
<td>Paina,b (% [±SD])</td>
<td>-</td>
<td>-27.0 (56.83)</td>
<td>-25.6 (61.82)</td>
</tr>
<tr>
<td>DLQIc (mean change)</td>
<td>-6.5 (±7.90)</td>
<td>NR</td>
<td>NR</td>
</tr>
</tbody>
</table>

Abbreviations: HiSCR= Hidradenitis Suppurativa Clinical Response; DLQI=Dermatology life Quality Index; NR=not reported
a mean % change from baseline
b change in numeric rating scale [NRS] at worst at each visit, among pts with BL NRS at worst ≥3; N=63
c DLQI was also collected at the last visit, which occurred at different time points and are not reported here

**Learning Objective:**
At the end of this presentation, readers should be able to understand the efficacy and safety of adalimumab for HS over a 3-year period

**Poster # 14**
Hidradenitis Suppurativa (HS) outcomes: an assessment of flap closure versus secondary intention healing

*Surgical Treatment*

*Ralph George¹, Andrew Pawliwec*
¹St. Michael's Hospital, department of Surgery, Toronto, ON, Canada

**Introduction:** HS is a difficult problem for surgeons. Wide excisions may be required in anatomical sites that are difficult to immobilize, prone to infection, and are cosmetically sensitive. The patient population can have comorbidities that adversely affect wound healing (obesity, diabetes, and smoking). This study examines surgical outcomes after primary flap closures and secondary intention healing in an HS population.

**Methods:** A prospective data base of HS patients and procedures was used to track operative outcomes. Patients are stratified by operative site, comorbidities and method of closure.

**Results:** 70 procedures in 31 patients over 47 months were evaluated. 15 people had more than one site operated on. The most commonly addressed anatomical areas were axilla, groin (inguinal-crural), inframammary, buttocks, and genital areas. Of 54 primary closures with advancement or rotation flaps 11 (20.5%) had significant wound dehiscence. Risk factors for dehiscence were axillary location, extent of disease, and obesity. 16 patients had complete healing with good function utilizing secondary intention closure. Secondary intention had good results but longer healing time.

**Conclusion:** Secondary intention healing is effective in surgical management of HS with good functional results but a longer time to closure. Advanced disease, axillary location, and obesity were associated with an increased risk of wound dehiscence in the population treated with primary closure.
**Poster # 15**  
**Intercostobrachial neuralgia after axillary surgery for Hidradenitis suppurativa: report of case series and review of literature**

*Marilia Oliveira M.D., M.S., D.V.M.*, Christopher Sayed *  
1 Duke Department of Dermatology DUMC, Durham, NC, USA; 2 Department of Dermatology, University of North Carolina School of Medicine, Chapel Hill, NC, USA

**Introduction:** Hidradenitis suppurativa (HS) is a debilitating, painful, chronic inflammatory condition of intertriginous skin. We present two cases of axillary HS refractory to multiple medical treatments but successfully treated with wide local excision in the outpatient setting. Patients subsequently developed hyperesthesia and paresthesia along the intercostobrachial nerve consistent with intercostobrachial neuralgia (ICBN). This has been reported after axillary node dissection for breast cancer, but is the first report after axillary HS surgery.

**Method:** We report 2 cases of intercostobrachial neuralgia following axillary HS excisions at the Department of Dermatology at the University of North Carolina, Chapel Hill. Information regarding age, sex, ethnic background, location of HS lesions, treatments prior to surgery, timeframe for development of intercostobrachial neuralgia, type of neuropathic pain, treatment used (including if improvement was noted) were recorded.

**Results:** Both patients are young African American females with severe, chronic HS on the axilla and refractory to multiple medical modalities. Both developed ICBN within a month after surgery reported as dysesthesia. Gabapentin has been helpful at a dose as high as 900 mg TID. One patient had complete resolution of dysesthesia after 12 months following excision. The second patient had resolution of pain with persistent numbness on the upper arm 4 months after surgery and also found relief with gabapentin.

