WELCOME
TO AAES

AAES 40TH
Annual Meeting

APRIL 7–9 LOS ANGELES
Local Arrangements Chair: Michael Yeh, MD
THANK YOU

Thank you to our AAES 2019 Meeting Sponsors! The American Association of Endocrine Surgeons gratefully acknowledges the generous support without which this meeting would not be possible.

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*as of February 27, 2019

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AAES FUTURE MEETINGS

April 4-6, 2020
Birmingham, Alabama
John Porterfield, MD
*The 2020 Meeting will start on Saturday and end on Monday

2021
Cleveland, Ohio
Vikram Krishnamurthy, MD

2022
New Orleans, Louisiana
Emad Kandil, MD
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Kelly Lovell, MD
Rosemarie Metzger, MD
Amy Quillo, MD
Sarah Schaefer, MD
Angelia Sherertz
Tricia Tidwell

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<table>
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<tr>
<th>Year</th>
<th>President</th>
<th>Vice President</th>
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<tbody>
<tr>
<td>2018-2019</td>
<td>Herbert Chen</td>
<td>Sonia Sugg</td>
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<td>Martha Zeiger</td>
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<td>Peter Angelos</td>
<td>Samuel Snyder</td>
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<td>Steven K. Libutti</td>
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<td>Sally E. Carty</td>
<td>Julie Ann Sosa</td>
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<td>Ashok R. Shaha</td>
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<td>Janice L. Pasieka</td>
<td>Jeffrey E. Lee</td>
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<td>Michael J. Demeure</td>
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<td>Geoffrey B. Thompson</td>
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<td>James Lee</td>
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OLIVER COPE MERITORIOUS ACHIEVEMENT AWARD

In April of 1984 at the American Association of Endocrine Surgeons Meeting in Kansas City, Drs. Edward Kaplan, Jack Monchik, Leonard Rosoff, Norm Thompson and Stuart Wilson proposed to the Council a new achievement award. The award honors a member of the AAES in recognition for contributions in the field of endocrine surgery as an investigator, teacher and clinical surgeon. It is not an annual award but is to be given to members of our Association who truly aspire to the spirit of this award.

On April 15, 1985 at the annual meeting of the AAES in Toronto, our President, Leonard Rosoff announced the first member to receive this award, Dr. Oliver Cope. In giving this award to Dr. Cope the decision of the Council was that from this day forward the award would be known as the Oliver Cope Meritorious Achievement Award for the American Association of Endocrine Surgeons.

Oliver Cope, MD  
Professor of Surgery, Harvard University and the Massachusetts General Hospital  
Awarded in Ontario in April 1985.

Stanley R. Friesen, MD, PhD  
Professor of Surgery, University of Kansas  
Awarded in Detroit, MI in April 1994.  
Dr. Friesen served as the President of our Association in 1983.

Norman W. Thompson, MD  
Henry King Ransom Professor of Surgery, University of Michigan  
Awarded in Atlanta, GA in April 2001.  
Dr. Thompson served as our inaugural President in 1980 and 1981.

Jon A. van Heerden, MD  
Professor of Surgery Mayo Clinic  
Awarded in Charlottesville, NC in April 2004.  
Dr. van Heerden served as our Recorder from 1987-1989, as our Vice-President in 1994, and as President in 1996.

Orlo H. Clark, MD  
Professor of Surgery, UCSF Mount Zion Medical Center  
Awarded in New York, NY in May 2006.  
Dr. Clark served as our inaugural Vice-President in 1980 and 1981, and as President in 1993.

Edwin L. Kaplan, MD  
Professor of Surgery, University of Chicago  
Awarded in Madison, WI in May 2009.  
Dr. Kaplan served as our President in 1982.
George L. Irvin, III, MD  
Professor Emeritus of Surgery, University of Miami  
Awarded in Pittsburgh, PA in April 2010.  
Dr. Irvin served as our Recorder from 1993-1996, as Vice-President in 1996, and as President in 1998

Stuart D. Wilson, MD  
Professor Emeritus of the Department of Surgery, Medical College of Wisconsin  
Awarded in Baltimore, MD in April 2016  
Dr. Wilson served as our Secretary-Treasurer from 1984-1988 and President from 1991-1992.

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<thead>
<tr>
<th>Oliver Cope, MD</th>
<th>Stanley R. Friesen, MD, PhD</th>
<th>Norman W. Thompson, MD</th>
<th>Jon A. van Heerden, MD</th>
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<td>Orlo H. Clark, MD</td>
<td>Edwin L. Kaplan, MD</td>
<td>George L. Irvin, III, MD</td>
<td>Stuart D. Wilson, MD</td>
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</table>
HONORARY MEMBERS

Individuals who have made outstanding contributions to the discipline of Endocrine Surgical Disease:

J. Aidan Carney, Pathologist
Stuart D. Flynn, Pathologist
Ian D. Hay, Endocrinologist
Virginia A. LiVolsi, Pathologist
Frank LoGerfo, Surgeon
A. G. E. “Ace” Pearse, Endocrinologist
Thomas S. Reeve, Endocrine Surgeon
F. John Service, Endocrinologist
Britt Skogseid, Endocrinologist
R. Michael Tuttle, Endocrinologist
William F. Young, Endocrinologist
RESIDENT/FELLOW RESEARCH AWARD WINNERS & POSTER COMPETITION WINNERS

The AAES Resident/Fellow Research Award was established in 1990 to encourage interest in endocrine surgery by those training as students and residents in general surgery. Presented work may be honored in either the Clinical or Basic Research categories. The AAES Poster Competition was established in 2007.

1990
Michael J. Demeure — San Francisco, California
“Actin Architecture of Cultured Human Thyroid Cancer Cells: Predictor of Differentiation?”
Gerard M. Doherty — Bethesda, Maryland
“Time to Recovery of the Hypothalamic-Pituitary-Adrenal Axis After Curative Resection of Adrenal Tumors in Patients with Cushing’s Syndrome”

1992
Rodney Pommier — New York, New York
“Eleven Year Experience with Adrenocortical Carcinoma”

1996
Jennifer Meko — St. Louis, Missouri
“Evaluation of Somatostatin Receptor Scintigraphy in Detecting Neuroendocrine Tumors”
Beth A. Ditkoff — New York, New York
“Detection of Circulating Thyroid Cells in Peripheral Blood”

1997
Herbert Chen — Baltimore, Maryland
“Implanted Programmable Insulin Pumps: 153 Patient Years of Surgical Experience”
K. Michael Barry — Rochester, Minnesota
“Is Familial Hyperparathyroidism a Unique Disease”

1998
Julie Ann Sosa — Baltimore, Maryland
“Cost Implications of the Different Management Strategies for Primary Hyperparathyroidism in the US”
David Litvak — Galveston, Texas
“A Novel Cytotoxic Agent for Human Carcinoid”

1999
Andrew Feldman — Bethesda, Maryland
“Results of Heterotrophic Parathyroid Autotransplantation: A 13-Year Experience”
Alan Dackiw — Houston, Texas
“Screening for MENI Mutations in Patients with Atypical Multiple Endocrine Neoplasia”
RESIDENT/FELLOW RESEARCH AWARD WINNERS & POSTER COMPETITION WINNERS

2000
Electron Kebebew — San Francisco, California
“ID1 Proteins Expressed in Medullary Thyroid Cancer”

2001
Nestor F. Esnaola — Houston, Texas
“Optimal Treatment Strategy in Patients with Papillary Thyroid Cancer: A Decision Analysis”
Katherine T. Morris — Portland, Oregon
“High Dehydroepiandrosterone-Sulfate Predicts Breast Cancer Progression During New Aromatase Inhibitor Therapy and Stimulates Breast Cancer Cell Growth in Tissue Culture: A Renewed Role for Adrenalectomy”

2002
Rasa Zarnegar — San Francisco, California
“Increasing the Effectiveness of Radioactive Iodine Therapy in the Treatment of Thyroid Cancer Using Trichostatin A (TSA), A Histone Deacetylase (HDAC)”
Denise M. Carneiro — Miami, Florida
“Rapid Insulin Assay for Intraoperative Confirmation of Complete Resection of Insulinomas”

2003
Petra Musholt — Hanover, Germany
“RET Rearrangements in Archival Oxyphilic Thyroid Tumors: New Insights in Tumorigenesis and Classification of Hürthle Cell Carcinoma”
Tina W.F. Yen — Houston, Texas
“Medullary Thyroid Carcinoma: Results of a Standardized Surgical Approach in a Contemporary Series of 79 Consecutive Patients from The University of Texas, M. D. Anderson Cancer Center in Houston”

2004
Rebecca S. Sippel — Madison, Wisconsin
“Does Propofol Anesthesia Affect Intra-Operative Parathyroid Hormone Levels During Parathyroidectomy? A Randomized Prospective Trial”
David Finley — New York, New York
“Molecular Analysis of Hürthle Cell Neoplasms by Gene Profiling”

2005
Mark Cohen — St. Louis, Missouri
“Long-Term Functionality of Cryopreserved Parathyroid Autografts: A 13-Year Prospective Analysis”
Kepal N. Patel — New York, New York
“MUC1 Plays a Role in Tumor Maintenance in Aggressive Thyroid Carcinomas”
RESIDENT/FELLOW RESEARCH AWARD WINNERS & POSTER COMPETITION WINNERS

2006
Kyle Zanocco — Chicago, Illinois
“Cost-Effectiveness Analysis of Minimally Invasive Parathyroidectomy for Asymptomatic Primary Hyperparathyroidism”

Ashley Kappes Cayo — Madison, Wisconsin
“Lithium Ions: A Novel Agent for the Treatment of Pheochromocytomas and Paragangliomas”

2007
Tracy S. Wang — New Haven, Connecticut “How Many Endocrine Surgeons Do We Need?”

David Yu Greenblatt — Madison, Wisconsin
“Valproic Acid Activates Notch1 Signaling and Inhibits Growth in Medullary Thyroid Cancer Cells”

2008
Elizabeth G. Grubbs — Houston, Texas
“Preoperative Vitamin D (VITD) Replacement Therapy in Primary Hyperparathyroidism (PHPT): Safe But Beneficial?”

Linwah Yip — Pittsburgh, Pennsylvania
“Loss of Heterozygosity of Selected Tumor Suppressor Genes in Parathyroid Carcinoma”

POSTER: Pierre Leyre — Poitiers, France
“Does the Risk of Compressive Hematoma After Thyroidectomy Authorize One-Day Surgery?”

2009
Insoo Suh — San Francisco, California
“Candidate Germline Alterations Predisposing to Familial Nonmedullary Thyroid Cancer Map to Distinct Loci on Chromosomes 1 and 6”

Susan C. Pitt — Madison, Wisconsin

POSTER: Matthew Nehs — Boston, Massachusetts
“Inhibition of B-RAFV600 Oncoprotein Prevents Cell Cycle Progression and Invasion In Vitro and Reduces Tumor Growth and Metastasis in an In Vivo Orthotopic Model of Thyroid Cancer”

POSTER: Bian Wu — Los Angeles, California
“Utilization of Parathyroidectomy in the Elderly: A Population-Based Study”
RESIDENT/FELLOW RESEARCH AWARD WINNERS & POSTER COMPETITION WINNERS

2010

David T. Hughes — Ann Arbor, Michigan
“Routine Central Lymph Node Dissection For Papillary Thyroid Cancer”

Matthew A. Nehs — Boston, Massachusetts
“Thyroidectomy With Neoadjuvant Plx4720 Extends Survival And Decreases Tumor Burden In An Orthotopic Mouse Model Of Anaplastic Thyroid Cancer”

POSTER: Aarti Mathur — Bethesda, Maryland
“Adrenal Venous Sampling in Primary Hyperaldosteronism: Standardizing A Gold Standard”

2011

Paxton V. Dickson — Houston, Texas
“Achieving Eugastrinemia in MEN1 Patients: Both Duodenal Inspection and Formal Lymph Node Dissection are Important”

Matthew Nehs — Boston, Massachusetts
“Necroptosis is a Novel Mechanism of Radiation-Induced Cell Death in Anaplastic Thyroid Cancer and Adrenocortical Cancer”

POSTER: Luc G.T. Moris — New York, New York
“Rising Incidence of Second Primary Cancer in Low-Risk Patients Receiving Radioactive Iodine Therapy”

2012

Ashley K. Cayo — Milwaukee, Wisconsin
“Predicting the Need for Calcium and Calcitriol Supplementation After Total Thyroidectomy: Results of a Prospective, Randomized Study”

Thomas J. Quinn — Bronx, New York
“Pasireotide (Som230) Is Effective for the Treatment of Pancreatic Neuroendocrine Tumors in a Multiple Endocrine Neoplasia Type 1 Conditional Knockout Mouse Model”

POSTER: Kevin Shepet — Madison, Wisconsin
“Parathyroid Cryopreservation Following Parathyroidectomy: A Worthwhile Practice?”

2013

Kai-Pun Wong — Hong Kong
“A Prospective Evaluation of Surgeon-Performed Transcutaneous Laryngeal Ultrasonography in Assessing Vocal Cord Function Before and After Thyroidectomy”

Scott K. Sherman — Iowa City, Iowa
“Gastric Inhibitory Polypeptide Receptor: A Future Alternative to Somatostatin Type 2 Receptor Imaging and Treatment in Neuroendocrine Tumors?”

POSTER: Sara Murray — Madison, Wisconsin
“Timing of Symptom Improvement After Parathyroidectomy”
RESIDENT/FELLOW RESEARCH AWARD WINNERS & POSTER COMPETITION WINNERS

2014
Heather Wachtel — Philadelphia, Pennsylvania
"Long-term Blood Pressure Control in Patients Undergoing Adrenalectomy for Primary Hyperaldosteronism"

Jessica Maxwell — Iowa City, Iowa
“A Practical Method to Determine the Site of Unknown Primary in Metastatic Neuroendocrine Tumors”

POSTER: Ben James — Chicago, Illinois
“A Novel Ultra-Rapid PTH Assay to Distinguish Parathyroid from Non-Parathyroid Tissue”

2015
Diana I. Ortiz – Medical College of Wisconsin “Cosyntropin Stimulation Testing On Postoperative Day 1 Allows for Selective Glucocorticoid Replacement Therapy in Patients Undergoing Adrenalectomy for Hypercortisolism: Results of a Novel, Multidisciplinary-Derived Institutional Protocolb”

Melanie A. McWade – Vanderbilt University
“Fluorescence Detection of the Parathyroid Gland: Realizing the Potential for Intraoperative Guidance”

POSTER: Idit Dotan – McGill University Health Center
“Bio-Conjugated Nanotechnology to Target Papillary Thyroid Cancer in Vitro”

POSTER: Uma Rajhbeharrysingh – Oregon Health and Science University
“Ionized Calcium And The Utility Of Maxpth To Evaluate Gastric Bypass Patients and Others With Non-Renal Secondary Hyperparathyroidism”

2016
Bruna Babic – National Institute of Health, National Cancer Institute
“Pediatric Patients with Pheochromocytoma and Paragangliomas Should Have Routine Preoperative Genetic Testing for Common Susceptibility Genes and Imaging to Detect Extra-Adrenal and Metastatic Tumors”

Peter T. White – University of Michigan
“A Novel Heat Shock Protein 90 Inhibitor Overcomes Receptor Tyrosine Kinase Resistance in Differentiated Thyroid Cancer”

POSTER: Selena Brouwer – University Medical Center Utrecht
“Intratumoral Heterogeneity of Microrna Expression is a Pervasive Feature in Papillary Thyroid Carcinoma”

POSTER: Wouter Kluijfhhout – University of California San Francisco
“CEA Should Not Routinely be Used for Detection of a First Recurrence in Patients With MTC”
RESIDENT/FELLOW RESEARCH AWARD WINNERS & POSTER COMPETITION WINNERS

2017

Kendall J. Keck – University of Iowa Carver College of Medicine
“Gene expression changes in small bowel neuroendocrine tumors associated with progression to metastases”

Omair Shariq – Mayo Clinic
“Contralateral suppression of aldosterone at adrenal venous Sampling predicts hyperkalemia following adrenalectomy for primary Aldosteronism”

POSTER: Priya Dedhia – University of Michigan
“Human intestinal tissue generates functional insulin producing cells”

POSTER: Heather Wachtel – Massachusetts General Hospital
“A multi-institutional analysis of adrenalectomy for secondary malignancy”

2018

John Tierney – Rush University Medical Center
“Expression of Programmed Death Ligand-1 and 2 in Adrenocortical Cancer Tissues: An exploratory study”

Kristen Limbach – Oregon Health & Science University
“Prospective Study of the Pathophysiology of Carcinoid Crisis”

POSTER: Sarah Fisher – MD Anderson Cancer Center
“Genetic characterization of childhood survivors of the Chernobyl accident with medullary Thyroid cancer”

POSTER: Wessel Vorselaars – University Medical Center Utrecht
“Clinical outcomes after unilateral adrenalectomy for primary hyperaldosteronism - a large worldwide and recently operated cohort of 435 patients”
### 2018-2019 NEW MEMBERS

#### ACTIVE MEMBERS

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<tr>
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<td>Megan Applewhite, MD</td>
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<td>Masha Livhits, MD</td>
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<td>Navin Niles, MD</td>
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<td>Ann Arbor, Michigan</td>
<td>Norman W. Thompson</td>
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<td>1981</td>
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<td>Glenn Geelhoed</td>
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<td>1982</td>
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<td>Robert C. Hickey</td>
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<td>1985</td>
<td>Toronto, Ontario, Canada</td>
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<td>1986</td>
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<td>Jon A. van Heerden</td>
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<td>Edwin L. Kaplan</td>
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<td>Barbara Kinder</td>
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<td>Janice L. Pasieka</td>
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<td>Jay K. Harness &amp; John Kukora</td>
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<td>Miguel F. Herrera</td>
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<td>Ashok R. Shaha</td>
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<td>Carmen Solorzano</td>
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<td>John A. Olson, Jr.</td>
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<td>2017</td>
<td>Orlando, Florida</td>
<td>Mira Milas</td>
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<td>2018</td>
<td>Durham, North Carolina</td>
<td>Sanziana Roman, Julie Ann Sosa</td>
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SPECIAL SESSIONS
Attendees are welcome to attend any sessions unless specifically stated

ADVANCED ENDOCRINE SURGERY COURSE
SATURDAY, APRIL 6, 2019   8:00 AM – 5:00 PM
Fairmont Miramar Hotel – Wilshire III & IV
*Separate registration required for this course

Back by popular demand! Take your skills to the next level and help enhance your clinical practice of endocrine surgery. This course will review current standards in management of complex endocrine diseases while engaging on a personal level with nationally recognized authorities in the field. A multi-disciplinary panel of experts will highlight the nuances of complex decision making. Panelists will be unaware of the real-life clinical scenarios presented which creates a more practical approach and lends itself well to learning objectives of practicing surgeons with a special interest in thyroid, parathyroid and adrenal disease.

GRAVES’ DISEASE PATIENT SESSION
SATURDAY, APRIL 6, 2019   5:00 PM – 6:30 PM
Fairmont Miramar Hotel  –  Wilshire I & II
This session is designed to serve our patients. The panel will discuss their intimate knowledge of Graves’ disease answer patient directed questions that pertain to your specialty.

ALLIED PROFESSIONALS SESSION
SUNDAY, APRIL 7, 2019   8:30 AM – 10:00 AM
Fairmont Miramar Hotel  –  Starlight Ballroom
This session is designed to highlight the utilization of multidisciplinary teams in endocrine surgery. The panel will discuss strategies they have employed that enable them to practice across the full scope of their training.

LUNCH SESSION: AAES GUIDELINES: RELEVANCE TO CLINICAL PRACTICE
SUNDAY, APRIL 7, 2019   12:25 PM – 1:40 PM
Fairmont Miramar Hotel  –  Starlight Ballroom
This session will highlight the American Association of Endocrine Surgeons (AAES) Guidelines. Following a brief overview of the history of the guidelines and future directions, an expert panel will briefly review selected topics related to the management of parathyroid and thyroid disease.