**Conclusion:** ICBN can occur after axillary HS surgery but tends to improve with time and may be improved with oral gabapentin. We aim to bring awareness of a possible complication after axillary HS surgery and will review relevant data on ICBN and axillary anatomy relevant to surgical interventions.

**Learning Objectives:**
- Discuss intercostobrachial neuralgia as a possible complication after axillary HS surgery.
- Review relevant data on ICBN.
- Learn axillary anatomy relevant to surgical interventions.

**Poster # 16**  
**Vulvar and perineal verrucous changes complicating hidradenitis suppurativa after wide excision**

*Rachael Ward*, Mary Ramirez, Tarannum Jaleel, MD  
1 Duke University Medical Center, Department of Dermatology, Durham, NC, USA

**Introduction:** Hidradenitis Suppurativa (HS), also known as acne inversa, is a chronic follicular occlusive disease primarily involving the intertriginous skin areas of the axillary, groin, perianal, perineal, and inframammary regions. Poorly controlled and long-standing HS may lead to significant complications including lymphatic obstruction, sinus tract formation, long-term systemic effects of chronic inflammation such as anemia, cardiovascular disease, and cancer.

**Results:** We report a case of a 53-year-old woman with a complex medical history including a greater than 20-year history of HS, who presented with a verrucous plaque involving and surrounding the vulva and inner thighs. This patient had the area excised and left it to granulate 18 years before her presentation, specifically noting incomplete healing and areas of ulceration. Her high-risk HPV assay in the year 2014 was negative.

**Conclusion:** Being able to correctly identify verrucous plaques overlying ulceration in this subset of patients is crucial; important diagnoses to consider include various types of squamous cell carcinoma (SCC) such as verrucous SCC and Marjolin's ulcer. Some other considerations include lymphedematous verrucous changes, pseudoepitheliomatous hyperplasia, lichen simplex chronicus, and primary systemic amyloidosis. Our report highlights the importance of vigilant exploration of anogenital lesions in patients with chronic HS and low threshold for biopsy, even in those patients who have undergone extensive surgical and excision.

**Learning Objective:** Importance of lower threshold for vigilant exploration and assessment of anogenital lesions in patients with HS.
Paul Skiba
University of North Carolina at Chapel Hill Department of Dermatology, Chapel Hill, NC, USA

Hidradenitis Suppurativa (HS) is a chronic inflammatory dermatologic disease that affects 0.5-1% of the population and causes significant decrease in the quality of life of affected patients. Clinically, it is characterized by follicular occlusions and inflammation of the folliculopilosebaceous unit resulting in painful nodules, isolated abscesses, and draining sinus tracts in areas associated with the typical distribution of apocrine glands. Current studies have investigated the relationship between HIV/AIDS and chronic inflammatory dermatologic disorders such as psoriasis and showed that although it is an immunodeficiency syndrome, HIV/AIDS patients experience more severe psoriasis and higher rates of psoriatic arthritis than patients without HIV/AIDS. However, the relationship between HIV/AIDS and other chronic inflammatory disorders such as HS remains poorly understood. This study aims to determine whether a relationship between HIV/AIDS and HS exists, investigate whether or not treating underlying HIV/AIDS could help alleviate HS symptoms in patients diagnosed with both, and assess if HIV/AIDS patients with HS are frequently unrecognized or misdiagnosed due to the lack of knowledge of a possible connection between these two conditions. A retrospective review of medical charts from patients diagnosed with both HIV/AIDS and HS was conducted in order to further epidemiologically characterize this unique group of patients, investigate a possible correlation between these disorders, assess for rates of misdiagnosis of HS in the setting of HIV/AIDS, and study possible HS symptom alleviation through HIV/AIDS disease management. Our results demonstrated that this co-diagnosed population was unique from patients with only an HS diagnosis in age of HS onset, race, and sex. Additionally, this population experienced a later HS disease onset often after HIV infection, suggesting a possible correlation between HIV infection and HS development. Misdiagnosis rates were also alarmingly high and suggest a lack of knowledge among physicians about HS symptom presentation.