BREAKFAST SESSION: RESEARCH FRONTIERS
MONDAY, APRIL 8, 2019   7:00 AM – 8:00 AM
Fairmont Miramar Hotel  –  Starlight Ballroom
A new session in 2019! The purpose of this session is to showcase the ability to perform scientifically rigorous research that has direct applications to advancing the ways in which we care for patients. Presenters will lead an interesting discussion regarding the journey to a scientific career in addition to the practical aspects of dissemination and adoption of new knowledge in practice.
ALLIED PROFESSIONALS BREAKFAST
MONDAY, APRIL 8, 2019   7:00 AM – 8:00 AM
Fairmont Miramar Hotel – Wilshire IV
This will be a casual breakfast for allied health professionals. AAES President Herb Chen, MD will represent the AAES Council as we discuss future topic ideas for the 2020 AAES Annual Meeting. Allied health professional membership will be discussed in addition to the recruitment of the planning committee for the 2020 meeting.

DIVERSITY AND INCLUSION PANEL
MONDAY, APRIL 8, 2019   10:30 AM – 11:30 AM
Fairmont Miramar Hotel – Starlight Ballroom
This session will provide insights into the issues of diversity, equity and inclusion within surgery. Panelists will discuss how their society promotes leadership development and advocates for diversity and inclusion. A structured discussion led by AAES President, Herb Chen, MD will follow individual presentations. Audience participation is expected and encouraged.

LUNCH SESSION: BUSINESS OF ENDOCRINE SURGERY:
THE EFFICIENT ENDOCRINE SURGICAL PRACTICE
Sponsorship provided by Stryker
MONDAY, APRIL 8, 2019   11:45 AM – 1:00 PM
Fairmont Miramar Hotel – Starlight Ballroom
This session is designed to help minimize burnout in Endocrine surgery by improvements in clinical efficiency. Panelists will discuss their unique insights into practice organization and optimization. Michael Starks, MD will moderate the panel discussion. Audience participation is expected and encouraged.

BREAKFAST SESSION: CESQIP
TUESDAY, APRIL 9, 2019   7:00 AM – 8:00 AM
Fairmont Miramar Hotel – Starlight Ballroom
This session is designed for programs participating in or interested in participation in the CESQIP. The session will provide an update on the Committee work on variable definitions, the validation project, an update from Arbormetrix and a review of the foundations of the program. There will be time dedicated to the discussion of programmatic strengths and weakness and the vision for future.

GRAVES’ DISEASE & THYROID FOUNDATION
BREAKFAST
TUESDAY, APRIL 9, 2019   7:00 AM – 8:00 AM
Fairmont Miramar Hotel – Wilshire I & II
Panelists will offer expertise during a moderated session including case presentations and questions. Audience participation will be highly encouraged.
HISTORICAL LECTURER

“From Penguins to Plankton - the Dramatic Impacts of Climate Change on the Antarctic Peninsula”

James McClintock, MD
University of Alabama at Birmingham

Monday, April 8, 2019  8:00 AM – 8:45 AM
Starlight Ballroom

James B. McClintock is the Endowed University Professor of Polar and Marine Biology at the University of Alabama at Birmingham. He received his Bachelor of Science degree from the University of California at Santa Cruz (1978) and his doctoral degree from the University of South Florida (1984). In 1987, after completing a National Science Foundation Postdoctoral Fellowship at the University of California at Santa Cruz, he joined the faculty of the Department of Biology at the University of Alabama at Birmingham. He became a Full Professor at UAB in 1997 and has also served as Dean of the School of Natural Sciences and Mathematics (1999-2003) and as Interim Dean of the Graduate School (2003-2005). Dr. McClintock's research has been funded continuously over the past 30 years by the National Science Foundation and focuses on aspects of marine invertebrate nutrition, reproduction, and primarily, Antarctic marine chemical ecology. Over the past decade his research has also encompassed studies of the impacts of rapid climate change and ocean acidification on Antarctic marine algae and invertebrates. He has published 276 peer-reviewed scientific publications, edited and written books, is invited to make numerous scientific and popular science presentations, and his research has been featured in a variety of public media outlets including the NPR Diane Rehm Show, NPR’s “On Point” with Tom Ashbrook, NPR Morning Edition with David Green, National Geographic Magazine, Smithsonian Magazine, Discover Magazine, Scientific American Magazine, CNN, the Washington Post, Wall Street Journal, Chicago Tribune, Los Angeles Times, and The Weather Channel. He has been an invited speaker for ‘TEDx’ (Birmingham) and ‘The Moth’ (Lincoln Center, New York City) and has served on workshops sponsored by the National Academy of Sciences on Climate Change and Polar Ecosystems. He recently returned from his 15th research expedition to Antarctica where over the past two decades he and his research collaborators have become among the world’s authorities on Antarctic marine chemical ecology and drug discovery and have developed an award winning interactive educational outreach web site (www.antarctica.uab.edu). His expertise on the ecological impacts of climate change and ocean acidification on marine life of the Antarctic Peninsula has garnered numerous invited lectures and he writes in the popular literature on this timely topic.
HISTORICAL LECTURE AT RECENT MEETINGS

2009  Edwin L. Kaplan, MD
University of Chicago
*Radiation Induced Thyroid Cancer – A Chicago Experience*

2010  Norman W. Thompson, MD
University of Michigan
*The Time Was Right*

2011  Jon A. van Heerden, MD
Medical University of South Carolina
*Pheochromocytoma Resection: Now and Then*

2012  Murray F. Brennan, MD
Memorial Sloan-Kettering Cancer Center
*Re-Operative Parathyroid Surgery Circa 1975*

2013  Orlo H. Clark, MD
University of California, San Francisco
*Recognition of Endocrine Glands and Abnormalities by Artists and Surgeons*

Wen T. Shen, MD MA
University of California, San Francisco
*From ‘Kindred Spirits’ to the Social Network*

2014  Patricia J. Numann, MD
SUNY Upstate Medical University
*Ode to an Indian Rhinoceros*

2015  Robert Beazley, MD
Boston University School of Medicine
*The Glands of Owen...Who Was Owen?*

2016  Samuel A. Wells, Jr., MD
National Cancer Institute
*The Diagnosis and Treatment of Thyroid Cancer: A Historical Perspective*

2017  David L. Nahrwold, MD
Northwestern University
*Surgery, Surgeons and their College*

2018  John L. Cameron, MD
John Hopkins Hospital
*William Stewart Halsted: Our Surgical Heritage (Also an Endocrine Surgeon!)*
CAROL & ORLO H. CLARK DISTINGUISHED LECTURER IN ENDOCRINE SURGERY

“Relationships and Resilience: Lessons Learned from Mentors and Heroes”
Selwyn M. Vickers, MD, FACS
University of Alabama School of Medicine, University of Alabama at Birmingham (UAB)

SUNDAY, APRIL 7, 2019    11:30 AM – 12:15 PM
Starlight Ballroom

Dr. Vickers is Senior Vice President of Medicine and Dean of the University of Alabama School of Medicine, one of the ten largest public academic medical centers and the third largest public hospital in the USA. He is a world-renowned surgeon, pancreatic cancer researcher, and pioneer in health disparities research. His major research interests include: gene therapy as an application in the treatment of pancreatobiliary tumors, the role of growth factors and receptors in the oncogenesis of pancreatic cancer, the implications of FAS expressions and Tamoxifen in the growth and treatment of cholangiocarcinoma, assessment of clinical outcomes in the surgical treatment of pancreatobiliary tumors, and the role of death receptors in the treatment of pancreatic cancer. Dr. Vickers is a member of 21 professional societies with leadership roles in many, including the National Academy of Medicine. He has served as president of the Society of Black Academic Surgeons, the Southern Surgical Association, and the Society for Surgery of the Alimentary Tract.
PRESIDENT’S INVITED LECTURERS AT RECENT MEETINGS

1991  Gregory B. Bulkley, MD  1999  James Hurley, MD  
Johns Hopkins University, Baltimore, Maryland  
Johns Hopkins University, Baltimore, Maryland  
Endothelial Xanthine Oxidase: a Radical Transducer of Signals and Injury  
Cornell University, New York, New York  
Post-Operative Management of Differentiated Thyroid Cancer  

1992  Donald Coffey, PhD  2000  Andrew F. Stewart, MD  
Bethesda, Maryland  
Bethesda, Maryland  
New Concepts Concerning Cancer  
University of Pittsburgh, Pittsburgh, Pennsylvania  
Pancreatic Islet Cell Transplantation

1993  John L. Doppman, MD  2001  William F. Young Jr., MD  
National Institutes of Health, Bethesda, Maryland  
National Institutes of Health, Bethesda, Maryland  
Recent Advances in Endocrinologic Imaging  
Mayo Clinic, Rochester, Minnesota  
Adrenal-Dependent Hypertension: Diagnostic Testing Insights

1994  Gordon J. Strewler, MD  2002  Sissy M. Jhiang, MD  
San Francisco, California  
The Parathyroid Hormone Related Protein: Clinical and Basic Studies of a Polymolecular Protein

1995  Ivor M.D. Jackson, MD  2003  Edward R. Laws Jr, MD  
Providence, Rhode Island  
Regulation of TSH Secretion: Implications for Disorders of the Thyroid Function  
The Ohio State University, Columbus, Ohio  
Lessons From Thyroid Cancer: Genetics and Gene Therapy  

1996  Victor E. Gould, MD  2004  David Duick, MD  
Rush-Presbyterian-Medical Center, Chicago, Illinois  
The Diffuse Neuroendocrine System: Evolution of the Concept and Impact on Surgery  
University of Virginia, Charlottesville, Virginia  
The Diagnosis and Management of Cushing’s Disease  

1997  Bertil Hamberger, MD, PhD  2005  Susan Leeman, PhD  
Karolinska Institute, Stockholm, Sweden  
The Nobel Prize  
Boston University, Boston, Massachusetts  
The NeuroPeptides: Substance P and Neurotensin  

April 7-9, 2019 • Los Angeles • AAES 40th Annual Meeting | 31
## PRESIDENT’S INVITED LECTURERS AT RECENT MEETINGS

<table>
<thead>
<tr>
<th>Year</th>
<th>Lecturer</th>
<th>Institution</th>
<th>Topic</th>
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<tbody>
<tr>
<td>2006</td>
<td>Michael Bliss, PhD</td>
<td>University of Toronto, Ontario, Canada</td>
<td>Harvey Cushing and Endocrinology</td>
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<td>2007</td>
<td>Virginia A. Livolsi, MD</td>
<td>University of Pennsylvania, Philadelphia, Pennsylvania</td>
<td>Thyroid Nodule FNA and Frozen Section: Partners or Adversaries</td>
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<td>2008</td>
<td>F. John Service, MD, PhD</td>
<td>Mayo Clinic, Rochester, Minnesota</td>
<td>Hypoglycemia in Adults – 80th Anniversary of Hyperinsulinism</td>
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<td>2009</td>
<td>Jeffrey M. Trent, PhD</td>
<td>Translation Genomics Research Institute, Phoenix, Arizona</td>
<td>Integrating Genetics, Genomics, and Biology Towards a More Personalized Medicine</td>
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<td>2010</td>
<td>Alexander J.B. McEwan, MB</td>
<td>University of Alberta, Edmonton, Alberta, Canada</td>
<td>The State of the Art of Radionuclide Imaging and Therapy in Patients with Neuroendocrine Tumors</td>
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<tr>
<td>2011</td>
<td>Allan H. (Bud) Selig</td>
<td>9th Commissioner of Major League Baseball</td>
<td>Major League Baseball – 2011 Economic and Health Related Issues</td>
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<td>2012</td>
<td>Atul A. Gawande, MD, MPH</td>
<td>Brigham and Women’s Hospital</td>
<td>Strategies for Improving Surgical Performance</td>
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<td>2013</td>
<td>Anders O.J. Bergenfelz, MD, PhD</td>
<td>Lund University Hospital</td>
<td>Quality Control in Clinical Practice and Postgraduate Education in Endocrine Surgery</td>
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<tr>
<td>2014</td>
<td>Yuri E. Nikiforov, MD, PhD</td>
<td>University of Pittsburgh School of Medicine</td>
<td>Progress in Genomic Markers for Thyroid Cancer: How Does it Affect Patient Management?</td>
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<td>2015</td>
<td>Gary Hammer, MD, PhD</td>
<td>University of Michigan</td>
<td>Translating Adrenal Stem Cells: Implications for Adrenal Disease</td>
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<td>2016</td>
<td>Steven A. Rosenberg, MD, PhD</td>
<td>National Cancer Institute and George Washington University</td>
<td>The Curative Potential of T-cell Transfer Immunotherapy for Patients with Metastatic Cancer</td>
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<td>2017</td>
<td>Jack A. Gilbert, PhD</td>
<td>University of Chicago</td>
<td>Thyroid Cancer and the Microbiome</td>
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<td>2018</td>
<td>Julie Freischlag, MD FRCS</td>
<td>Wake Forest University</td>
<td>Breakthrough to Brave</td>
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CONFERENCE INFORMATION
ACCREDITATION

PROGRAM OBJECTIVES

This activity is designed for all endocrine surgeons seeking the latest developments in endocrine surgical technique and related research. The intent of the program is to improve the quality of patient care and improve overall patient safety. Audience participation and interaction will be encouraged. The content and format of the program have been determined based on evaluations and suggestions of attendees of previous programs.

At the completion of this activity, attendees will be able to:

1. Describe the most up to date innovations in endocrine surgical care to ensure providers are engaging in patient-centered care using the most valid, reliable and current information available to the specialty
2. Participate in discussions, and explain current developments in the science and clinical practice of endocrine surgery
3. Explain practical new approaches and solutions to relevant concepts and problems in endocrine surgical care.
4. Apply additional working knowledge to assist them with their existing and growing endocrine practice.
5. New information and recent developments as they relate to recently established guidelines and procedures
6. Explain the new designation of Noninvasive Follicular thyroid cancer with Papillary-like nuclear features (NIFTP) and what it means for the management care plan of this subtype of thyroid cancer.
7. Apply new techniques to clinical practice to improve efficiency and reduce physician and allied provider burnout

CONTINUING MEDICAL EDUCATION CREDIT INFORMATION

Accreditation
This activity has been planned and implemented in accordance with the Essential Areas and Policies of the Accreditation Council for Continuing Medical Education (ACCME) through the joint providership of the American College of Surgeons and American Association of Endocrine Surgeons. The American College of Surgeons is accredited by the ACCME to provide continuing medical education for physicians.

AMA PRA Category 1 Credits™
The American College of Surgeons designates this live activity for a maximum of 27.25 AMA PRA Category 1 Credits™. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

Of the AMA PRA Category 1 Credits™ listed above, a maximum of 14.00 credits meet the requirements for Self-Assessment.
ACCREDITATION CONTINUED

CME CERTIFICATES AND EVALUATION FORMS
You may complete your attendance verification, meeting evaluation and self-assessment posttest online. You will receive your electronic CME certificate after completing the evaluation and posttests. Your final CME hours will be submitted to the ACS. Members of the ACS will have their credits posted to the ACS website around 30 days post-activity if your ACS number is provided.

The website to claim your CME credits will be emailed to all attendees.

The American Board of Surgery requirement for fulfillment of MOC Part 2 is the completion of a minimum of 90 hours of AMA PRA Category 1 Credit™ over a three-year cycle. At least 60 of the 90 hours must include a self-assessment activity—a written Q&A exercise (paper or online) that assesses the surgeon’s understanding of the material presented during the CME program. A score of 75% or higher must be attained on the self-assessment exercise. Multiple attempts are permitted.
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<th>SATURDAY, April 6, 2019</th>
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<td>ADVANCED ENDOCRINE SURGERY COURSE</td>
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<td>BREAKFAST SESSION: RESEARCH FRONTIERS</td>
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| **MEETING TOTAL** | **27.25** | **14.00** |
DISCLOSURE INFORMATION

In accordance with the ACCME Accreditation Criteria, the American College of Surgeons must ensure that anyone in a position to control the content of the educational activity (planners and speakers/authors) has disclosed all relevant financial relationships with any commercial interest. For additional information, please visit the ACCME website: http://www.accme.org/requirements/accreditation-requirements-cme-providers/policies-and-definitions/financial-relationships-and-conflicts-interest

The ACCME also requires that ACS manage any reported conflict and eliminate the potential for bias during the session. Any conflicts noted below have been managed to our satisfaction. The disclosure information is intended to identify any commercial relationships and allow learners to form their own judgments. However, if you perceive a bias during a session, please report it on the evaluation.

In compliance with the ACCME Accreditation Criteria, the American College of Surgeons must ensure that anyone in a position to control the content of the educational activity has disclosed all relevant financial relationships with any commercial interest. All reported conflicts are managed by a designated official to ensure a bias-free presentation. Please see the insert to this program for the complete disclosure list.
<table>
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<th>Speakers / Moderators / Discussants</th>
<th>Nothing to Disclose</th>
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HOTEL INFORMATION

FAIRMONT MIRAMAR HOTEL & BUNGALOWS (Main Hotel)
101 Wilshire Boulevard, Santa Monica, CA 90401
T: 310-576-7777
W: www.fairmont.com/Santa-Monica

HUNTLEY HOTEL (Overflow Hotel)
1111 Second Street, Santa Monica, CA 90401
T: 310-394-5454
W: www.thehuntleyhotel.com

AIRPORT INFORMATION

Both the Fairmont Miramar Hotel and the Huntley Hotel are located 12 miles from the Los Angeles International Airport (LAX) — www.flylax.com.

Additional airports in the area include:

Burbank Bob Hope Airport (BUR), approximately 30 miles from the hotels
Long Beach Airport (LGB), approximately 30 miles from the hotels
Ontario Airport (ONT), approximately 55 miles from the hotels

TRANSPORTATION FROM LAX AIRPORT

Airport Shuttle
There is no complimentary shuttle service between the hotel and the airport.

Limousine
Complete coordination of transportation needs is available through our Concierge at (310) 576-7777 ext. 3951.

Taxi Service
Rates: Approximately $45.00 and up one way between airport and hotel

Uber or Lyft
Rates: Approximately $15.00-$20.00 one way between airport and hotel

CONTACTS

Michael W. Yeh, MD, Local Arrangements Chair
E: myeh@mednet.ucla.edu

AMERICAN ASSOCIATION OF ENDOCRINE SURGEONS
201 East Main Street, Suite 1405, Lexington, KY 40507
T: 859-402-9810   F: 859-514-9166    E: info@endocrinesurgery.org
W: www.endocrinesurgery.org
AGENDA
FRIDAY, APRIL 5, 2019

6:30 AM – 7:00 am  Wilshire I & II Prefunction
ENDOCRINE SURGERY UNIVERSITY REGISTRATION & BREAKFAST
7:00 am — 5:45 pm  Wilshire I, II, & III

ENDOCRINE SURGERY UNIVERSITY
An educational activity for Fellows of the AAES Comprehensive Clinical Fellowship in Endocrine Surgery

COURSE DIRECTOR
Rebecca Sippel, MD - University of Wisconsin

COURSE FACULTY/PANELISTS
- Eren Berber, MD – Cleveland Clinic
- Ashley Cayo, MD – Aurora Advanced Healthcare
- Herbert Chen, MD – University of Alabama at Birmingham
- Electron Kebebew, MD – Stanford University
- Jennifer Kuo, MD, MPH – Columbia University Medical Center
- Brenessa Lindeman, MD MA – University of Alabama at Birmingham
- Matthew Nehs, MD - Brigham & Women’s Hospital
- Fiemu Nwariaku, MD – University of Texas Southwestern Medical Center
- Wen Shen, MD - University of California-San Francisco
- Carmen Solorzano, MD, MPH – Vanderbilt University Medical Center
- Robert Udelsman, MD – Miami Cancer Institute

6:30 pm — 8:30 pm  Wilshire I & II
ENDOCRINE SURGERY UNIVERSITY DINNER
SATURDAY, APRIL 6, 2019

7:00 am — 12:00 pm  Wilshire I & II
ENDOCRINE SURGERY UNIVERSITY, CONTINUED

8:00 am — 5:00 pm  Wilshire III & IV
ADVANCED ENDOCRINE SURGERY COURSE
*Separate registration required

COURSE DIRECTORS
Shaghayegh Aliabadi, MD – The Oregon Clinic
Erin Felger, MD – Washington Hospital Center

COURSE MODERATORS
- F. Thurston Drake, MD – Boston University School of Medicine
- Allan Siperstein, MD – Cleveland Clinic
- Linwah Yip, MD – University of Pittsburgh

COURSE PANELISTS
- Inne Borel Rinkes, MD – University Medical Center Utrecht, Netherlands
- Carolyn Garner, MD – Endocrine & Oncologic Surgical Associates, Texas
- Phillip Haigh, MD – Kaiser Permanente Los Angeles Medical Center
- Electron Kebebew, MD – Stanford University
- Mirriam Lango, MD – Fox Chase Cancer Center
- Angela Leung, MD – University of California Los Angeles
- Steven Libutti, MD – Rutgers Cancer Institute of New Jersey
- Mira Milas, MD – Banner Health University Medical Center Phoenix
- Sarah Oltmann, MD – University of Texas Southwestern Medical Center
- Juan Pablo Pantoja, MD – Instituto Nacional de Ciencias Medicas y Nutricion Salvador Zubiran
- Sareh Parangi, MD – Massachusetts General Hospital
- Janice Pasieka, MD – University of Calgary
- Richard Prinz, MD - NorthShore University HealthSystem
- Ashok Shaha, MD – Memorial Sloan-Kettering Cancer Center
- Stan Sidhu, MD – University of Sydney
- Meredith Sorensen, MD – Dartmouth-Hitchcock Medical Center
- Martin Walz, MD – Academic Hospital of the University of Duisburg-Essen

8:00 am — 12:00 pm  Reed Park Courts
TENNIS TOURNAMENT
Additional registration fee applies

12:00 pm – 5:00 pm  Palos Verdes Golf Club
GOLF TOURNAMENT
Additional registration fee applies

2:00 pm — 7:00 pm  Starlight Ballroom Prefunction
REGISTRATION OPEN
AGENDA

2:00 pm — 6:00 pm  Jones Library
AAES COUNCIL MEETING

4:00 pm — 6:00 pm  Volleyball Courts #4 & 5 at Perry’s Rentals (1200 Pacific Coast Highway)
BEACH VOLLEYBALL
Additional fee applies

5:00 pm — 6:30 pm  Wilshire I & II
GRAVES’ DISEASE PATIENT SESSION
MODERATORS: Dawn Elfenbein, MD – University of California, Irvine
PANELISTS: Kimberly Dorris – Graves’ Disease & Thyroid Foundation; Trevor Angell, MD – Brigham and Women’s Hospital, Harvard Medical School; Regina Castro, MD – Mayo Clinic; Kimberly Vanderveen, MD – Denver Center for Endocrine Surgery, P.C.; and Insoo Suh, MD – University of California San Francisco

6:30 pm — 8:30 pm  The Penthouse- located at the Huntley Hotel
EXECUTIVE COUNCIL DINNER
Invitation Only

9:00 pm — 11:00 pm  Herringbone Restaurant
YOUNG SURGEONS’ SOCIAL
*This event is primarily for AAES Resident, Fellow and Candidate members. Join your fellow young surgeons for an evening of comradery at Herringbone, located less than 1 mile from the hotel, just blocks from the Santa Monica Pier. Drink tickets will be handed out as you arrive and hors d’oeuvres will be available.
AGENDA

SUNDAY, APRIL 7, 2019

6:30 am — 4:00 pm    Starlight Ballroom Prefunction
REGISTRATION OPEN

7:00 am — 8:30 am    Santa Monica Beach
BEACH BIKE RIDE
Pick up your bike rental outside the hotel and ride along the beautiful Santa Monica beach, just steps from the hotel.

7:30 am — 8:30 am    Wilshire Rooms
FELLOWSHIP COMMITTEE MEETING
FOUNDATION BOARD MEETING
IT COMMITTEE MEETING
CESQIP COMMITTEE MEETING

8:30 am — 9:30 am    Wilshire Rooms
RESEARCH COMMITTEE MEETING
COMMUNITY BASED SURGEONS COMMITTEE MEETING
FUNDRAISING TASK FORCE MEETING
ENDOCRINE SURGERY IDENTITY TASK FORCE MEETING

8:30 am — 10:00 am   Wedgewood Ballroom
POSTER WALK AROUND AND POSTER JUDGING
Poster Chair: Thomas Wang, MD

8:30 am — 10:00 am   Starlight Ballroom
ALLIED PROFESSIONALS SESSION
MODERATOR: Helina Somervell, MD – Johns Hopkins
PANELISTS: Ann Arnold, MD – University of Wisconsin; Nancy Jackson, MD – UT Southwestern; Todd Chennell, MD – University of Rochester, Strong Memorial Hospital; Heather Wachtel, MD – University of Pennsylvania Medical Center; and Brian Saunders, MD – Penn State Milton S. Hershey Medical Center

10:30 am — 11:30 am   Starlight Ballroom
AAES OPENING SESSION, DR. HERBERT CHEN

11:30 am — 12:15 pm   Starlight Ballroom
CAROL & ORLO H. CLARK DISTINGUISHED LECTURER IN ENDOCRINE SURGERY
“Relationships and Resilience: Lessons Learned from Mentors and Heroes”
SPEAKER: Selwyn Vickers, MD – University of Alabama School of Medicine
AGENDA

12:15 pm — 1:45 pm
LUNCH ON YOUR OWN

OR

12:25 pm — 1:40 pm  Starlight Ballroom
LUNCH SESSION: “AAES Clinical Practice Guidelines: Relevance to Clinical Practice”
Additional Fee for Lunch
MODERATORS: Sally Carty, MD – University of Pittsburgh, and Chris McHenry, MD – MetroHealth Medical Center
PANELISTS: Tracy Wang, MD, MPH – Medical College of Wisconsin; Scott Wilhelm, MD – University Hospitals/Case Medical Center; Kepal Patel, MD – NYU Langone Medical Center; Thomas Fahey, MD – New York Presbyterian-Weill Cornell Medical Center; Megan Haymart, MD – University of Michigan; and Nancy Perrier, MD - MD Anderson Cancer Center

1:45 pm — 2:45 pm  Starlight Ballroom
SCIENTIFIC SESSION I: Papers 1-4
MODERATORS: Rachel Kelz, MD - University of Pennsylvania, and Adrian Harvey, MD – University of Calgary

2:45 pm — 3:15 pm  Wedgewood Ballroom
BREAK, EXHIBITS, & POSTER VIEWING

3:15 pm — 4:00 pm  Starlight Ballroom
SCIENTIFIC SESSION II: Papers 5-7
MODERATORS: Cord Sturgeon, MD – Northwestern Medicine, and Masha Livhits, MD, MD – University of California, Los Angeles

4:00 pm — 5:00 pm  Starlight Ballroom
PRESIDENTIAL ADDRESS
“Who Are You?”
SPEAKER: Herb Chen, MD - University of Alabama at Birmingham

6:00 pm — 8:00 pm  Shutters on the Beach
AAES PRESIDENT’S RECEPTION
Join colleagues and friends for the signature kick-off reception to the AAES Annual Meeting. Shutters on the Beach is a short ½ mile (14 minute) walk from the Meeting hotels. Drink tickets and hors d’oeuvres will be provided.
MONDAY, APRIL 8, 2019

7:00 am — 5:00 pm  
REGISTRATION OPEN  
*Starlight Ballroom Prefunction*

7:00 am — 8:00 am  
*Wilshire Rooms*
EDUCATION COMMITTEE MEETING  
FELLOWSHIP ACCREDITATION COMMITTEE MEETING

7:00 am — 8:00 am  
*Wedgewood Ballroom*
CONTINENTAL BREAKFAST IN EXHIBIT HALL

7:00 am — 8:00 am  
*Wilshire III*
NEW MEMBER BREAKFAST  
Invitation Only

7:00 am — 8:00 am  
*Starlight Ballroom*
BREAKFAST SESSION: RESEARCH FRONTIERS  
MODERATORS: Carrie Lubitz, MD – Massachusetts General Hospital; and Rachel Kelz, MD – University of Pennsylvania  
PANELISTS: Megan Haymart, MD – University of Michigan; and Drew Shirley, MD – The Ohio State University Wexner Medical Center

8:00 am — 8:45 am  
*Starlight Ballroom*
HISTORICAL LECTURER  
“From Penguins to Plankton - the Dramatic Impacts of Climate Change on the Antarctic Peninsula”  
SPEAKER: James McClintock, MD - *University of Alabama at Birmingham*

8:45 am — 10:00 am  
*Starlight Ballroom*
SCIENTIFIC SESSION III: Papers 8-12  
MODERATORS: Jennifer Ogilvie, MD – *NYU Langone Health*, and Matthew Nehs, MD – *Brigham & Women’s*

10:00 am — 10:30 am  
*Wedgewood Ballroom*
BREAKS, EXHIBITS, & POSTER VIEWING

10:30 am — 11:30 am  
*Starlight Ballroom*
DIVERSITY, EQUITY AND INCLUSION PANEL  
MODERATORS: Herb Chen, MD – University of Alabama at Birmingham  
PANELISTS: Nipun Merchant, MD – University of Miami; Malcolm Brock, MD – The Johns Hopkins University School of Medicine; Minerva Romero Arenas, MD, MPH – University of Texas Rio Grande Valley, School of Medicine; and Sareh Parangi, MD – Massachusetts General Hospital
AGENDA

10:30 am — 11:30 am    Fig Restaurant – Fairmont Miramar Hotel
AAES & OTO LEADERS LUNCH

11:30 am — 1:30 pm
LUNCH ON YOUR OWN

OR

11:45 am — 1:00 pm    Starlight Ballroom
LUNCH SESSION: “Business of Endocrine Surgery: The Efficient Endocrine Surgical Practice”
Sponsorship for this session provided by Stryker
Additional Fee for Lunch
MODERATORS: Michael Starks, MD – Penobscot Surgical Care, PA; and Julie McGill, MD – Emory at Decatur - Specialty Surgery
PANELISTS: David Bimston, MD - Memorial Center For Integrative Endocrine Surgery; Douglas Fraker, MD – University of Pennsylvania; Amanda Lewis, MD – Norman Regional Health System; and Michael Yeh, MD – University of California, Los Angeles

1:30 pm — 2:45 pm    Starlight Ballroom
SCIENTIFIC SESSION IV: Papers 13-17
MODERATORS: Mark Sywak, MD – University of Sydney, and Susan Pitt, MD – University of Wisconsin

2:45 pm — 3:00 pm    Wedgewood Ballroom
BREAKS, EXHIBITS, & POSTER VIEWING

3:00 pm — 4:30 pm    Starlight Ballroom
SCIENTIFIC SESSION V: Papers 18-23
MODERATORS: Barbra Miller, MD – University of Michigan, and Brian Untch, MD – Memorial Sloan Kettering

4:30 pm — 5:30 pm    Starlight Ballroom
AAES BUSINESS MEETING
*Only Active, Allied Specialist and Senior Members need attend

7:00 pm — 8:00 pm    Fairmont Miramar Hotel Front Lawn – Under the Fig Tree
GALA RECEPTION

8:00 pm — 10:30 pm    Starlight Ballroom
GALA DINNER
Gala Dinner included with registration; ticket required for guests
The AAES Gala Dinner has assigned seating. Please come by the Registration Desk and sign up for your seat by Monday at 1:30 pm.
TUESDAY, APRIL 9, 2019

7:00 am — 8:00 am  Starlight Ballroom Prefunction
REGISTRATION OPEN

7:00 am — 8:00 am  Wedgewood Ballroom
CONTINENTAL BREAKFAST IN EXHIBIT HALL

7:00 am — 8:00 am  Starlight Ballroom
BREAKFAST SESSION: CESQIP
MODERATORS: David Schneider, MD – University of Wisconsin; and Jennifer Rosen, MD – Washington Hospital Center
PANELISTS: Reese Randle, MD – University of Kentucky; Judy Jin, MD – The Cleveland Clinic; Barry Inabnet, MD – Icahn School of Medicine at Mount Sinai; and Derek Punches, MD – ArborMetrix

7:00 am — 8:00 am  Wilshire I & II
BREAKFAST SESSION: GRAVES’ DISEASE & THYROID FOUNDATION
MODERATORS: Dawn Elfenbein, MD – University of California, Irvine
PANELISTS: Kimberly Dorris – Graves’ Disease & Thyroid Foundation; Julie Miller, MD – Royal Melbourne Hospital; and Richard Hodin, MD – Massachusetts General Hospital

8:00 am — 9:30 am  Starlight Ballroom
INTERESTING CASES SESSION
MODERATOR: Sonia Sugg, MD – University of Iowa Hospitals & Clinics
PANELISTS: Steven Libutti, MD – Rutgers Cancer Institute of New Jersey; Sally Carty, MD – University of Pittsburgh; Carmen Solorzano, MD, MPH – Vanderbilt University Medical Center; and Ashok Shana, MD – Memorial Sloan-Kettering Cancer Center

9:30 am — 9:45 am  Wedgewood Ballroom
BREAK, EXHIBITS, & POSTER VIEWING

9:45 am — 11:15 am  Starlight Ballroom
SCIENTIFIC SESSION VI: Papers 24-29
MODERATORS: Allan Siperstein, MD - Cleveland Clinic, and Aarti Mathur, MD – Johns Hopkins

11:15 am — 11:45 am  Wedgewood Ballroom
BREAK, EXHIBITS, & POSTER VIEWING

11:45 am — 1:00 pm  Starlight Ballroom
SCIENTIFIC SESSION VII: Papers 30-34
MODERATORS: Amelia Grover, MD – Virginia Commonwealth University, and John Porterfield, MD – University of Alabama at Birmingham

1:00 pm
MEETING ADJOURN
SCIENTIFIC PROGRAM

♦ Denotes Resident/Fellow Research Award Competition Paper

NOTE: Author listed in **BOLD** is the presenting author
The Scientific Program includes all sessions that are eligible for CME credit.
Credit amounts for each session are listed on page 37.
SCIENTIFIC PROGRAM
SUNDAY, APRIL 7, 2019

8:30 am — 10:00 am  Wedgewood Ballroom
POSTER WALK AROUND & POSTER JUDGING

8:30 am — 10:00 am  Starlight Ballroom
ALLIED PROFESSIONALS SESSION
MODERATORS: Helina Somervell, MD – Johns Hopkins
PANELISTS: Ann Arnold, MD – University of Wisconsin; Nancy Jackson, MD – UT Southwestern; Todd Chennell, MD – University of Rochester, Strong Memorial Hospital; Heather Wachtel, MD – University of Pennsylvania Medical Center; and Brian Saunders, MD – Penn State Milton S. Hershey Medical Center

10:00 am — 10:30 am  Wedgewood Ballroom
BREAK, EXHIBITS, & POSTER VIEWING

10:30 am — 11:30 am  Starlight Ballroom
AAES OPENING SESSION

Welcome & Memoriam – Herbert Chen, MD
Welcome to Los Angeles – Michael Yeh, MD
Introduction of New Members
Introduction to 2018 Paul LoGerfo Award Presentations – James Howe, MD
Heather Wachtel, MD – University of Pennsylvania
David Schneider, MD – University of Wisconsin
Introduction to 2018 ThyCa: Thyroid Cancer Survivors’ Association Award for Thyroid Cancer Research – James Howe, MD
Lawrence Shirley, MD – Ohio State University Wexner Medical Center
Announcement of 2019 Award Winners – James Howe, MD

11:30 am — 12:15 pm  Starlight Ballroom
CAROL & ORLO H. CLARK DISTINGUISHED LECTURER IN ENDOCRINE SURGERY
“Relationships and Resilience: Lessons Learned from Mentors and Heroes”
SPEAKER: Selwyn Vickers, MD – University of Alabama School of Medicine

12:15 pm — 1:45 pm
Lunch On Your Own

OR

12:25 pm — 1:40 pm  Starlight Ballroom
LUNCH SESSION: “AAES Clinical Practice Guidelines: Relevance to Clinical Practice”
Additional Fee for Lunch
MODERATORS: Sally Carty, MD – University of Pittsburgh, and Chris McHenry, MD – MetroHealth Medical Center
PANELISTS: Tracy Wang, MD, MPH – Medical College of Wisconsin; Scott Wilhelm, MD – University Hospitals/Case Medical Center; Kepal Patel, MD – NYU Langone Medical Center; Thomas Fahey, MD – New York Presbyterian-Weill Cornell Medical Center; Megan Haymart, MD – University of Michigan; and Nancy Perrier, MD – MD Anderson Cancer Center

1:45 pm — 2:45 pm  
Starlight Ballroom  
SCIENTIFIC SESSION I: Papers 1-4  
MODERATORS: Rachel Kelz, MD, MSCE, MBA – University of Pennsylvania, and Adrian Harvey, MD – University of Calgary

♦ 01. KETOGENIC DIET COMBINED WITH ANTIOXIDANT N-ACETYLCYSTEINE (NAC) INHIBITS TUMOR GROWTH IN A MOUSE MODEL OF ANAPLASTIC THYROID CANCER

Abha Aggarwal1, Zuliang Yuan1, Matthew A Nehs1

1Surgery, Brigham and Women’s Hospital

♦ 02. A COMPARISON OF LONG-TERM QUALITY OF LIFE IN LOW RISK DIFFERENTIATED THYROID CANCER PATIENTS TREATED WITH HEMITHYROIDECTOMY VERSUS TOTAL THYROIDECTOMY

Pim J Bongers1,2, Caylee A Greenberg1, Menno R Vriens2, Martijn Lutke Holzik3, David Goldstein4, Karen Devon1, Lorne R Rotstein1, Anna M Sawka5, Jesse D Pasternak1

1Department of General Surgery, University Health Network, 2Department of Surgical Oncology and Endocrine Surgery, University Medical Center Utrecht, 3Department of Surgery, Hospital Group Twente, 4Department of Otolaryngology-Head Neck Surgery, University Health Network, 5Department of Endocrinology, University Health Network

♦ 03. IMMUNE INFILTRATE-ASSOCIATED DYSREGULATION OF DNA REPAIR MACHINERY PREDISPOSES TO PAPILLARY THYROID CARCINOGENESIS

Norman G Nicolson1, Taylor C Brown1, Reju Korah1, Tobias Carling1

1Yale Endocrine Neoplasia Lab, Department of Surgery, Yale School of Medicine

♦ 04. SKELETAL EFFECTS OF COMBINED MEDICAL AND SURGICAL MANAGEMENT OF PRIMARY HYPERPARATHYROIDISM

Lauren E. Orr1, Hui Zhou2, Catherine Y. Zhu1, Philip I. Haigh3, Annette L. Adams2, Michael W. Yeh1

1Department of Surgery, UCLA David Geffen School of Medicine, 2Department of Research & Evaluation, Kaiser Permanente Southern California, 3Department of Surgery, Kaiser Permanente Los Angeles Medical Center

2:45 pm — 3:15 pm  
Wedgewood Ballroom  
BREAK, EXHIBITS, & POSTER VIEWING
SCIENTIFIC PROGRAM

3:15 pm — 4:00 pm  Starlight Ballroom

SCIENTIFIC SESSION II: Papers 5-7
MODERATORS: Cord Sturgeon, MD – Northwestern Medicine, and Masha Livhits, MD, MD – University of California, Los Angeles

♦ 05. FACTORS ASSOCIATED WITH LATE RECURRENCE AFTER PARATHYROIDECTOMY FOR PRIMARY HYPERPARATHYROIDISM

Reema Mallick¹, Linwah Yip¹, Sally E Carty¹, Kelly L McCoy¹

¹Department of Surgery, University of Pittsburgh

♦ 06. CORONARY ARTERY DISEASE IS MORE SEVERE IN PATIENTS WITH PRIMARY HYPERPARATHYROIDISM.