Learning objective:
To introduce new data about the association between HIV/AIDS and HS in order to encourage further exploration of this relatively unexplored association as well as to aid in the awareness, diagnosis, and treatment of HS in the HIV/AIDS population.

Erica Neuren, BA¹, Amit Garg, MD²
¹Zucker School of Medicine at Hofstra/Northwell, Hempstead, NY, USA; ²Zucker School of Medicine at Hofstra/Northwell, Department of Dermatology, New Hyde Park, NY, USA

Introduction: Polycystic ovary syndrome (PCOS) has been linked to hidradenitis suppurativa (HS). However, the evidence establishing a relationship between the two conditions is limited. We sought to determine prevalence of PCOS among HS patients and the strength of their association.

Methods: Cross-sectional analysis involving 22,060 HS patients sampled from a demographically heterogeneous population-based sample of over 50 million unique patients across all census regions of the United States.

Results: Prevalence of PCOS among patients with HS was 8.8%, compared to 2.8% in patients without HS (p<.0001). The likelihood of HS patients having PCOS was 2.16 [95% CI 2.06-2.27] times that of non-HS patients, and PCOS was associated with HS across all patient subgroups. The strength of the HS association with PCOS was similar to that of diabetes mellitus [OR 2.90, 95% CI 2.85-2.95] and obesity [OR 3.98, 95% CI 3.92-4.04] with PCOS.

Limitations: Influence of disease severity on strength of association with PCOS could not be assessed, nor could an HS phenotype for patients also having PCOS. This analysis could not establish directionality of the relationship, nor a causal link.

Conclusion: PCOS is associated with HS. HS patients with symptoms or signs of androgen excess should be screened for PCOS.
Learning Objectives:
To determine prevalence of PCOS among HS patients and the strength of their association.

Poster # 19  Hidradenitis Suppurativa patients can benefit from topical surfactant-based gel matrix wound dressing- A case series

Afsaneh Alavi, MD, FRCPC, Jeannine A. Archer, MD, Divine Joyce Briones, RPN, Sharon A. Whitty, MSc, MB, BCH BAO, Eran Shavit, MD
Women's College Hospital, Division of Dermatology, Toronto, ON, Canada

Hidradenitis Suppurativa (HS) is a chronic, recurrent, debilitating disease predominantly affecting the apocrine gland-bearing skin. Topical antibiotics and various local agents have been used in the management of early stages of HS. Appropriate wound care is part of the management required to treat patients with HS. Wound care in patients with Hidradenitis Suppurative is challenging and limited data in this area is available. Occlusion of hair follicle, colonization of bacteria and dysregulation of the immune system all play a role in the pathogenesis of this disease. Biofilms have been recognized as being major players in the activation of the immune system.

Surfactant-based biomaterial is currently being utilized in burn and wound care, and is built with two polymer chains, one being hydrophilic and one being hydrophobic. This results in surfactant (detergent) properties that are cell-friendly and bio-compatible in the form of a micelle gel matrix (MGM)

The study tested the use of this biofilm based dressing, a surfactant based polymer matrix, as a safe and effective treatment in improving wound healing.

Methodology: The aim of the pilot study was to show the use of the MGM dressing on the inflammatory HS lesions. We enrolled 3 subjects with inflammatory HS lesions located in the axilla, groin or sub-mammary regions. The female to male ratio was 2:1. The patients were evaluated clinically by lesion count, and using patient satisfaction questionnaires over the course of 4 weeks.

Results: The study tested the MGM dressing over the course of 4 weeks. Sixty six percent (66%) of the subjects showed a decrease in inflammatory lesion count by week 4. Thirty-three (33%) of the subjects were satisfied with the gel matrix dressing.

Conclusion: Topical surfactant-based micelle gel matrix dressing (*) is a safe and effective, therapy for HS inflammatory lesions. More studies are required with larger sample size.