Omar Koibaity¹, Damien Mandry¹,², Phi-Linh Nguyen-Thi³, Claire Nomine-Criqui⁴, Lea De-marquet⁵, Valerie Croise-Laurent¹,², Laurent Brunaud⁶,⁷

¹Department of Radiology, Université de Lorraine, CHU Nancy (Brabois), ²INSERM, IADI, Université de Lorraine, ³PARC - Pôle S2R, clinical epidemiology and evaluation, Université de Lorraine, CHU Nancy (Brabois), ⁴Department of Surgery, Université de Lorraine, CHU Nancy (Brabois), ⁵Department of Endocrinology, Université de Lorraine, CHU Nancy (Brabois), ⁶INSERM U1256, Faculty of Medicine

♦ 07. NORMOCALCEMIC HYPERPARATHYROIDISM: A CESQIP ANALYSIS

T.K. Pandian¹ - Sarah H Bird¹, Lindsay E Kuo¹, Carrie C Lubitz¹, Antonia E Stephen¹

¹Harvard

4:00 pm — 5:00 pm  Starlight Ballroom

PRESIDENTIAL ADDRESS

“Who Are You?”

SPEAKER: Herb Chen, MD - University of Alabama at Birmingham
MONDAY, APRIL 8, 2019

7:00 am — 8:00 am  Starlight Ballroom
**BREAKFAST SESSION: Research Frontiers**
MODERATORS: Carrie Lubitz, MD – Massachusetts General Hospital; Rachel Kelz, MD – University of Pennsylvania
PANELISTS: Megan Haymart, MD – University of Michigan; and Drew Shirley, MD – The Ohio State University Wexner Medical Center

7:00 am — 8:00 am  Wilshire IV
**BREAKFAST SESSION: Allied Professionals Breakfast**
PANELISTS: Kim Wall, NP – MCW; Lisa LaFay, MD – University of Pittsburgh Medical Center; and Todd Chennell, NP – University of Rochester, Strong Memorial Hospital

8:00 am — 8:45 am  Starlight Ballroom
**HISTORICAL LECTURER**
“From Penguins to Plankton - The Dramatic Impacts of Climate Change on the Antarctic Peninsula”
SPEAKER: James McClintock, MD – University of Alabama at Birmingham

8:45 am — 10:00 am  Starlight Ballroom
**SCIENTIFIC SESSION III: Papers 8-12**
MODERATORS: Jennifer Ogilvie, MD – NYU Langone Health, and Matthew Nehs, MD – Brigham & Women’s

♦ 08. DERIVATION OF A COST-SAVING SCREENING STRATEGY FOR ASYMPTOMATIC PRIMARY HYPERPARATHYROIDISM

**John J Nguyen-Lee**1, Mario Paciuc2, Rudy Guerra2, Nestor F. Esnaola3, Kyle A. Zanocco4, Feibi Zheng5
1General Surgery, Houston Methodist Hospital, 2Statistical Genetics and Bioinformatics, Rice University, 3General Surgery and Surgical Oncology, Houston Methodist Hospital, 4Endocrine Surgery, UCLA David Geffen School of Medicine, 5General Surgery and Endocrine Surgery, Houston Methodist Hospital

♦ 09. CURRENT MANAGEMENT OF HYPOCALCEMIA AFTER TOTAL THYROIDECTOMY: A COST-EFFECTIVENESS ANALYSIS

**Kristina J Nicholson**1, Kenneth J Smith2, Kelly L McCoy1, Sally E Carty1, Linwah Yip1
1Endocrine Surgery, University of Pittsburgh, 2Medicine, University of Pittsburgh
10. SURGERY ALONE FOR PAPILLARY MICROCARCINOMA IS MORE COST EFFECTIVE THAN LONG TERM ACTIVE SURVEILLANCE

Jia Feng Lin¹, Pascal Jonker¹, Stanley Sidhu², Leigh Delbridge², Anthony Glover², Diana Learoyd³, Ahmad Aniss², Schelto Kruijff¹, Mark Sywak²

¹Surgical Oncology, University Medical Center Groningen, ²Endocrine Surgical Unit, University of Sydney, ³Department of Endocrinology, University of Sydney

11. ADHERENCE TO CONSENSUS GUIDELINES FOR SCREENING OF PRIMARY ALDOSTERONISM IN AN UNDERSERVED OUTPATIENT URBAN HEALTH CARE SYSTEM

Maheshwaran Sivarajah¹, Toni Beninato², Thomas J Fahey III²

¹St. Barnabas Hospital, Bronx, ²NY Presbyterian/Weill Cornell Medical Center

12. SURGICAL RESECTION IN EARLY STAGE PANCREATIC NEUROENDOCRINE TUMORS IN THE UNITED STATES: ARE WE OVER- OR UNDERTREATING PATIENTS?

Sitaram V Chivukula¹, John F Tierney¹, Martin Hertl¹, Jennifer Poirier¹, Xavier M Keutgen²

¹Surgery, Rush University Medical Center, ²Surgery, University of Chicago

10:00 am — 10:30 am Wedgewood Ballroom
BREAKS, EXHIBITS, & POSTER VIEWING

10:30 am — 11:30 am Starlight Ballroom
DIVERSITY, EQUITY AND INCLUSION PANEL
MODERATORS: Herb Chen, MD – University of Alabama at Birmingham
PANELISTS: Nipun Merchant, MD – University of Miami; Malcolm Brock, MD – The Johns Hopkins University School of Medicine; Minerva Romero Arenas, MD, MPH – University of Texas Rio Grande Valley, School of Medicine; and Sareh Parangi, MD – Massachusetts General Hospital

11:30 am — 1:30 pm LUNCH ON YOUR OWN

1:30 pm — 2:45 pm Starlight Ballroom
SCIENTIFIC SESSION IV: Papers 13-17
MODERATORS: Mark Sywak, MD – University of Sydney, and Susan Pitt, MD – University of Wisconsin

13. MOLECULAR PROFILING DOES NOT SIGNIFICANTLY CONTRIBUTE TO THE DIAGNOSTIC ALGORITHM FOR THE PREDICTION OF MALIGNANCY IN THYROID NODULES

Bernice L Huang¹, John A Chabot¹, James A Lee¹, Jennifer H Kuo¹

¹Columbia University Medical Center
14. AGGRESSIVE VARIANTS OF PAPILLARY THYROID MICROCARCINOMA ASSOCIATED WITH HIGH-RISK FEATURES, NOT SURVIVAL
Simon A Holoubek¹, Huan Yan¹, Amna Khokar¹, Kristine Kuchta², David J Winchester¹, Richard A Prinz¹, Tricia A Moo-Young¹
¹Endocrine Surgery, NorthShore University HealthSystem, ²Biostatistics and Research Informatics, NorthShore University Health System

15. SHOULD INCIDENTAL MULTIFOCALITY BE AN INDICATION FOR COMPLETION THYROIDECTOMY IN PAPILLARY THYROID CANCER?
Victoria Harries¹, Laura Y Wang¹, Marlena McGill¹, Ashok R Shaha¹, Jatin P Shah¹, Richard J Wong¹, R Michael Tuttle¹, Snehal G Patel¹, Ian Ganly¹
¹Memorial Sloan Kettering Cancer Center

16. EARLY POST-OPERATIVE THYROGLOBULIN QUANTIFIES RISK OF RECURRENT THYROID CANCER.
Jayani Hasula Jayasekara¹, Jia Feng Lin¹, Man-Shun Wong¹, Ahmad Aniss¹, Leigh Delbridge¹, Anthony Glover¹, Stan Sidhu¹, Mark Sywak¹
¹University of Sydney Endocrine Surgery Unit, Royal North Shore Hospital

17. THYROGLOBULIN WASHOUT FROM CERVICAL LYMPH NODE FINE NEEDLE ASPIRATION BIOPSIES IN PATIENTS WITH DIFFERENTIATED THYROID CANCER: DEFINING AN OPTIMAL CUT-OFF
Bora Kahramangil¹,², Emin Kose¹, Mustafa Donmez¹, Husnu Aydin¹, Jordan Reynolds¹, Vikram Krishnamurthy¹, Judy Jin¹, Joyce Shin¹, Allan Siperstein¹, Eren Berber¹
¹Cleveland Clinic, ²General Surgery, Cleveland Clinic Florida

2:45 pm — 3:00 pm Wedgewood Ballroom
BREACKS, EXHIBITS, & POSTER VIEWING

3:00 pm — 4:30 pm Starlight Ballroom
SCIENTIFIC SESSION V: Papers 18-23
MODERATORS: Barbra Miller, MD – University of Michigan, and Brian Untch, MD – Memorial Sloan Kettering

18. IS THERE A METHOD TO THE MADNESS? EXAMINING THE SURGICAL APPROACH AND OUTCOMES OF LAPAROSCOPIC ADRENALECTOMY AMONG CESQIP SURGEONS
Annette Marie Pascual Marrero¹, Hadiza Kazaure¹, Samantha Thomas², Michael Stang¹, Randall Scheri²
¹Endocrine Surgery, Duke University, ²Duke University
SCIENTIFIC PROGRAM

♦ 19. DEFINING THE COMPETENCIES FOR LAPAROSCOPIC TRANSABDOMINAL ADRENALECTOMY: AN INVESTIGATION OF INTRA-OPERATIVE BEHAVIORS AND DECISIONS OF EXPERTS

Amin Madani1, Karan Grover1, Jennifer H Kuol, Barbara Miller2, Quan-Yang Duh3, Wen Shen3, Masha Livhits4, Philip W Smith5, Toni Beninato6, Rebecca S Sippel7, Elliot J Mitmaker8, James A Lee1

1Surgery, Columbia University, 2Surgery, University of Michigan, 3Surgery, University of California - San Francisco, 4Surgery, University of California - Los Angeles, 5Surgery, University of Virginia, 6Surgery, Cornell University, 7Surgery, University of Wisconsin, 8Surgery, McGill University

♦ 20. OBESITY IS ASSOCIATED WITH NON-LOCALIZING IMAGING IN PRIMARY ALDOSTERONISM

Victoria M Gershuni1, Daniel S Herman2, Rachel R Kelz1, Robert E Roses1, Debbie L Cohen3, Scott O Trerotola4, Douglas L Fraker1, Heather Wachtel1

1Department of Surgery, Division of Endocrine and Oncologic Surgery, University of Pennsylvania, 2University of Pennsylvania, 3Department of Medicine, University of Pennsylvania, 4Department of Interventional Radiology, University of Pennsylvania

♦ 21. COMPARISON BETWEEN FUNCTIONAL AND NON-FUNCTIONAL ADRENOCORTICAL CARCINOMA

Alaa Sada1, Malke Asaad2, Katherine A Bews3, Geoffrey B thompson1, David R Farley1, Benzon M Dy1, Melanie L Lyden1, Elizabeth B Habermann3, Travis J Mckenzie1

1General Surgery, Mayo Clinic, 2Mayo Clinic, 3Surgical Outcomes Program, Kern Center for the Science of Health Care Delivery, Mayo Clinic

♦ 22. ADRENOCORTICAL TUMORS HAVE A DISTINCT LONG NON-CODING RNA EXPRESSION PROFILE AND LINC00271 IS A PROGNOSTIC MARKER IN ADRENOCORTICAL CARCINOMA

Floryne O Buishand1,2, Yi Liu-Chittenden2, Yu Fan2, Sudheer Gara2, Dhaval Patel2, Amit Tirosh2,3, Daoud Meerman2, Electron Kebebew2,4

1University of Edinburgh, 2National Cancer Institute, 3Sheba Medical Center, 4Stanford University

♦ 23. A NOVEL HEAT SHOCK PROTEIN 90 INHIBITOR POTENTLY TARGETS ADRENOCORTICAL CARCINOMA TUMOR SUPPRESSION VIA ALTERATION OF LONG NON-CODING RNA EXPRESSION

Ton Wang1, Chitra Subramanian1, Brian Blagg2, Mark S Cohen1

1Surgery, University of Michigan, 2Medicinal Chemistry, University of Notre Dame
TUESDAY, APRIL 9, 2019

7:00 am — 8:00 am  Starlight Ballroom
BREAKFAST SESSION: CESQIP
MODERATORS: David Schneider, MD – University of Wisconsin; Jennifer Rosen, MD – Washington Hospital Center
PANELISTS: Reese Randle, MD – University of Kentucky; Judy Jin, MD – The Cleveland Clinic; Barry Inabnet, MD – Icahn School of Medicine at Mount Sinai; and Derek Punches, MD - ArborMetrix

7:00 am — 8:00 am  Wilshire I & II
BREAKFAST SESSION: Graves’ Disease & Thyroid Foundation Breakfast
MODERATORS: Dawn Elfenbein, MD – University of California, Irvine
PANELISTS: Kimberly Dorris – Graves’ Disease & Thyroid Foundation; Julie Miller, MD – Royal Melbourne Hospital; and Richard Hodin, MD – Massachusetts General Hospital

8:00 am — 9:30 am  Starlight Ballroom
INTERESTING CASES
MODERATOR: Sonia Sugg, MD – University of Iowa Hospitals & Clinics
PANELISTS: Steven Libutti, MD – Rutgers Cancer Institute of New Jersey; Sally Carty, MD – University of Pittsburgh; Carmen Solorzano, MD, MPH – Vanderbilt University Medical Center; and Ashok Shana, MD – Memorial Sloan-Kettering Cancer Center

9:30 am — 9:45 am  Wedgewood Ballroom
BREAK, EXHIBITS, & POSTER VIEWING

9:45 am — 11:15 am  Starlight Ballroom
SCIENTIFIC SESSION VI: Papers 24-29
MODERATORS: Allan Siperstein, MD – Cleveland Clinic, and Aarti Mathur, MD – Johns Hopkins

24. ENERGY LEVEL AND FATIGUE AFTER THYROID SURGERY FOR THYROID CANCER: A POPULATION-BASED STUDY ON PATIENT-REPORTED OUTCOMES
David T Hughes1, David Reyes-Gastelum2, Kevin Kovatch3, Ann S Hamilton4, Kevin C Ward5, Megan Haymart2

1Surgery, University of Michigan, 2Internal Medicine, University of Michigan, 3Otolaryngology, University of Michigan, 4Keck School of Medicine of University of Southern California, 5Rollins School of Public Health, Emory University
25. SELF-ASSESSMENT OF THE VOICE AFTER TOTAL THYROIDECTOMY USING VHI QUESTIONNAIRES. RESULTS OF A PROSPECTIVE STUDY

Frédéric Borel¹, Christophe Tresallet², Antoine Hamy³, Muriel Mathonnet⁴, Jean-Christophe Lifante⁵, Laurent Brunaud⁶, Olivier Marret⁷, Cécile Caillard⁸, Florent Espitalier⁹, Fabrice Menegaux², Jean-Benoit Hardouin¹⁰, Claire Blanchard¹¹, Eric Miraille¹²

¹Clinique de Chirurgie Digestive et Endocrinienne, Hôtel Dieu, CHU Nantes, Place Alexis Ricordeau, 44093 Nantes CEDEX 1, France., ²Chirurgie Générale, Viscérale et Endocrinienne, Hôpital Pitié-Salpêtrière, AP-HP, Sorbonne Universités Pierre et Marie Curie (Paris 6), ³Chirurgie digestive et endocrinienne, CHU Angers, ⁴Chirurgie digestive, générale et endocrinienne, CHU de Limoges, ⁵Chirurgie générale, endocrinienne, digestive et thoracique, Centre Hospitalier Lyon-Sud, ⁶Service de chirurgie digestive, hépato-biliaire, et endocrinienne, CHU Nancy - Hôpital de Brabois, ⁷Chirurgie Vasculaire, CHD Vendée, ⁸Clinique de Chirurgie Digestive et Endocrinienne, Hôtel Dieu, CHU Nantes, ⁹Oto-Rhino-Laryngologie, Hôtel Dieu, CHU Nantes, ¹⁰Plateforme de Méthodologie et de Biostatistique – DRCi, Faculté de Médecine et Pharmacie, ¹¹Clinique de Chirurgie Digestive et Endocrinienne, CHU Nantes, ¹²Nantes University Hospital

♦ 26. SAME-DAY DISCHARGE IS NOT ASSOCIATED WITH INCREASED READMISSION OR COMPLICATION RATES FOLLOWING THYROIDECTOMY

Q Lina Hu¹,², Masha J Livhits¹, Clifford Y Ko¹,², Michael W Yeh¹

¹Department of Surgery, University of California, Los Angeles, ²American College of Surgeons

27. MORBIDITY IN PATIENTS WITH PERMANENT HYPOPARATHYROIDISM AFTER TOTAL THYROIDECTOMY

Anders OJ Bergenfelz¹, Erik Nordenström², Martin Almqvist²

¹Surgery, Department of Clinical Sciences, ²Surgery, Surgery

28. AUTOFLUORESCENCE IMAGING OF PARATHYROID GLANDS: AN ASSESSMENT OF POTENTIAL INDICATIONS

Emin Kose¹, Bora Kahramangil¹, Edwina Moore¹, Husnu Aydin¹, Mustafa Donmez¹, Vikram Krishnamurthy¹, Allan Siperstein¹, Eren Berber¹

¹Cleveland Clinic

♦ 29. META-ANALYSIS: ACTIVE SURVEILLANCE FOR LOW RISK PAPILLARY THYROID CARCINOMA

Bianka Saravana-Bawan¹, Amandeep Bajwa¹, Todd McMullen¹

¹Department of Surgery, University of Alberta
11:15 am — 11:45 am  Wedgewood Ballroom
BREAK, EXHIBITS, & POSTER VIEWING

11:45 am — 1:00 pm  Starlight Ballroom
SCIENTIFIC SESSION VII: Papers 30-34
MODERATORS: Amelia Grover, MD – Virginia Commonwealth University, and John Porterfield, MD – University of Alabama at Birmingham

♦ 30. A GROWTH MODEL OF NEUROENDOCRINE TUMOR SURROGATES AND THE EFFICACY OF A NOVEL SOMATOSTATIN-RECEPTOR GUIDED ANTIBODY-DRUG CONJUGATE: PERSPECTIVES ON CLINICAL RESPONSE?
Brendon Herring¹, Jason Whitt¹, Jianfa Ou², Joel Berry², Herbert Chen¹, Xiaoguang Margaret Liu², Renata Jaskula-Sztul¹
¹Department of Surgery, University of Alabama at Birmingham School of Medicine, ²Department of Biomedical Engineering, University of Alabama at Birmingham School of Engineering

♦ 31. OVEREXPRESSION OF SOMATOSTATIN RECEPTOR TYPE 2 (SSTR2) IN NEUROENDOCRINE TUMORS FOR IMPROVED [68GA] DOTATATE IMAGING AND TREATMENT
Rachael E Guenter¹, Tolulope Aweda², Alex Chang¹, Jason Whitt¹, X. Margaret Liu³, Herbert Chen¹, Suzanne Lapi², Renata Jaskula-Sztul¹
¹Surgery, University of Alabama at Birmingham, ²Radiology, University of Alabama at Birmingham, ³Biomedical Engineering, University of Alabama at Birmingham

♦ 32. DUAL INHIBITION OF BRAF AND MEK INCREASES SODIUM IODIDE SYMPORTER EXPRESSION IN PATIENT-DERIVED PAPILLARY THYROID CANCER CELLS IN VITRO
Timothy M. Ullmann¹, Heng Liang², Maureen D. Moore¹, Isra Al Jamed², Katherine D. Gray¹, Dessislava Stefanova¹, Jessica Limberg¹, Jessica L. Buicko¹, Brendan Finnerty¹, Toni Beninato¹, Rasa Zarnegar¹, Irene Min², Thomas J. Fahey¹
¹Department of Surgery, New York Presbyterian Hospital: Weill Cornell Medical Center, ²Department of Surgery, Weill Cornell Medicine
SCIENTIFIC PROGRAM

♦ 33. NOVEL USE OF A CLIA-CERTIFIED CDKN2C LOSS ASSAY IN SPORADIC MEDULLARY THYROID CARCINOMA

Jessica E Maxwell¹, Naifa Busaidy², Mimi Hu², Nancy Perrier¹, Jeffrey Lee¹, Paul Graham¹, Gilbert Cote², Elizabeth Grubbs¹

¹Surgical Oncology, MD Anderson Cancer Center, ²Endocrine Neoplasia, MD Anderson Cancer Center

34. NOVEL GENE PANEL AS A PROGNOSIS MARKER FOR ACTIVE SURVEILLANCE IN THYROID CANCER

Emmanuelle ML Ruiz¹, Muthusamy Kunnimalaiyaan¹, Emad Kandil¹

¹Surgery and oncology department, School of Medicine of Tulane University

1:00 pm

MEETING ADJOURN
ABSTRACTS

♦ Denotes Resident/Fellow Research Award Competition Paper

NOTE: Author listed in **BOLD** is the presenting author
Background: Anaplastic thyroid cancer (ATC) is a fatal malignancy. Evolved resistance renders most chemotherapies ineffective. Many advanced cancers have deregulated cellular energy metabolism characterized by glucose dependency, aerobic glycolysis, and increased oxidative stress levels. Both glucose dependency and increased oxidative stress lead to cellular proliferation. Therefore, in this study we sought to determine if a ketogenic diet (low carbohydrate, high fat) and N-acetylcysteine/NAC (antioxidant) could inhibit tumor growth in a mouse model of ATC.

Methods: We used the ATC line 8505c to establish xenografts in nude mice (n=6/group). Group1 was fed standard diet (SD); group2 was given a ketogenic diet (KD); Group3 was given SD with NAC in the drinking water (40mM); and Group4 was given KD plus NAC (40mM). Tumor volumes, ketones, and glucose levels were measured. In vitro, 8505c cells were treated using media with High Glucose (HG) (25mM), Low Glucose (LG) (3mM), HG plus NAC (200uM), or LG plus NAC for 96 hours. We performed proliferation assays, Seahorse glycolysis assays, and ROS assays for oxidative stress. Hexokinase-2 copy number variation (CNV) was analyzed by Fluorescent in-situ hybridization (FISH).

Results: We found that Ketogenic diet plus NAC dramatically decreased tumor volume compared to SD (22.5 mm³ +/- 12.4 vs. 147.3 mm³ +/- 54.4, P<0.05) and also compared to SD plus NAC (P< 0.05). In vitro, proliferation was reduced in the cells cultured in LG plus NAC compared to both HG and LG alone (p<0.001 and p<0.005). NAC caused a reduction in glycolysis capacity by Seahorse analysis in both HG and LG treatments (p<0.001). LG plus NAC significantly lowered ROS compared to HG alone (p=0.014). Finally, Hexokinase-2 copy number variation was markedly lower in cells grown with LG plus NAC compared to HG and LG alone (p<0.001).

Conclusions: A ketogenic diet combined with the antioxidant NAC dramatically reduced tumor size in a mouse model of ATC. Glucose restriction combined with NAC reduced cell proliferation by decreasing cellular oxidative stress, glycolysis capacity, and Hexokinase-2 expression in vitro. Further studies are warranted to explore the role for these metabolic therapies in ATC treatment.
Pim J Bongers1-2, Caylee A Greenberg1, Menno R Vriens2, Martijn Lutke Holzik3, David Goldstein4, Karen Devon1, Lorne R Rotstein1, Anna M Sawka5, Jesse D Pasternak1

1Department of General Surgery, University Health Network, 2Department of Surgical Oncology and Endocrine Surgery, University Medical Center Utrecht, 3Department of Surgery, Hospital Group Twente, 4Department of Otolaryngology-Head Neck Surgery, University Health Network, 5Department of Endocrinology, University Health Network

Background: Although either total thyroidectomy (TT) or hemithyroidectomy (HT) may be acceptable in managing low-risk differentiated thyroid cancers (DTC), the long-term health-related quality of life (HRQoL) implications of these options are not well-understood. We aimed to compare measures of long-term HRQoL in low-risk DTC patients treated with TT to those treated with HT.

Methods: We performed a self-administered survey of adults treated for low-risk DTC with tumors ≤4cm that underwent surgery between 2005-2016 at a large university hospital. The survey included the European Organization for Research and Treatment of Cancer QLQ-C30 questionnaire, supplementary QLQ-THY34 module, Assessment of Survivor Concerns (ASC) questionnaire, and Multidimensional Fatigue Inventory (MFI-20). Primary outcome was the difference between TT and HT in the global scale of quality of life measured by the EORTC-QLQ-C30 and secondary outcomes included HRQoL functional, symptom (hair problems, restlessness, swallowing, tingling, voice concerns, cramps, joint pain), and patient worry scales (cancer and general health related). Significant patient and treatment-related confounders were included in multivariable regression analyses.

Results: Overall survey response rate was 51.0% (270/529). The definitive surgical intervention was TT for 211 (78.1%) and HT for 59 patients (21.9%). Time of survey after surgical treatment was longer for the TT group (median 98 vs 74 months, p=0.001), reflecting recent trends in increasing use of HT. Recurrence rates were similar (1.8%-TT vs 3.4%-HT, p=0.297) and HT had lower but significant rates of levothyroxine treatment (99.5%-TT vs 66.0%-HT, p=0.001). Global quality of life score did not differ between groups (77.6-TT vs 76.9-HT, p=0.214). Multivariable analysis showed HT to be associated with more cancer related worry, specifically fear of recurrence (p=0.023), and overall health concern (p=0.032). Other quality of life markers, often associated with thyroid hormone therapy, were not significantly different in adjusted multivariable models.

Conclusions: In this cross-sectional survey, individuals with low risk DTC treated with TT or HT had similar global scores of HRQoL. In hypothesis-generating secondary analyses, cancer-related worry appeared higher in individuals treated with HT compared to TT. While further independent validation is required, these data highlight a previously unreported impact of surgical regimen to the postoperative quality of life for low-risk DTC patients.
**ABSTRACTS**

♦ 03. IMMUNE INFILTRATE-ASSOCIATED DYSREGULATION OF DNA REPAIR MACHINERY PREDISPOSES TO PAPILLARY THYROID CARCINOMA

**Norman G Nicolson**¹, Taylor C Brown¹, Reju Korah¹, Tobias Carling¹

¹Yale Endocrine Neoplasia Lab, Department of Surgery, Yale School of Medicine

Background: Autoimmune thyroiditis is a risk factor for development of papillary thyroid cancer (PTC). Additionally, many PTC specimens without a pre-operative diagnosis of thyroiditis are found to have immune infiltrates in the resection specimen. Inflammation and genotoxic reactive oxygen species contribute to thyrocyte DNA damage, which is mutagenic only if repaired incorrectly. We hypothesized that the immune milieu in the inflamed thyroid may signal thyrocytes to dysregulate DNA repair, contributing to carcinogenesis.

Methods: RNA-seq data was obtained for PTC (n=505) and paired normal thyroid (n=59) samples from The Cancer Genome Atlas (TCGA) and for Hashimoto’s (n=15) and normal thyroids (n=264) from the Genotype-Tissue Expression (GTEx) project. Immune marker RNA expression was compared to histological estimates, and then to expression of selected DNA repair genes. To confirm the RNA-seq findings, gene expression analysis by quantitative PCR (qPCR) was performed for the error-prone DNA polymerase POLQ in fresh frozen PTC (n=23), normal thyroid adjacent to PTC (n=21), and normal thyroid adjacent to nodules and adenomas (n=11). Immunohistochemistry was performed on formalin-fixed PTC and thyroid adenoma sections to localize POLQ expression to specific cell types.

Results: Immune marker expression matched histological immune cell fraction for TCGA data. Immune markers such as CD4 closely correlated in the PTC samples with POLQ expression (r=0.50, Spearman’s rho), but for other DNA repair genes there was no relationship (TDG, r=0.09; POLE, r=0.11) or an inverse relationship (PMS2, r=-0.32). Immune infiltrate in PTC-adjacent normal thyroid closely correlated to POLQ expression in the same tissue (r=0.85) and in the paired PTC (r=0.36). Thyroid tissue from GTEx with Hashimoto’s had at least 3-fold increased expression of POLQ (p<0.001) and CD3E (p<0.0001). POLQ expression by qPCR was significantly higher in PTC and PTC-adjacent normal samples than in normal thyroid adjacent to benign lesions (mean normalized log2-transformed expression, 4.2 vs 5.5 vs 0.0, p<0.001). Immunohistochemistry confirmed that most POLQ expression was in thyrocytes rather than lymphocytes, in all tissue types studied.

Conclusions: This study demonstrates a close correlation between adjacent immune infiltrate and expression of error-prone DNA repair machinery in thyrocytes, likely reflecting a pathway by which autoimmune thyroid diseases predispose patients to PTC development.
Background: Parathyroidectomy (PTX) increases bone mineral density (BMD) and decreases fracture risk in patients with primary hyperparathyroidism (PHPT). The aim of this study was to assess the effect of adding bisphosphonates either before or after PTX on skeletal outcomes.

Methods: A retrospective cohort study of bisphosphonate-naïve patients with osteoporosis and classic PHPT (calcium 10.5 and PTH >65) within a vertically integrated healthcare system was performed (1995 to 2016). Osteoporosis was defined by a baseline T-score < -2.5 at any site, or by using ICD-9/10 codes. Time-varying Cox regression was used to estimate an adjusted risk of any fracture in five comparison groups: observation, bisphosphonates alone, PTX alone, bisphosphonates followed by PTX, and PTX followed by bisphosphonates. The secondary outcome was hip BMD change within 6 years after PTX.

Results: The cohort comprised 1,737 patients, of which 303 underwent PTX (17%), 433 were treated with bisphosphonates only (25%), 125 were treated with bisphosphonates followed by PTX (7%), and 69 underwent PTX followed by bisphosphonate treatment (4%). We observed 278 fractures overall with a median follow up of 5.2 years. PTX was associated with a reduction in fracture risk compared to observation (HR 0.55, 95% CI 0.35-0.84). Bisphosphonate treatment followed by PTX was associated with a reduction in fracture risk similar to that observed with PTX alone (HR 0.46, 95% CI 0.25-0.83). However, PTX followed by bisphosphonate treatment did not reduce fracture risk (HR 1.09, 95% CI 0.65-1.81). The fracture risk associated with bisphosphonate therapy alone was similar to observation (HR 0.82, 95% CI 0.62-1.08). PTX alone was associated with a nonsignificantly greater increase in hip BMD (5.66%, 95% CI 3.69-7.64) compared to PTX followed by bisphosphonates (3.76%, 95% CI -0.15-7.67).

Conclusions: Bisphosphonate initiation after PTX may antagonize the beneficial effects of PTX on fracture risk in osteoporotic patients with PHPT. Until further research is performed, bisphosphonates should be avoided in the postoperative period.
Background: The surgical cure rate for primary hyperparathyroidism (PHP) is >95%, but in several recent studies the rate of long-term recurrence is higher than once appreciated. Our aim was to identify factors of late recurrence after seemingly curative parathyroidectomy.

Methods: With institutional approval, prospectively collected data were retrieved for all patients who had surgery for sporadic PHP from 11/72 to 1/15 with long-term follow-up, defined as ≥3 years. Patients who had concomitant thyroidectomy or persistent PHP were excluded. Recurrent PHP (RPHP) was defined by 6 months of postoperative eucalcemia followed by elevated calcium and high/inappropriately unsuppressed PTH levels. Patients with RPHP were compared to a contemporaneous cohort with durable cure (CPHP) defined by consistent eucalcemia through most recent follow-up (range 36-211 mo, mean 73). Statistical analysis used student’s t test for continuous data and Fisher’s exact test for categorical data.

Results: 262 patients met inclusion criteria: 29 (11%) with RPHP and 233 (89%) with CPHP. Gender (p=0.8) and mean age (p=0.6) were similar. Mean follow-up differed by group (RPHP 94.8 mo vs CPHP 70.4 mo, p<0.01). Mean time to RPHP recurrence was 84 mo (range 13-179). Although 83% of RPHP patients had unilateral exploration vs 72% of CPHP (p=0.3), all RPHP patients had a single gland resected at initial surgery vs 197/233 (85%) CPHP patients (p<0.01) with no difference in resected gland size(p=0.9). The mean final intraoperative PTH level was higher in the RPHP (48.04 pg/mL) compared to the CPHP group (37.5 pg/mL, p<0.01), and the mean 6-month calcium level was slightly higher, as well (9.6 vs 9.3 mg/dL, p<.001). The mean 6-month PTH value did not significantly differ between groups (RPHP 67.8 vs CPHP 59.6 pg/mL, p=0.8). Notably, at 6 months, RPHP patients were much more likely to have eucalcemic elevation in PTH than were CPHP patients (86% vs 15%, p<0.01).

Conclusions: Patients followed long-term after apparent curative parathyroidectomy for PHP have a high rate of late recurrence (11%), with hypercalcemia reappearing as many as 15 years later. At 6-month follow-up, an elevated PTH is strongly associated with recurrence, a finding that may help to guide cost-effective surveillance recommendations.
06. CORONARY ARTERY DISEASE IS MORE SEVERE IN PATIENTS WITH PRIMARY HYPERPARATHYROIDISM.

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Background: Primary hyperparathyroidism (PHPT) is associated with an increased cardiovascular mortality and mechanisms underlying this association are unclear. The coronary calcium score (CAC score) is a strong and independent risk predictor for 10-year coronary event: 22-28% when CAC > 400 (high risk), 12-16% when CAC 101-400 (intermediate risk), 2-6% when CAC 1-101 (low risk), and 1-2% when CAC = 0 (very low risk). However, available data about coronary artery disease are very limited in PHPT. The goal of this study was to evaluate CAC score in a large number of PHPT patients, to compare with control subjects, and to evaluate predictors of CAC score in PHPT.

Methods: Cross-sectional study of consecutive PHPT patients without history of coronary artery disease, history of diabetes, or severe chronic kidney disease (GFR < 30 mL/min/1.73 m²). CAC scores in PHPT patients were compared with population-based control subjects (n=6110) from the Multi-Ethnic Study of Atherosclerosis (MESA) with adjustments on patient’s age, gender, and ethnicity.

Results: Mean CAC score was 120 ± 344 (range 0-2587) in 130 patients with PHPT (109 females). CAC score was > 400 (high risk) in 13 patients, between 101 and 400 (intermediate risk) in 14 patients, between 1 and 100 (low risk) in 42 patients, and null in 61 patients. When compared with control subjects, the percentage of positive CAC scores (i.e. non-null) was similar in PHPT patients (53 versus 50%). However, positive CAC scores were significantly higher and at the 67th percentile of the MESA cohort (p<0.001). CAC score was positively correlated with patient’s age (0.342; p<0.001), antihypertensive medications number (0.207; p=0.018), 25OH-vitD level (0.191; p=0.029), and negatively with GFR (-0.212 ; p=0.015) and 24h-urinary calcium (-0.192 ; p=0.035). In multivariate analysis, patient’s age (1.135; 1.034-1.246; p=0.007) and antihypertensive medications (8.810; 2.447-31.716; p<0.001) remained independent predictors of high-intermediate risk CAC scores (CAC score > 100).

Conclusions: High-intermediate risk CAC scores were observed in 21% of PHPT patients (10-year coronary event > 12%). Positive CAC scores were significantly higher in PHPT patients than in population-based control subjects. Patient’s age and antihypertensive medications should be taken into account in future studies.
Background: Normocalcemic primary hyperparathyroidism (nPHPT) has been described as a unique clinical entity that may be more challenging to cure compared to classical primary hyperparathyroidism. Lack of consistent findings in the literature regarding the incidence of multi-gland disease and clinical outcomes may be due to single-center studies with small numbers of patients. We utilized a multi-institutional database to better characterize this condition.

Methods: The Collaborative Endocrine Surgery Quality Improvement Program (CESQIP) database from all 48 participating institutions during 2014-2018, was queried for patients undergoing parathyroidectomy for sporadic primary hyperparathyroidism. Those without recorded preoperative calcium levels were excluded. Patient characteristics, operative details, pathology, and outcomes data were compared between patients with nPHPT and those with elevated calcium (PHPT). Of note, calcium levels in CESQIP are reported as categorical values (low, normal, high, very high) based on each institution’s laboratory reference range.

Results: Among 7634 patients, 65 were excluded due to lack of preoperative calcium values. In the remaining 7569, 9.7% (733) were nPHPT. Mean age at surgery and sex were similar for nPHPT and PHPT cohorts. Preoperative parathyroid hormone (PTH) levels were not elevated in 13.2% vs 11.3% and high in 85.0% vs 87.7% for nPHPT and PHPT, respectively. In the nPHPT cohort, 47 patients (6.4%) were undergoing remedial surgery compared with 307 patients (4.5%) with PHPT (p<0.05). The PHPT cohort had a single parathyroid resected more frequently than the nPHPT group (73.3% vs 47.5%, p<0.05). Similarly, patients with nPHPT had a higher rate of subtotal (3.5 gland) resection (10.0% vs 4.7%, p<0.05). Pathology reported a higher frequency of multi-gland hyperplasia in the nPHPT cohort (43.1% vs 21.9, p <0.05). The rate of clinical concern for persistent hyperparathyroidism was similar between the two groups (p=0.09) but not reported in 25% overall.

Conclusions: Patients with nPHPT have higher rates of multi-gland disease compared with PHPT. The rate of persistent disease did not differ between the two groups but follow up was limited. More patients with nPHPT were undergoing remedial surgery, suggesting that parathyroidectomy in this cohort may have higher failure rates. These data support routine multi-gland exploration and long term follow up for nPHPT patients.
08. DERIVATION OF A COST-SAVING SCREENING STRATEGY FOR ASYMPTOMATIC PRIMARY HYPERPARATHYROIDISM

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Background: Primary hyperparathyroidism (PHPT) is the most common cause of hypercalcemia in the ambulatory setting. Several studies have demonstrated that PHPT is an underdiagnosed condition. Few studies have examined the utility of implementing a screening program for hypercalcemic patients in the outpatient setting. Our study seeks to find a cost-saving screening strategy for diagnosing PHPT based on peak calcium level, age and gender in a primary care population.

Methods: We reviewed laboratory data resulting from primary care office visits at our institution between January 2016 through December 2017 to evaluate patients that had at least one episode of hypercalcemia (serum calcium >10.4 mg/dL). We excluded patients who had a history of transplant or were on calcium elevating medications such as thiazide diuretics. For each calcium threshold, we calculated the percentage of patients who were found to have an elevated PTH level (> 65pg/mL) in our system. Using a previously published decision analysis on observation versus parathyroidectomy in asymptomatic PHPT, we determined whether net cost savings could be achieved by screening hypercalcemic patients given their probability of PHPT and expected cost savings from fracture risk reduction, given their gender and age.

Results: There were 459,002 primary care office visits from 155,350 unique patients in the study period. Of these patients, 2,271 had at least one hypercalcemic lab value. After exclusion of transplant patients and patients on potentially confounding medications, there were 1,326 patients, of which 28.2% had a PTH level checked. The likelihood of having biochemically classic PHPT was 27.3%, 25%, 33.3%, 38.6%, 45.2%, and 51% for threshold peak serum calcium levels of 10.5, 10.6, 10.7, and 10.8, and 10.9, and ≥11 respectively. Cost savings was established at a screening threshold of 10.5 for all patients until age 66 for men and 69 for women. For men aged 67-68, and women aged 70-71, the optimal screening threshold was 10.8. For men 69 or older and women 72 or older, there was no optimal screening threshold.

Conclusions: For our primary care population, cost savings can be achieved by screening hypercalcemic patients with a life expectancy exceeding 16 years, with varying thresholds based on age and gender.
ABSTRACTS

♦ 09. CURRENT MANAGEMENT OF HYPOCALCEMIA AFTER TOTAL THYROIDECTOMY: A COST-EFFECTIVENESS ANALYSIS

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Background: Symptomatic hypocalcemia is a complication of total thyroidectomy (TT) that may result in hospital readmission. Strategies for management include treatment initiation when symptomatic, or prevention by routine or PTH-directed oral calcium supplementation. The cost-effectiveness of these three often-utilized strategies for management of post-TT hypocalcemia is unclear.