(*) - PluroGel®

Learning objectives:
- Discuss importance of wound care in HS for improving QoL
- Present a topical therapy option for advanced HS
Hidradenitis Suppurativa (HS) is a chronic disease of recurrent inflammatory lesions predominantly involving the axilla, groin and the sub-mammary areas. These lesions have an unpredictable course, a tendency to rupture (producing malodorous discharge), and can result in chronically draining wounds.

Living with HS negatively impacts a patient’s self-esteem and quality of life. However, optimal chronic wound care directly improves their quality of life as well as health economics. A vital part of quality wound care is access to effective and economical wound care dressing options.

Presently, the mainstay of therapy for advanced HS is systemic treatment, however, we believe that a patient’s satisfaction with topical wound dressings plays a substantial role in improved quality of life.

The flexible absorbent all-in-one post-op dressing is an all-in-one post-op dressing that effectively absorbs and retains blood and surgical exudates. It is optimized for post-op use and blood absorption. The silicone adhesive layer ensures that the dressing can be changed without damaging the wound or surrounding skin.

**Methodology:** The aim of this pilot project was to demonstrate the use of absorbent dressing on areas subject to draining HS lesions. We enrolled five (5) subjects with inflammatory HS lesions located in the axilla, groin or sub-mammary regions. Female to male ratio was 4:1. The usage of absorbent post-op dressing was determined. Patient’s satisfaction was assessed via questionnaires over the course of 6 weeks. Enrollment is ongoing.

**Results:** Patients were assessed over the course of 6 week. Overall, patients gave positive feedback in the dressing satisfaction questionnaire. Forty percent (40%) of the subjects were satisfied with the absorbency of the dressing. Fifty percent (50%) of the subjects were satisfied with lack of pain while wearing the dressing and during dressing changes.

**Conclusion:** Topical post-op absorbent wound dressing (*) is a safe and effective dressing for HS inflammatory lesions.

(*) – Mepilex Post-Op®

**Learning objectives:**
- Discuss importance of wound care in HS for improving QoL
- Present a topical therapy option for advanced HS

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Gamma-secretase inhibitors may cause Hidradenitis Suppurativa-like lesions

**Pathophysiology (late-breaking)**

Ghias MH†, Woodring T‡, O'Sullivan Coyne G§, Kong HSF, Chen AP⁰, and Lowes MA¶

† Albert Einstein College of Medicine, Bronx, NY; ‡ Dermatology Branch, Center for Cancer Research, National Cancer Institute, Bethesda MD; § Early Clinical Trials Developmental Program, DCTD, National Cancer Institute, Bethesda MD; ¶ The Rockefeller University, New York, NY

A minority of hidradenitis suppurativa (HS) cases are associated with mutations within gamma-secretase subunits nicastrin (NCSTN), presenilin-1 (PSEN1 or PS1), and presenilin enhancer 2 (PEN2 or PSENEN). These subunits form a transmembrane protein complex with downstream protein activation, including Notch. Animal models with gamma-secretase and Notch knockouts have shown an increase in infundibular plugging and cyst formation.

Patients with hereditary Alzheimer’s disease (AD) carry mutations in gamma-secretase subunits (PSEN1 or PSEN2) or in the amyloid precursor protein (APP). The gain of function gamma-secretase mutations result in altered APP processing leading to the production of amyloid-beta plaques. To date, there is no known association between HS and AD.

Due to the discovery of increased gamma-secretase activity in AD, gamma secretase inhibitors (GSI) have been developed in an attempt to lower amyloid-beta production. In addition, given the role of Notch in carcinogenesis, GSIs have also been investigated for the treatment of desmoid tumors, aggressive fibromatosis, and other solid tumors.