Methods: A Markov cohort model from the payer perspective was created for patients undergoing outpatient TT. Management strategies included routine supplementation with calcium alone (RS), a protocol for post-operative PTH-based selective supplementation with calcium and calcitriol (SS), and no supplementation (NS) until patients demonstrated postoperative hypocalcemic symptoms. Markov cycle length was one week and model time horizon was 6 months. Patients in each strategy could remain asymptomatic or develop symptomatic hypocalcemia, managed with outpatient oral supplementation, intravenous calcium infusion administered in an ambulatory care setting, or inpatient intravenous calcium infusion. Effectiveness was measured in quality-adjusted life years (QALYs). Costs were obtained from the CMS fee schedule and the VA Federal Supply Schedule. Quality-of-life utilities and probabilities came from the current literature. Sensitivity analyses were performed to test model parameter assumptions.

Results: RS was the preferred strategy, costing $351 per patient and resulting in 0.497 QALYs. SS cost $577 for 0.494 QALYs, while NS was most costly at $4,953 for 0.492 QALYs. The model was robust on one-way sensitivity analysis to variations in the costs of calcium carbonate and hospital admission, probability of symptomatic hypocalcemia, and hospital length of stay. In the base case model, >90% of symptomatic patients in the RS and SS strategies are treated with outpatient oral supplementation, and the added cost of NS was due to ~45% of symptomatic patients requiring either ambulatory or inpatient intravenous infusion. However, the cost-effectiveness of NS approached that of SS or RS when >97% of symptomatic patients could be treated with oral supplementation alone. On probabilistic sensitivity analysis, RS was preferred in 82% of scenarios.

Conclusions: In this data-driven theoretical model, routine calcium supplementation after TT was the least costly option and resulted in the largest QALY gain. After TT, a preventative calcium supplementation strategy should be strongly considered.
10. SURGERY ALONE FOR PAPILLARY MICROCARCINOMA IS MORE COST EFFECTIVE THAN LONG TERM ACTIVE SURVEILLANCE

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Background: Papillary thyroid microcarcinoma (PMC), often diagnosed incidentally, is mostly an indolent type of thyroid cancer. Patients submitted to protocolled total thyroidectomy (TTx) and postoperative radioactive iodine (RAI) ablation may be overtreated. TTx comes with a risk of complication, increased patient burden and health costs. Recent data suggest that PMC maybe treated with active surveillance (AS) rather than immediate surgery and RAI. The aim of this study is to assess survival outcomes and costs of conventional treatment for an Australian PMC cohort and to compare these costs with those of an AS approach.

Methods: A prospectively collected surgical cohort of patients treated for papillary thyroid cancer (PTC) between 1985 and 2017 from an Australian tertiary referral center was studied. Only patients with PMC (defined as PTC < 1 cm), known treatment and follow-up data were included for analysis. The primary outcome measure was the cost of surgical treatment and hypothetical AS. Secondary outcome measures included surgical complication rates, type of surgery, disease specific survival (DSS), overall survival (OS) and recurrence free survival (RFS).

Results: In total 349 out of 2079 patients fulfilled inclusion criteria. Costs of surgical treatment and hypothetical AS were estimated at a one-time A$9,041 and a biannually A$308, respectively. We estimate that the cost of one surgical PMC treatment equals approximately 14.5 years of AS. Mean follow-up was 13.4 months. Permanent complications occurred in 2.6% of the patients; the most prevalent complication was hypocalcaemia (2.3%). The 5-year OS, DSS and RFS were 97%, 100% and 95% respectively. Disease recurrence occurred in 11 (3.2%) patients during follow-up. Around 67% of the PMC patients were treated with postoperative RAI. Postoperative RAI did not reduce recurrence rates (P>0.05).

Conclusions: Surgery may have a long term economic advantage for patients who are likely to require more than 14.5 years of follow-up in an AS scheme. Less than 3 percent of patients that undergo total or hemithyroidectomy for PMC have permanent complications. Postoperative RAI has no effect on recurrence rates and might be omitted. Therefore, surgery is a cost-effective and safe treatment option for younger Australian PMC patients.
ABSTRACTS

11. ADHERENCE TO CONSENSUS GUIDELINES FOR SCREENING OF PRIMARY ALDOSTERONISM IN AN UNDERSERVED OUTPATIENT URBAN HEALTH CARE SYSTEM

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Background: Primary aldosteronism (PA) is one of the most common causes of secondary hypertension. Deleterious effects of increased oxidant stress and cardiovascular complications are more common in these patients. Surgical removal of the aldosterone-producing adenoma or medical management with mineralocorticoid receptor-blockers can prevent adverse outcomes. Current guidelines recommend detection by using the plasma aldosterone/renin ratio (ARR) to detect possible PA in specific groups described in the Endocrine Society 2016 clinical practice guidelines. Here we aimed to determine adherence to guidelines for PA screening in an urban non-profit health care system serving an indigent population.

Methods: We reviewed records of adult patients in the outpatient setting of an urban health care system between 2013-2017. The ICD 9 and 10 diagnosis codes were used to identify patients meeting the inclusion criteria for screening for PA according to the Endocrine Society 2016 guidelines. The corresponding aldosterone, renin activity and 24hr urine aldosterone values were identified. Multivariate logistic regression was performed on each criterion to determine predictors of screening.

Results: There were 129,111 patients seen in the outpatient clinics and 7,175 patients (5.5%) met criteria for PA screening. The mean age of patients meeting criteria was 61 +/- 15.4 years and 57.6% were women. African Americans were the most common ethnic group (3,501; 48.8%) and Medicare (2,803; 39%) and Medicaid (2,626; 36.6%) were the most common insurance providers. The aldosterone-renin ratio (ARR) or 24hr urine aldosterone level was checked in 86 (1.2%) patients; 22 (25.3%) had an ARR>20. Of the 77 patients with “hypertension and an adrenal mass”, 14 (18.2%) had ARR checked. On multivariate logistic regression, significant positive predictors for being screened were “patients with 3 elevated blood pressure values” OR 10.13 (95%CI: 5.07-20.25) p<0.001, “hypertension and an adrenal mass” OR 11.98 (95%CI: 4.34-33.09) p<0.001, “hypertension and spontaneous hypokalemia” OR 3.09 (1.32-2.71) p=0.009 and “hypertension and diuretic-induced hypokalemia” OR 5.09 (2.22-11.70) p<0.001.

Conclusions: The missed opportunity to diagnose PA represents a significant health care disparity in this underserved community. It is possible that timely identification and treatment of PA in underserved health care populations could ameliorate health care disparities related to hypertension.

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12. SURGICAL RESECTION IN EARLY STAGE PANCREATIC NEUROENDOCRINE TUMORS IN THE UNITED STATES: ARE WE OVER- OR UNDERTREATING PATIENTS?

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Abstracts

Background: The incidence of pancreatic neuroendocrine tumors (PanNETs) is continuously rising, in part due to the incidental finding of smaller tumors on cross-sectional imaging. Current guidelines suggest that non-operative management should be considered for PanNETs < 2cm. The objective of this study was to evaluate the utilization of surgery for PanNETs < 2cm in the United States, identify factors that influence clinicians to operate, and determine variables associated with survival in early stage PanNETs.

Methods: Using the National Cancer Database (2004-2014), 3,243 cases of T1 (<2cm) PanNETs were identified. These cases were broken down into two groups according to size (0-1 cm and 1-2 cm) and lymph node metastases. Additional patient and tumor characteristics were examined. Multivariate models were used to identify factors that predicted failure to undergo surgery and to assess the impact of surgery on patient survival.

Results: 75% (753/1,003) of PanNETs measuring 0-1 cm and 80% (1,799/2,240) of PanNETs measuring 1-2cm were resected in this time period. 84 of these were functional PanNETs and 82% (69/84) of those were resected. Variables influencing primary tumor resection on multivariate analysis included presence of positive lymph nodes (OR 3.0-3.6), location of tumor in body/tail of pancreas (OR 1.5), moderately or well-differentiated tumors (OR 2.3-4.9), and surgery at academic centers (OR 1.5). Patients with PanNETs 1-2 cm were more likely to undergo resection than those 0-1 cm (p=0.05), and functional tumors were more likely to undergo resection as well (p=0.05). When looking at 5 year survival rates and controlling for other variables, patients who underwent resection for PanNETs 1-2 cm had longer survival than those who did not have surgery (median follow-up 33.6 months, HR 0.51, CI 0.34-0.75, p<0.001). However, this survival benefit was not confirmed for PanNETs 0-1cm (median follow-up 31.5 months, HR=0.63, CI 0.36-1.11, p=0.11).

Conclusions: Contrary to current guideline recommendations, a vast majority of patients with PanNETs < 2cm undergo surgical resection in the United States and multiple factors influence this decision. A survival benefit may be present for surgical resection of PanNETs 1-2 cm, suggesting that current recommendations should perhaps be revised.
13. MOLECULAR PROFILING DOES NOT SIGNIFICANTLY CONTRIBUTE TO THE DIAGNOSTIC ALGORITHM FOR THE PREDICTION OF MALIGNANCY IN THYROID NODULES

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Background: The diagnostic algorithm used to predict the malignancy risk of thyroid nodules includes clinical factors, sonographic characteristics, cytopathology findings, and molecular profiling. Altogether, the algorithm can be costly and time-consuming for patients and clinicians. The added value of each diagnostic step of the algorithm has never been fully elucidated. We aimed to evaluate the stepwise contribution of each diagnostic step toward an accurate determination of malignancy.

Methods: A single institution, retrospective study of 137 patients who underwent partial or total thyroidectomy was performed. Only dominant nodules with clear pathological correlates were evaluated. Demographic information included age, sex, race, family history of thyroid cancer, radiation exposure, and nodule size. The American Thyroid Association (ATA) 2015 ultrasound risk stratification for each nodule was determined based on the average rating of four experienced sonographers. Descriptive statistics were performed with Wilcoxon rank sum and chi square tests. A baseline logistic regression model for predicting malignancy was regressed on demographic information. In a stepwise fashion, the 1) ATA risk stratification 2) Bethesda classification of FNABs and 3) molecular profiling were added to the baseline model and the statistical significance of the addition of each diagnostic step was analyzed using the likelihood ratio test. Receiver operating characteristic (ROC) curves and area under the curve (AUC) were calculated for each model.

Results: Most patients were women (83%) with a median age of 55 years (interquartile range [IQR], 44-66). Median nodule diameter was 3.0cm (IQR, 1.8-4.0). Malignancy rate was 39%, with the majority being papillary carcinoma (85%). The additions of ATA risk stratification and Bethesda classification to preceding models were statistically significant (p < .001). The addition of molecular profiling was not significant (p = .81). ROC curves of the models showed similar results: AUCs for the baseline model and for models sequentially including ATA stratification, Bethesda classification, and molecular profiling were 0.76, 0.85, 0.91, and 0.91 respectively.

Conclusions: The diagnostic algorithm to determine malignancy risk in thyroid nodules involves many steps. Although the use of molecular profiling is increasing, our data suggests that it does not significantly add to our ability to predict malignancy in thyroid nodules.
Background: Papillary thyroid microcarcinoma (PTMC) is generally associated with excellent survival, and non-operative management has been considered an option for patients with low-risk characteristics. However, the data on presentation and survival in aggressive variants of PTMC microcarcinomas is limited. The purpose of this study is to compare the pathologic presentation and overall survival of classic PTMC (cPTMC) versus aggressive variants of PTMC.

Methods: Patients treated for papillary thyroid carcinoma (PTC) between 2004 and 2015 in the National Cancer Database were identified. Inclusion criteria were: Age ≥18 years, tumor size ≤1.0cm, and PTC of either classic variant, tall cell (TC), or diffuse sclerosing (DS) subtypes. Univariate and multivariate analyses were performed to identify associations between key variables. Overall survival was analyzed by Kaplan Meier.

Results: There were 82,056 patients with cPTMC, 923 with TC, and 219 with DS. Extrathyroidal extension and nodal involvement was significantly more common in TC and DS when compared to cPTMC (p<0.05). Patients with TC were also more likely than cPTMC to have distant metastatic disease (p<0.05). TC and DS patients were significantly more likely to be treated with total thyroidectomy. Only 78.6% of cPTMC received a total thyroidectomy, as compared to 87.7% for TC and 83.6% for DS (p<0.05). Radioactive iodine was only used as a treatment modality in 26.1% cPTMC patients compared to 48.5% for TC and 45.2% for DS (p<0.05). On multivariate analysis, TC (4.48, 3.99-5.48) and DS (2.81, 1.96-4.03) histology were both found to be an independent predictor of ETE. TC was an independent predictor of positive nodal metastasis (1.56, 1.29-1.90). Despite the aggressive pathologic presentations of TC and DS, there was no difference in overall survival of TC and DS patients when compared to those with cPTMC.

Conclusions: Tall cell and diffuse sclerosing variants are associated with more aggressive features as compared to classic papillary microcarcinoma. More aggressive treatment of these subtypes may account for the lack of difference in survival between aggressive subtypes compared to cPTMC.
Background: Multifocality in papillary thyroid carcinoma (PTC) is common. The aim of this study is to determine whether patients with multifocal disease (MFD), treated with thyroid lobectomy alone, have increased recurrence in the contralateral lobe, regional recurrence and poorer survival.

Methods: After IRB approval, patients with PTC treated with thyroid lobectomy from 1993 to 2015 were identified from an institutional database. Patients with surgery other than a lobectomy, T4 or unresectable disease, distant metastases at presentation, and those in whom multifocality could not be determined were excluded. Nine hundred and thirty-five patients were identified. The rates of immediate completion thyroidectomy (defined as performed within 12 month of initial surgery) were similar between groups (38 patients (5.8%) in the unifocal disease (UFD) group versus 17 (6.1%) in MFD group). After excluding patients who had an immediate completion thyroidectomy, 880 patients were included in the outcome analysis, of whom 618 patients (70.2%) had UFD and 262 patients (29.8%) had MFD. Rate of contralateral lobe recurrence, regional recurrence free survival (RRFS) and overall survival (OS) were calculated using the Kaplan-Meier method.

Results: With a median follow-up of 49 months, patients with MFD had similar rate of contralateral lobe recurrence to UFD (HR 1.088; 95% CI 0.281 – 4.210). The 5-year rate of contralateral lobe recurrence in the UFD and MFD groups were 0.8% and 1.3%, respectively (p=0.903). Patients with MFD were more likely to develop regional recurrence (5-year RRFS 98.7% versus 100.0% for the MFD and UFD groups, respectively (p=0.027)). Despite this, all patients were salvaged and there were no disease-related deaths in either group. The 5-year OS for the UFD group and MFD group were 96.1% and 95.9%, respectively.

Conclusions: Patients with MFD PTC do not appear to have an increased probability of developing contralateral lobe recurrence. In our cohort, there was a marginally increased risk of regional recurrence; despite this, there was no impact on survival. MFD should not be considered as an indication for completion thyroidectomy.
16. EARLY POST-OPERATIVE THYROGLOBULIN QUANTIFIES RISK OF RECURRENCE IN PAPILLARY THYROID CANCER.

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Background: Post-operative follow up of papillary thyroid cancer (PTC) commonly involves serial serum thyroglobulin (Tg) levels. Prior studies have demonstrated a decreased rate of recurrence in PTC in patients with an early post-operative serum Tg<1-2ng/mL. The aim of this study was to determine whether post-operative Tg can quantify the risk of recurrence in PTC.

Methods: This study reviewed patients who underwent a total thyroidectomy for PTC >10mm and had complete biochemical data available in the period 2000-2016. All patients had a post-operative stimulated Tg measured within 3 months of total thyroidectomy. Thyroglobulin levels were measured using the Roche e601 assay (since 2014), minimum Tg measurable 0.1ng/mL and Immulite 2000 assay (prior to 2014), minimum Tg measurable 1ng/mL. Median follow-up was 18 months (range 1-181 months). Structural recurrence was defined as disease detected on imaging and confirmed on biopsy. Biochemical recurrence or persistence was defined as serum Tg≥1ng/mL with negative Tg antibodies and no evidence of structural disease.

Results: The study group included 503 patients with a mean age of 50 years and mean tumor size of 24mm, 220 (43.7%) patients had stimulated post-operative Tg<1ng/mL, 55 (10.9%) had 1ng/mL≤Tg<2ng/mL and 228 (45.3%) had Tg≥2ng/mL. The overall rate of recurrence for each group was 9%, 30.9% and 59.2% respectively (p≤0.0002). For patients with stimulated post-operative Tg<2ng/mL the risk of structural recurrence was 4% compared to 30.3% for those with a Tg≥2ng/mL (p<0.0001). In patients with Tg<0.5ng/ml the total recurrence rate was 6.5%. In addition, 381 (75.7%) patients underwent radioiodine (RAI) ablation post-operatively and 122 (24.3%) had nil post-operative RAI ablation. There was no significant difference in structural recurrence (16.8% vs 13.1%) nor biochemical recurrence or persistence (17.8% vs 19.7%) between these groups.

Conclusions: In patients undergoing total thyroidectomy for papillary thyroid cancer, early post-operative stimulated thyroglobulin accurately quantifies the risk of disease recurrence.
Background: Thyroglobulin washout (TGW) is frequently used adjunctive to cytology in patients with differentiated thyroid cancer (DTC) undergoing fine needle aspiration biopsy (FNA) of cervical lymph nodes (LN). Although recent American Thyroid Association (ATA) guidelines recommended a cut-off of 1 ng/ml, there remains a confusion about what TGW value should be considered positive. This study aims to investigate the validity of current recommendations and determine an optimal TGW cut-off in follow-up of DTC.

Methods: This is an IRB-approved clinical study correlating TGW values with cytology in patients with DTC who underwent FNA of cervical LNs. From an institutional database, patients who underwent LN FNA with concurrent TGW and blood thyroglobulin measurements between 2009-2018 were identified. All TGWs were performed by diluting leftover FNA aspirate in 5 cc of saline. LNs with malignant cytology were resected and metastatic involvement confirmed pathologically. LNs with benign cytology were followed up for at least 6 months with ultrasound and tumor markers to confirm benign nature. ROC curves were constructed to determine the optimal cut-offs of absolute TGW level and TGW/blood thyroglobulin ratio to diagnose LN recurrence.

Results: 58 patients underwent 71 FNAs of suspicious cervical LNs (21 in central, 50 in lateral neck compartments) during follow-up. 47 LNs were found to be metastatic, while 24 proved benign. One patient had a pathologically confirmed LN metastasis despite a TGW of 0. Sensitivity, specificity, positive predictive value, negative predictive value, and accuracy of the ATA cut-off of 1 ng/ml to diagnose nodal recurrence were 94%, 88%, 94%, 88%, and 92%, respectively. ROC curve revealed that 2.8 ng/ml was the optimal TGW level to diagnose LN metastasis (94% sensitive, 96% specific). Optimal cut-off for TGW/blood thyroglobulin ratio was 14.6 (85% sensitive, 100% specific). Overall, absolute TGW level proved superior to TGW/blood thyroglobulin in predicting nodal recurrence.

Conclusions: This study suggests that a revision of the TGW cut-off to 2.8 ng/ml from the currently recommended value of 1.0 ng/ml in LN FNAs would increase the specificity without decreasing sensitivity in detecting recurrence from differentiated thyroid cancer. Overall, absolute TGW level was more accurate than TGW/blood thyroglobulin ratio for predicting nodal recurrence.
18. IS THERE A METHOD TO THE MADNESS? EXAMINING THE SURGICAL APPROACH AND OUTCOMES OF LAPAROSCOPIC ADRENALECTOMY AMONG CESQIP SURGEONS

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Background: Laparoscopic adrenalectomy can be performed using a transabdominal (TA) or posterior retroperitoneal approach (PRA). Choosing the optimal approach can be challenging. Multi-institutional level data describing the characteristics and outcomes of patients undergoing these operative approaches are scarce.

Methods: Adult patients undergoing TA or PRA were selected from the Collaborative Endocrine Surgery Quality Improvement Program (CESQIP, 2014-18). Bivariate analyses were used to compare patient characteristics and outcomes for TA vs. PRA. Outcomes included conversion to open procedure, capsular disruption, and ≥1 complications. The effect of operative approach on the incidence of ≥1 complication was determined using univariate and multivariate techniques.

Results: Among 833 patients who underwent laparoscopic adrenalectomy, 539 (64.7%) underwent TA and 294 (35.3%) PRA. Median age was 54 years. Patients who underwent PRA were more likely to have BMI≤40 (89.8% vs. 81.8%, p=0.001). The most prevalent diagnoses for PRA were hyperaldosteronism, pheochromocytoma, and non-functioning nodule vs. pheochromocytoma, hyperaldosteronism, and Cushing’s syndrome for TA. Patients undergoing PRA were more likely to have smaller (median 2.4 vs. 3.2cm, p<0.001) and right-sided nodules (46.6% vs. 36.9%, p=0.02). PRA was associated with a lower conversion to open procedure (0.7% vs. 4.1%, p=0.004), and shorter length of stay (1 day: 73.8% vs. 49.5%, p=0.001). However, PRA was associated with a higher rate of capsular disruption (12.6% vs. 7.6%, p=0.02); among PRA with capsular disruption, the median nodule size was 2.2cm, and 16.2% were for metastatic disease. Overall, PRA was associated with a lower complication rate (3.1% vs. 8.7%, p=0.002). In unadjusted analysis, patients who underwent PRA were less likely to develop ≥1 complication (OR=0.42, 95% CI 0.19-0.96, p=0.04), however after multivariate adjustment, there was no statistical difference in complication rate between both procedures (OR=0.47, 95% CI 0.20-1.12, p=0.09).

Conclusions: CESQIP surgeons are selective in choosing PRA. Difference in complication risk was insignificant in adjusted analyses, however, our study revealed a higher rate for capsular disruption during PRA even for small tumors. Therefore, the decision to choose PRA, particularly for malignant tumors should be carefully weighed. Contrary to published data, our study suggests that PRA should not be generalized and should be used only in select cases.
ABSTRACTS

19. DEFINING THE COMPETENCIES FOR LAPAROSCOPIC TRANSABDOMINAL ADRENALECTOMY: AN INVESTIGATION OF INTRA-OPERATIVE BEHAVIORS AND DECISIONS OF EXPERTS

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Background: Safe performance of laparoscopic transabdominal adrenalectomy (LTA) requires the application of a complex body of knowledge and skills, which are difficult to define, teach and measure. This qualitative study aims to define and characterize expert behaviors, decisions and other cognitive processes required to perform LTA.

Methods: Hierarchical and cognitive task analyses for right and left LTA were performed using semi-structured interviews and field observations of experts to describe the thoughts and behaviors that exemplify optimal performance. Verbal data was recorded, transcribed verbatim, supplemented with published literature, coded and thematically analyzed using a constructivist grounded-theory approach by two independent reviewers. This was iteratively elaborated until data reached saturation.

Results: A conceptual framework was synthesized based on 10 interviews (median 53 minutes [46-63]), 5 adrenalectomies and 9 literary sources (5 book chapters, 4 online videos). Sixty tasks (Right: 52; Left: 55), 55 cognitive behaviors and 84 potential errors were identified and categorized into 8 procedural steps and 6 fundamental principles: anticipation, establishing exposure, identifying safe planes, considering oncologic principles, tactical modification, and error recovery. Experts unanimously reported the importance of creating a 3D mental model of the anatomy/pathology (e.g. aberrant vessels, tumor location) that is consistently fine-tuned throughout the operation, with conscious awareness of danger zones (e.g. “medial arc” surrounding the adrenal/periadrenal fat). Surgeons described methods to optimize exposure and accentuate safe planes, such as using gravity and dynamic traction/counter-traction via pushing, pulling and lifting maneuvers in the axis of areolar and fibrous attachments. Despite variations in dissection techniques, experts highlighted two themes: “macrodissection” (large sweeping motions) and “microdissection” (fine dissection of thin layers), with emphasis on non-linear motions and effective transitions between the two when appropriate. Surgeons stressed the importance of tactical modification when faced with failure of progression, hemorrhage, suboptimal exposure, and loss of bearings. Teamwork and effective communication were also consistently described as essential for avoiding and managing physiologic changes, or to coordinate contingency plans when required.

Conclusions: This study defines behaviors and competencies that are essential to performing LTA effectively and safely. This framework may serve as the basis for educational curricula, assessment tools, self-reflection, coaching and quality-control metrics.
20. OBESITY IS ASSOCIATED WITH NON-LOCALIZING IMAGING IN PRIMARY ALDOSTERONISM

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Background: Primary aldosteronism (PA) is the most common etiology of secondary hypertension. However, due to the high rates of concomitant hypertension in obesity, obese patients may have unrecognized PA. We hypothesize that obesity may impact the rate of diagnosis and likelihood of surgical management for patients with PA.

Methods: We conducted a retrospective cohort analysis of patients with PA (1997-2017) who underwent adrenal vein sampling (AVS). Patients were classified by body mass index as obese (BMI>=35) or non-obese (BMI<35). Primary outcome was change in blood pressure measurements and anti-hypertensive medications (by WHO Defined Daily Dose). Secondary outcome was clinical resolution determined by previously published PASO criteria.

Results: Of 418 PA patients who underwent AVS, over 35% (n=131) were classified as obese (mean BMI 40.1 vs. 28.7 kg/m2, p<0.001). The majority of the obese group were male (67.9 vs. 56.1%, p=0.02) and presented at a younger age (51.4 vs. 54.4 years old, p=0.008). Patients with higher BMI had greater number of pre-operative anti-hypertensive medications (6.7 vs. 5.7, p=0.04). There was no difference between duration of hypertension (10 years for both, p=0.90), baseline comorbidities, or biochemical presentation (plasma aldosterone, renin, or aldosterone:renin ratio). Significantly, obese patients were less likely to have evidence of an adrenal tumor on imaging (67.9 vs. 78.1%, p=0.03), although rates of lateralizing AVS were comparable between groups (74.6 vs. 77.3%, p=0.55). Among the 285 patients who underwent adrenalectomy, the median tumor size was significantly smaller in the obese patients (1.1 vs. 1.5 cm, p=0.014). While both groups were able to eliminate medication use, the obese group trended toward higher mean arterial pressure (99.6 vs. 96.1 mm Hg, p=0.07) at long-term follow-up.

Conclusions: Obese patients with PA may have smaller tumors, and imaging may be less helpful for identifying an adrenal mass. AVS is essential in these patients, as it may prevent them from being falsely classified as non-surgical candidates. Although both obese and non-obese patients benefitted substantially from adrenalectomy, obese patients had persistent hypertension which may reflect underlying essential hypertension.
ABSTRACTS

♦ 21. COMPARISON BETWEEN FUNCTIONAL AND NON-FUNCTIONAL ADRENOCORTICAL CARCINOMA

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Background: While roughly half of adrenocortical Carcinomas (ACC) present with manifestations of clinical or subclinical hormone hypersecretion, whether functional status impacts outcomes remains controversial. We sought to compare survival between functional and nonfunctional neoplasms.

Methods: All adult patients diagnosed with ACC at our institution between 1997 and 2017 were identified. Patients who underwent hormonal assessments were included. Demographics, tumor characteristics, TNM stages and outcomes were analyzed using Chi-square and Wilcoxon Rank Sum tests. Survival was assessed using Kaplan-Meier analysis and univariate and multivariable Cox proportional hazards regression.

Results: A total of 266 patients were identified. Patients presented with stage I (6%), stage II (33%), stage III (26%), and stage IV disease (32%); stage was unknown in 3%. Left-sided neoplasms were more common (56%). Grade was reported in 29% of patients, with 32% of tumors being grade I/II and 68% grade III/IV. Average neoplasm size was 12±6 cm. Fifty-three percent (n=140) of tumors were found to be functional. Among these, isolated cortisol secretion was the most common presentation (48%), followed by mixed hormone secretion (25%), isolated sex hormone secretion (19%), and aldosterone secretion (8%). Patients with functional ACC were younger (49±16 vs 54±14, p=0.02) and more likely to be female (69% vs 51%, p=0.002). There was no difference in laterality, neoplasm size or grade between functional and nonfunctional neoplasm (P>0.05). However, functional ACC were more likely to present with metastatic disease vs nonfunctional (41% vs 21%, p=0.001). Surgical resection was performed in 77% of patients. When comparing 30-day morbidity between functional and nonfunctional ACC, there was no significant difference in incidence or severity. The median overall survival (OS) was 35 months. Overall survival was better for nonfunctional ACC (median 66 vs 22 months, p=0.01). On multivariable analysis, functional ACC was associated with worse survival after adjusting for age, sex, grade, stage and resection HR=1.5 (95% CI, 1.04-2.14, p=0.03).

Conclusions: Approximately half of ACC present with either isolated or mixed hormone secretion. While short term morbidity after resection of ACC was similar between nonfunctional and functional variants, long term survival was worse for patients with functional tumors.
Background: Adrenocortical carcinoma (ACC) is an aggressive malignancy with a low but variable overall survival rate. Even after complete tumor resection, over half of patients develop recurrent disease. Long noncoding RNAs (lncRNAs) have been found to be involved in cancer initiation/progression and as markers of cancer prognosis. The role of lncRNAs in ACC is poorly understood. Thus, in this study we performed lncRNA expression profiling in ACC, adrenocortical adenoma (ACA) and normal adrenal cortex (NAC).

Methods: Total RNA was extracted from fresh frozen tissue samples (11 ACA, nine ACC and five NAC samples) with histopathological confirmed diagnosis. ArrayStar Human LncRNA/mRNA Expression Microarray V3.0 was used for transcriptome analysis. Differentially expressed lncRNAs were validated using TaqMan real-time quantitative PCR in a validation cohort including an additional 10 ACCs. The ACC dataset from the Cancer Genome Atlas (TCGA) project was used to evaluate the prognostic utility of lncRNAs found to be differentially expressed in ACC. Survival curves were plotted by Kaplan-Meier analysis, and differences in survival rates were assessed using a log-rank test. P < 0.05 was considered significant. Gene Set Enrichment Analysis (GSEA) was performed to identify lncRNA-associated biological signaling pathways.

Results: Unsupervised hierarchical and heat map clustering showed distinct clustering of ACC samples compared with NAC and ACA samples by lncRNA expression profiles. A total of 874 lncRNAs were differentially expressed between ACC and NAC, including known carcinogenesis-related lncRNAs such as HOTTIP, HOXA11-AS1, CRNDE, LINC00271 and TBXAS1. One thousand seventy-six lncRNAs were differentially expressed between ACC and ACA. LINC00271 was a prognostic marker, with patients with low LINC00271 expression surviving significantly shorter than patients with a high LINC00271 expression. Median survival time (MST) for the low-expression group was 1788 days, whereas the MST was not reached for the high-expression group (P < 0.019). Importantly, low LINC00271 expression was positively associated with WNT signaling pathway, cell cycle, and regulation of chromosome organization.

Conclusions: ACC has a distinct lncRNA expression profile. LINC00271 is a prognostic marker in ACC and is involved in biological pathways commonly dysregulated in ACC.
ABSTRACTS

23. A NOVEL HEAT SHOCK PROTEIN 90 INHIBITOR POTENTLY TARGETS ADRENOCORTICAL CARCINOMA TUMOR SUPPRESSION VIA ALTERATION OF LONG NON-CODING RNA EXPRESSION

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Background: Adrenocortical carcinoma (ACC) is an aggressive malignancy with poor survival in advanced disease. Recent studies demonstrate that long noncoding RNAs (lncRNAs) are mutated in ACCs compared to normal adrenal cells and effect genes responsible for tumor suppression, cellular homeostasis, survival, and metastasis. We hypothesize that a novel, more potent c-terminal heat shock protein 90 (Hsp90) inhibitor (KU758) targets ACC tumor suppression more effectively via alteration of lncRNA expression.

Methods: Validated ACC cell lines SW13, RL251, and NCI-H295R were grown in 2D culture. Cell viability after treatment with KU758 was measured by MTS assay. NCI-H295R cells were treated with 0.5–1.0 µM KU758 and 1.0 µM 17-AAG (N-terminal Hsp90 inhibitor) for 24 hours. RNA was extracted from the treated cells, normalized by NanoDrop, and converted to cDNA. LncRNA expression analysis using SYBR Green qPCR was performed. Data analysis was by Qiagen.

Results: KU758 potently inhibits ACC cell proliferation with IC50 values as low as 0.6 µM after 72h treatment versus 6.8 µM for normal fibroblast cells. After treatment of NCI-H295R cells with KU758, there was a statistically significant (greater than 2 fold; p<0.01) downregulation in the oncogenic lncRNAs AFAP1-AS, BCAR4, LSNINCT5, BANCR, CRNDE, and UCA, and upregulation in the tumor suppressing lncRNA TUG1 compared to control. Treatment with 17-AAG did not cause any significant change in the lncRNAs affected by KU758 treatment except CRNDE (also decreased), while treatment with 17-AAG caused a statistically significant decrease (p<0.01) in the oncogenes KRASP1, LINC00152, LINC00963, LUCAT1, and PVT1 and upregulation in the tumor suppressors TUG1 and TUSC7. Treatment with 1.0 µM 17AAG also significantly adversely increased the oncogenes CBR3-AS1, GACAT1, SUMOIP3 and decreased the tumor suppressor PTENP1 compared to treatment with KU758.

Conclusions: This is the first study demonstrating that Hsp90 inhibitors are able to significantly alter lncRNA expression in ACC cells. The novel C-terminal inhibitor KU758 appears to have greater specificity for ACC compared to the N-terminal inhibitor 17-AAG and also lacks adverse upregulation of several oncogenes observed with 17AAG that could lead to tumor growth and spread. Further translational characterization with siRNA-mediated knockdowns and in vivo efficacy studies are warranted to validate this promising new therapeutic.
24. ENERGY LEVEL AND FATIGUE AFTER THYROID SURGERY FOR THYROID CANCER: A POPULATION-BASED STUDY ON PATIENT-REPORTED OUTCOMES

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Background: Patients often report poor energy after thyroid surgery. The aim of this study was to quantify the incidence and factors associated with patient-reported lack of energy and fatigue following thyroid surgery for differentiated thyroid cancer (DTC).

Methods: Patients diagnosed with DTC from 2014-2015 included in the Georgia and Los Angeles Surveillance, Epidemiology, and End Results (SEER) cancer registries were surveyed by mail approximately 2.5 years after their initial diagnosis. Patients' survey data was linked to their SEER data. Multivariable regression analysis with odds ratio (OR) and 95% confidence interval (CI) was performed to determine patient variables predictive of change in energy level and fatigue severity after thyroid surgery.

Results: Of 2632 respondents (63% response rate), 2584 were included (48 excluded for not having surgery). The mean age was 50.4 years, 1780 (68.9%) were female, 1780(77.6%) were AJCC-7 Stage 1, and 2407(93.2%) had papillary thyroid cancer. Surgery included total thyroidectomy with lymph node removal (1275[49.3%]), total thyroidectomy (990[38.3%]), and thyroid lobectomy (319[12.3%]). Radioiodine therapy was delivered in 1465(57.6%) and thyroid hormone suppression in 1296(51.5%). Over a third, 988(38.2%), reported much worse or somewhat worse energy level compared to before surgery and 1310(50.7%) rated their fatigue as very severe, severe, or moderate. Reports of weight gain 934(36.1%), low mood 860(33.3%), voice changes 718(27.8%) and low calcium 598(23.1%) for >3 months were also common. The following characteristics were related to a higher likelihood to report worse energy following thyroid surgery: age <45 years old, receiving radioiodine (OR 1.31[CI1.10-1.56]), thyroid hormone suppression (OR 1.48[CI1.21-1.82]), having depression before surgery (OR 1.34[CI1.07-1.67]), and reporting low calcium after surgery (OR 1.26[CI1.02-1.54]). Variables related to reporting of significant fatigue included: age <45 years old, thyroid hormone suppression (OR 1.63[CI1.34-1.99]), one (OR 1.43[CI1.17-1.75]) or ≥2 (OR 2.25[CI1.71-2.97]) comorbidities, and depression prior to surgery (OR 2.34[CI1.85-2.95]). There were no significant correlations of reports of either fatigue or worse energy with extent of thyroid surgery or voice complaints.

Conclusions: Over a third of patients report worsening of energy levels following thyroidectomy for DTC and more than half report significant fatigue. These findings underscore the importance of informing patients of the potential impact of thyroid cancer treatment.
25. SELF-ASSESSMENT OF THE VOICE AFTER TOTAL THYROIDECTOMY USING VHI QUESTIONNAIRES. RESULTS OF A PROSPECTIVE STUDY

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Background: Post thyroidectomy voice disorders are probably the most frequent complication after thyroidectomy. We report the long-term voice quality outcomes after total thyroidectomy using a simple self-assessment tool; the voice handicap index (VHI) self-questionnaire.

Methods: This observational prospective multicenter study (ClinicalTrial NCT02167529) included 800 patients, who underwent total thyroidectomy between 2014 and 2017 in 7 Hospitals. Exclusion criteria included confirmed extended malignant disease, age <18 years, and preoperative voice disorders with confirmed vocal cord palsy (VCP). All patients filled in pre-and postoperative VHI questionnaires (month-2 and month-6). The VHI questionnaire includes 30 items, scored on a 5-point scale. The higher the score (maximum 120 points), the more impaired the voice quality is. A difference ≥ 18 points is considered as clinically significant.

Results: Eight hundred patients were analyzed. Mean VHI scores were 7.0 ±11.9 preoperatively, 13.6±19.8 at month-2, 8.6±14.5 at month-6. All differences were statistically significant; p<.0001 for pre versus month-2, p=.004 for pre versus month-6, p<.0001 for month-2 versus month-6. Thirty-six patients (4.5%) presented with a postoperative VCP. VHI score was significantly impaired in patients with VCP compared to those without VCP at month-2 (24.8 ± 29.2 versus 13.0 ± 19.0; p <.0001) and postoperative month-6 (13.5 ± 22.6 versus 8.3 ± 13.8; p=.044). In patients with no VCP, VHI scores were 7.0±11.2 preoperatively, 13.0±19.0 at month-2, and 8.3±13.8 at month-6. All differences were statistically significant; p<.0001 for pre versus month-2, for pre versus month-6 and for month-2 versus month-6. Among patients without postoperative VCP, 18.8% and 8.5% still described clinically relevant voice impairment (≥18 points) on postoperative month-2 and month-6. There was no difference between month-2 VHI score in patients without VCP and month-6 VHI score in patients with VCP (p=.879). VCP (p=.02) and thyroid weight (p=.008) only were associated with increased risk of postoperative voice impairment.

Conclusions: Postoperative VCP significantly impairs patients’ voice quality perception after thyroidectomy. Even without VCP, patients described an impaired voice. Evaluation of the voice was similar in non-VCP patients at 6 months and in VCP patients at 2 months. One out five patients with no postoperative VCP still experienced post thyroidectomy voice disorders at month-2.
26. SAME-DAY DISCHARGE IS NOT ASSOCIATED WITH INCREASED READMISSION OR COMPLICATION RATES FOLLOWING THYROIDECTOMY

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Background: Overnight hospitalization following thyroidectomy has been a widely adopted practice due to concern for complications such as hypocalcemia and hematoma. The objective of this study was to examine the safety of same-day discharge after thyroidectomy using a national, clinically validated registry containing thyroidectomy-specific outcome measures.

Methods: The American College of Surgeons National Surgical Quality Improvement Project (ACS NSQIP) Targeted Thyroidectomy database was used to identify patients who underwent thyroidectomy from January 1, 2016 to December 31, 2017. Patients who underwent radical neck dissection or whose length of stay was greater than 3 days were excluded. A 1:1 propensity score match was used to match patients who were discharged on postoperative day (POD) 0 and those discharged on POD 1 or 2. The primary outcome was 30-day readmission and secondary outcomes included thyroidectomy-specific complications (hypocalcemia, neck hematoma, and recurrent laryngeal nerve [RLN] injury). Multivariable logistic regression models were constructed to assess the association between discharge timing and postoperative outcomes.