A recent poster at the 2017 Society for Investigational Dermatology (SID) Annual Meeting presented cutaneous adverse events (AEs) in patients with desmoid tumors treated with gamma-secretase inhibitor Nirogacestat (PF-0308014). The majority of patients (12/17) in the phase II clinical trial (NCT01981551) experienced cutaneous AEs. Of these affected patients, 9 experienced HS-like follicular and cystic lesions, and 6 had pruritic eruptions.
We reviewed the literature for GSI-associated cutaneous AEs. Potential AD GSI agents, including Semagacestat, Avagacestat, GSI-136, and MK0752, resulted in cutaneous adverse events. RO4929097, a GSI for advanced solid tumor chemotherapy, also demonstrated skin AEs. The follicular and cystic lesions described in many of these studies resemble HS-like lesions.

While HS pathogenesis is likely multifactorial, studying the cutaneous manifestations of GSI therapy could help us to understand the role of gamma secretase activity in developing HS lesions and clinical phenotypes.

**Learning objective:**
To understand the extent of the relationship between pharmacological gamma secretase inhibition and HS-like clinical lesions.

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**Poster # 22**  
**Incidence of Hidradenitis Suppurativa in the Pediatric Population in the United States**

Amit Garg, MD¹, Margareta Midura, BS¹, Vassiliki Papagermanos, BA¹, Rebekah Balth, MD¹, Andrew Strunk, MA¹, Nika Finelt, MD¹

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**Importance:** The true pediatric prevalence of Hidradenitis Suppurativa (HS) is unknown.

**Objective:** To establish pediatric (0-17 years of age) overall and group-specific prevalence estimates of HS in the United States (US).

**Design:** Retrospective analysis of the case cohort as of March, 2017.

**Setting:** A demographically heterogeneous population-based sample of over 4.5 million unique pediatric patients across all US census regions.

**Participants:** HS patients aged 0-17 (n = 1,240) identified using electronic health records data.

**Main Outcomes:** Overall point prevalence for HS in pediatric population, as well as gender-, age-, and race-specific prevalence estimates of HS within this population.

**Results:** The overall **crude HS prevalence in the US pediatric population sample was 0.027%, or 27.1 per 100,000 people (95% CI 25.6-28.6). The **crude prevalence in females was 44.0 per 100,000 (95% CI 41.3-46.9), approximately four times that of males [11.0 per 100,000, 95% CI 9.7-12.5]. HS prevalence was highest among patients aged 15-17 years [115.2 per 100,000, 95% CI 107.7-123.0] compared with all other age groups. HS prevalence among African Americans [70.1 per 100,000, 95% CI 63.2-77.5] and biracial patients [54.3 per 100,000, 95% CI 33.2-83.9] was more than three-fold and two-fold, respectively, that of Caucasians [22.4 per 100,000, 95% CI 20.7-24.3].

**Conclusions and Relevance:** HS is an uncommon disease in the United States pediatric population. It disproportionately affects females, older pediatric patients, and African-Americans and biracial patients.

**Learning Objectives:**
To determine the overall and group-specific incidence of HS in the US pediatric population.
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.

<table>
<thead>
<tr>
<th>Name</th>
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| Alavi, Afshaneh           | Grant Consultant: AbbVie  
Speaker’s Bureau: AbbVie, Galderma, Janssen, LEO Pharma, Novartis  
Clinical Trials Investigator: AbbVie, Galderma, Janssen, LEO Pharma, Novartis  
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| Hamzavi, Iltifat          | Investigator – grant to institution: AbbVie  
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| Sayed, Christopher | Advisory Board member: AbbVie Inc.  
                        Speaker Bureau: AbbVie Inc.  
                        Clinical Trial Investigator: AbbVie Inc, UCB |
| Schultz, Gregory   | Grant assess effects of Plurogel on bacterial biofilms on pig skin explants: Medline;  
                        Grant assess effects of Neutrolin on bacterial biofilms on pig skin explants: Cormedix;  
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| Shavit, Eran       | Honorium for EIDON meeting, Sept 2017: AbbVie Inc.                                             |
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| Soliman, Yssra     | no conflict declared                                                                         |
| Tan, Jerry         | Advisory board: Allergan, AbbVie, Valeant; Trialist: AbbVie, Valeant; Consultant: Novartis    |
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