Results: Of the 10,502 patients, 2776 (26.4%) were discharged on POD 0 and 7726 (73.6%) were discharged on POD 1 or 2. Patient characteristics predictive of same-day discharge included younger age, white race, lower ASA class, independent functional status, and lack of comorbidities. Operative characteristics predictive of same-day discharge included lobectomy, benign indication, central neck dissection, vessel sealant device use, intraoperative RLN monitoring, and lack of postoperative drain use. Following propensity score matching, 1976 matched pairs were created. In this matched cohort, the rates of readmission were similar when comparing patients discharged on POD 0 to those discharged on POD 1 or 2 (adjusted odds ratio [aOR] 1.29, 95% confidence interval [CI] 0.83-2.03). Likewise, no statistically significant differences were found in the rates of surgical site infection (aOR 0.78, 95% CI 0.34-1.73), clinically severe hypocalcemia (aOR 0.99, 95% CI 0.56-1.75), neck hematoma (aOR 1.08, 95% CI 0.57-2.06), or RLN injury (aOR 0.74, 95% CI 0.54-1.01).

Conclusions: In a national cohort of patients undergoing thyroidectomy, same-day discharge was not associated with higher readmission or complication rates when compared with discharge 1 or 2 days after surgery.
27. MORBIDITY IN PATIENTS WITH PERMANENT HYPOPARATHYROIDISM AFTER TOTAL THYROIDECTOMY

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Background: Permanent hypoparathyroidism is common after thyroidectomy. The present study evaluated the risk for morbidity in patients operated with total thyroidectomy for benign disease with and without permanent hypoparathyroidism.

Methods: Data was retrieved from the Scandinavian Quality Register for Thyroid, Parathyroid and Adrenal Surgery and cross-linked with the Swedish National Prescription Registry for Pharmaceuticals, the National Data Inpatient Registry, and Causes of Death Registry. Patients with benign thyroid disease were included. Permanent hypoparathyroidism was defined as treatment with active Vitamin D for more than 6 months after thyroidectomy. Analyzed morbidity was evaluated by multivariable Cox’s regression analysis and presented as Hazard ratio (HR) and 95 % confidence interval.

Results: There were 4828 patients. The mean (s.d.) follow up was 4.5 (2.4) years. Some 239 (5.0 %) patients medicated for permanent hypoparathyroidism. Patients with permanent hypoparathyroidism had an increased risk for renal insufficiency, HR 4.88 (2.00-11.95), and an increased risk for any malignancy, HR 2.15 (1.08-4.27). Patients with permanent hypoparathyroidism with known cardiovascular disease at the time of thyroidectomy, had an increased risk for cardiovascular events during follow-up, HR 1.88 (1.02-3.47).

Conclusions: Patients with permanent hypoparathyroidism after total thyroidectomy have an increased risk of long-term morbidity. These results are a cause of great concern.
28. AUTOFLUORESCENCE IMAGING OF PARATHYROID GLANDS: AN ASSESSMENT OF POTENTIAL INDICATIONS

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Background: Although autofluorescence (AF) imaging of parathyroid glands (PG) has been described, there are concerns about its reliability and ideal applications. Furthermore, studies have reported a subjective assessment without a pathologic confirmation of all PGs assessed. The aim of this study is to determine the accuracy of AF to detect PGs and potential indications in thyroid and parathyroid surgery by doing an AF –pathologic correlation.

Methods: This is an IRB-approved prospective study of patients undergoing thyroidectomy and parathyroidectomy with AF imaging. Initially, AF characteristics of PGs versus thyroid and other central neck soft tissues were quantified. Based on this distinction, each specimen that was sent to pathology was inspected with this imaging and predicted to be parathyroid versus non-parathyroid tissue. This prediction was correlated with pathology. Ability to detect PGs before surgical dissection and on thyroidectomy specimens incidentally was also assessed. Normalized autofluorescence intensities (PG AF / measured background intensity) were compared using paired-samples t-test. ROC curve was constructed.

Results: 310 patients underwent parathyroidectomy (n=137), total thyroidectomy (n=139) and thyroid lobectomy (n=34). Autofluorescence was demonstrated in 947 (98\%) of 971 PGs, with 228 (23\%) identified with AF before dissection. Mean AF intensities of parathyroid, thyroid, and other central neck tissues (soft tissue, thymus, muscle, lymph node) were 1.73, 1.38, and 1.43, respectively (p=0.003). There were 550 specimens that were imaged with AF first and then sent to pathology. For these samples, sensitivity, specificity, positive predictive and negative predictive values to predict parathyroid tissue were 93.9\%, 97.1\%, 94.9\% and 96.6\%, respectively. False positive and false negative rates were 2\% each. In 7\% (n=12/173) of thyroidectomy specimens, incidentally resected, visually not suspected PGs were identified with AF, leading to implantation. In patients with parathyroid disease and negative preoperative localization, 30\% of glands were recognized with AF before dissection.

Conclusions: In this large prospective evaluation with pathologic confirmation, the accuracy of AF to identify PGs was high. Potential utilities seems to be in (1) prediction of PG location before dissection, (2) facilitation of PG identification in patients with parathyroid disease and negative localization and (3) assessment of thyroidectomy specimens for incidental parathyroidectomy.
29. META-ANALYSIS: ACTIVE SURVEILLANCE FOR LOW RISK PAPILLARY THYROID CARCINOMA

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of active surveillance criteria to include tumors up to 1.5cm.

Background: The incidence of thyroid cancer has been increasing, particularly papillary thyroid carcinomas (PTC) of size < 2cm. The majority of this increase is thought to be due to incidental findings on imaging. Because of the relatively indolent nature of PTC, active surveillance (AS) has been proposed rather than traditional surgical management for patients with low risk PTC. This meta-analysis assessed the available literature regarding the efficacy of active surveillance of PTC.

Methods: A systematic search was conducted of EMBASE, MEDLINE and PubMed with keywords “active surveillance,” “thyroid microcarcinoma” and “thyroid carcinoma.” Inclusion criteria were active surveillance of low risk PTC, defined as T1a or T1b, N0, M0 disease. Main outcomes of interest were tumor growth, defined as growth in maximum diameter by ≥ 3mm, metastatic spread to cervical lymph nodes or extra nodal disease, thyroid cancer-related mortality, incidence of delayed thyroid surgery (DTS), and disease recurrence after delayed thyroid surgery. Secondary outcomes included indication for DTS, decrease in primary tumor, defined as decrease in maximum diameter by ≥ 3mm, and overall mortality. A meta-analysis was performed obtaining pooled proportions.

Results: A total of 9 studies met inclusion criteria for final analysis. Across the 9 studies, there were a total of 4253 patients with a mean follow-up time of 51.7 months. Pooled analysis revealed during AS 4.4% (95%CI 3.1-5.8%) of patients demonstrated tumor growth by maximum diameter. A total of 1% (95%CI 0.6-1.5%) of patients developed cervical lymph node metastasis, 0.04% (95%CI 0.002-0.2%) developed extra nodal disease, and overall mortality rate was 0.03% (95%CI 0.0005-0.2%). Delayed thyroid surgery was performed in 9.7% (95%CI 6.0-14.1%) of patients. The main indication for surgery was patient preference at 51.9% (95%CI 44.9-58.9%) in comparison to only 29.1% (95% 23.1-35.6%) of patients receiving DTS for tumor growth. Analysis was restricted to studies of AS for PTMC a total of 7 studies with a total of 3905 patients with results demonstrating no significant difference in primary or secondary outcomes.

Conclusions: Active surveillance is an appropriate management strategy for low risk PTMC and further consideration should be given to extension.
30. A GROWTH MODEL OF NEUROENDOCRINE TUMOR SURROGATES AND THE EFFICACY OF A NOVEL SOMATOSTATIN-RECEPTOR GUIDED ANTIBODY-DRUG CONJUGATE: PERSPECTIVES ON CLINICAL RESPONSE?

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Background: Patient-derived xenografts (PDXs) are invaluable tools for testing personalized therapeutics on tumors prior to their administration to patients. However, as PDX models for neuroendocrine tumors (NETs) are largely lacking, we have developed a three-dimensional (3D) flow-perfusion polydimethylsiloxane (PDMS) bioreactor model for the purpose of culturing tumor surrogates from patient-derived NET samples. This work evaluates the length of time that surrogates were successfully cultured ex vivo, and the response of surrogates to a novel antibody-drug conjugate (ADC).

Methods: 18 Patient-derived NET samples (G1 n=7, G2 n=7, GX n=4) were implanted into bioreactors, and cultured. Surrogates were incubated with the fluorescent dye IR-783 before fluorescence imaging with an In Vivo Imaging System (IVIS). Growth was defined as increased radiant efficiency on imaging. Further, a G2 pancreatic NET sample was implanted into four bioreactors. Two surrogates were treated with ADC comprised of a potent anti-mitotic Monomethyl auristatin E, linked to an antibody to somatostatin receptor 2 (SSTR2), a NET-specific target on the cell membrane. Growth rate/viability and response to ADC treatment were assessed by incubating surrogates with IR-783 and the RealTime-Glo™ AnnexinV Apoptosis and Necrosis Assay (Promega) respectively, prior to daily IVIS imaging over six days. Histologic sections of the original sample were stained to assess SSTR2 expression. Surrogates derived from a NET xenograft (BON-1 cells) were likewise evaluated.

Results: The mean duration of surrogate growth was 33.5 days. No statistically significant difference existed in surrogate growth for primary gastroenteropancreatic NETs vs. metastases (t = -0.12, df = 14, p = 0.906). Patient-derived NET bioreactors treated with ADC exhibited much higher degrees of apoptosis (13-fold, 9-fold) and necrosis (2.5-fold, 1.6-fold). Similarly, treated BON-1 surrogates exhibited less proliferation (1.2-fold, 1.9-fold) and higher apoptosis (1.5-fold, 1.1-fold) than controls. In all cases, response to ADC treatment correlated with SSTR2 positivity.

Conclusions: Patient-derived NET surrogates can be reliably cultured within the bioreactor system for up to 33 days, regardless of metastatic status. The bioreactor model can be used to evaluate the efficacy of antibody-guided molecular chemotherapy ex vivo and may be particularly useful for predicting clinical responses in patients not eligible for clinical trials due to deteriorating health.
31. OVEREXPRESSION OF SOMATOSTATIN RECEPTOR TYPE 2 (SSTR2) IN NEUROENDOCRINE TUMORS FOR IMPROVED [68GA] DOTATATE IMAGING AND TREATMENT

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Background: Neuroendocrine tumors (NETs) can be found in various sites throughout the body. These tumors are often slow growing with low metabolic activity, making them particularly difficult to image with the current imaging standards. However, a new technique for NET imaging using PET/CT with radiolabeled somatostatin analogs is becoming more common, as many NETs overexpress somatostatin receptor subtype 2 (SSTR2). Unfortunately, patients with high-grade NETs often have a diminished level of SSTR2 and are not eligible for this imaging. We have found that the histone deacetylase inhibitors (HDACi) thailandepsin A (TDP-A) and valproic acid (VPA) can upregulate the expression of SSTR2 in NET cells and xenografts for improved detection and treatment.

Methods: To evaluate the effect of HDACi’s on SSTR2 expression at the mRNA and protein level in NET cell lines, qPCR and western blotting was performed. The effect of TDP-A on SSTR2-based imaging was investigated by both an image stream and flow cytometry analysis on NET cells pre-treated with TDP-A, followed by the detection of octreotide (OCT, somatostatin analog with high binding affinity to SSTR2). Changes in SSTR2 expression in NET xenografts before and after TDP-A treatment were imaged using [68Ga]DOTATATE small animal PET/CT. Conclusively, IHC staining was used to further confirm increased SSTR2 incidence in xenografts.

Results: The functional upregulation of somatostatin receptor subtype 2 (SSTR2) in NETs after HDACi (TDP-A or VPA) treatment was confirmed through in vitro experiments and small animal PET/CT imaging using [68Ga]DOTATATE. The HDAC inhibitors TDP-A and VPA increased SSTR2 transcription and protein expression in various NET cell lines. Image stream analysis showed improved binding of OCT-Cy5 in NET cells treated with TDP-A for 12 hours and flow cytometry confirmed a 2-fold increase in SSTR2 prevalence on the cell surface after TDP-A treatment. Furthermore, IHC staining performed on NET xenografts showed increased density of SSTR2 after TDP-A treatment. PET/CT imaging with [68Ga] DOTATATE confirmed the ability to enhance radiopeptide uptake in NET xenografts after treatment with TDP-A.

Conclusions: This study demonstrates a new method to improve high-grade NET imaging and potential treatments through SSTR2 targeting, which can help more accurately diagnose and treat NET patients.
32. DUAL INHIBITION OF BRAF AND MEK INCREASES SODIUM IODIDE SYMPORTER EXPRESSION IN PATIENT-DERIVED PAPILLARY THYROID CANCER CELLS IN VITRO

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Background: The majority of papillary thyroid cancers (PTC) are driven by acquired mutations, typically in the BRAF or RAS genes, that aberrantly activate the mitogen activated protein kinase (MAPK) pathway. This leads to malignant transformation, de-differentiation, and decrease of sodium-iodide symporter (NIS) expression, resulting in resistance to radioactive iodine therapy. We sought to determine whether inhibition of aberrant MAPK-signaling can restore NIS expression.

Methods: We identified an optimal dosing regimen of dabrafenib (BRAF inhibitor) and trametinib (MEK inhibitor) using BCPAP cells, a BRAF V600E-mutant human PTC cell line. Next, we prospectively developed primary cultures of PTCs and benign adenomas derived from operative specimens and applied drug treatment from 24-48 hours. Samples were genotyped to identify BRAF, HRAS, NRAS and KRAS mutations. We performed Western blotting to measure MAPK activity via p-ERK levels and RT-qPCR to measure NIS expression after treatment.

Results: Pilot experiments in BCPAP cells demonstrated optimal upregulation in NIS levels by qPCR with doses of dabrafenib at 0.5uM or 1.0uM and trametinib at 0.25uM, but the combination was about twice as effective as the best single treatment, trametinib at 0.25uM (fold-change 6.1 ± 1.7 vs. 2.6 ± 0.2, respectively). Dabrafenib alone resulted in only mild decreases in p-ERK levels, whereas trametinib treatment alone or in combination abolished p-ERK signaling. In the primary culture experiments, 23 patient specimens were included: 19 PTCs and 4 adenomas. BRAF V600E mutations were identified in 14/19 (73.6%) PTCs; the remainder were BRAF and RAS wildtype. In human PTC-derived primary cultures, dual treatment with dabrafenib and trametinib increased NIS expression (fold-change 3.7 ± 0.8), while single treatment with dabrafenib did not (fold-change 1.2 ± 0.3). This effect was unique to PTC cells; benign adenomas treated with dabrafenib and trametinib showed no increase in NIS expression (FC 1.1 ± 0.3).

Conclusions: BRAF inhibition with dabrafenib neither eliminated aberrant MAPK signaling nor increased NIS expression in patient-derived PTC cells. Dual treatment with BRAF and MEK inhibitors significantly upregulated NIS expression, suggesting that BRAF inhibition alone may be insufficient to induce NIS upregulation in PTC. This effect was cancer-specific; adenomas did not show similar NIS upregulation.
NOVEL USE OF A CLIA-CERTIFIED CDKN2C LOSS ASSAY IN SPORADIC MEDULLARY THYROID CARCINOMA

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Background: The cyclin-dependent-kinase inhibitors (CDKN)/retinoblastoma pathway has been implicated in sporadic medullary thyroid carcinoma (sMTC) tumorigenesis. Somatic CDKN2C loss has been retrospectively associated with decreased overall survival in MTC patients, independent of RET status. In this study, we evaluated CDKN2C loss in a prospective clinical environment using a novel CLIA-certified assay to confirm its association with aggressive disease and interrogate response to targeted therapy.

Methods: Patients with advanced sMTC underwent tumor genotyping for the purpose of management of targeted therapy, including evaluation of CDKN2C loss using a FISH-based CLIA-certified assay.

Results: Tumors from fifty-eight patients with advanced sMTC were evaluated for CDKN2C loss from 5/2017 to 10/2018. Twenty-eight patients had haploid loss (1n) (48.2%), 27 (46.6%) were diploid wildtype (2n), and the test was indeterminate in 3 cases (5.2%). Eleven (19%) patients presented with M1 disease and 40 (69%) developed distant metastasis. Patients with CDKN2C loss had a shorter time to development of distant metastasis compared to those with wildtype CDKN2C (21 versus 71 months, p=.04). Of the 28 patients treated with targeted therapies, median time from diagnosis to initiating therapy was 52 months in those with CDKN2C loss vs. 103 months in wildtype patients (p=0.14). No association was seen in CDKN2C status and radiographic response to first targeted agent (p=1), duration of therapy (p=1), or likelihood of transition to a second targeted agent (p=1). Among patients treated with targeted therapy, patients with CDKN2C loss had a median PFS of 31 months, compared to 56 months in those wildtype patients (p=.40).

Conclusions: This study represents the first evaluation in the clinical setting of CDKN2C loss in MTC. In a cohort of patients with advanced disease, this alteration is frequent with half of the tumors harboring a loss. CDKN2C loss may be associated with decreased time to distant metastasis and decreased time to requiring therapy, both measures of disease aggressiveness, with a trend towards shorter PFS for patients on targeted therapy. A larger cohort and longer follow-up will be required to assess the impact of CDKN2C loss on response to treatment and if patients might receive additional benefit from the inclusion of a CDK inhibitor.
34. NOVEL GENE PANEL AS A PROGNOSIS MARKER FOR ACTIVE SURVEILLANCE IN THYROID CANCER

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Background: Treatment for the low risk papillary thyroid cancer (PTC) may lead to unnecessary consequences as a surgery and unnecessary cost. Thus, an active surveillance strategy was recently proposed as an option for managing patients with low-risk PTCs. The aim of this study was to identify a gene panel to predict the lymph node metastasis to help with the decision making for active surveillance.

Methods: The Cancer Genome Atlas database containing patients with PTC from 19 medical centers provided 495 samples were analyzed. To define a gene signature correlated with the lymph node stage (N0 or N1), a learning machine model was used. A Receptive Operative Curve (ROC) analysis was used to estimate the strength of the prediction through the calculation of the Area Under Curve (AUC). To define the correlation of the genes’ signature with clinical parameters, Kruskal-Wallis test was performed. Finally, a survival analysis using the survival R package was done.

Results: We identified a panel of 25 genes with an AUC of 0.83 for the A score, which can differentiate the N0 and N1 PTC samples with a p-value inferior to 2x10^-16. The gene panel is significantly correlated with all other aggressive features. Interestingly, the panel was more powerful in predicting metastasis in patients with T1 tumors (p=4.75E-4). The panel also stratified specimens according to extrathyroidal extension (p= 2.41E-13). The panel significantly predicts the DFS of samples with no lymph node metastasis (p=0.026283).

Conclusions: This novel 25-gene panel is a potential prognostic marker for selection of patients for active surveillance. The panel can accurately predict lymph node metastasis and recurrence in patients with low risk PTC.
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Thomas Szabo Yamashita1, Alaa Sada1, Irina Bancos2, Megan G Berger3, William F Young2, Benzon M Dy3, David R Farley1, Melanie L Lyden3, Geoffrey B Thompson3, Travis J Mckenzie3

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Omair A Shariq1, Katherine A Bews2, Benzon M Dy1, Melanie L Lyden1, David R Farley1, Geoffrey B Thompson1, Elizabeth B Habermann2, Travis J McKenzie1

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Michael D Traynor1,2, Alaa Sada1, Geoffrey B Thompson1, Christopher R Moir2, Irina Bancos1, David R Farley1, Benzon M Dy1, Melanie L Lyden1, Elizabeth B Habermann4, Travis J McKenzie1

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♦ 04. PET FOR INDETERMINATE ADRENAL MASSES - A RETROSPECTIVE REVIEW

Scott Assen1, Denise Chan1, Stephanie Nguyen1, Sanjay Bansal1, Janice Pasieka2

1University of Calgary, 2Department of Surgery, University of Calgary

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1University Medical Center Utrecht, 2Weill Cornell Medical College, 3University of California San Francisco, 4Boston University School of Medicine and Department of Graduate Medical Sciences, 5New York Presbyterian Columbia University, 6University of Chicago Medi-
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Vikram D Krishnamurthy1, Robert Naples1, Sam Zolins1, Judy Jin1, Eren Berber1, Allan Siperstein1, Joyce J Shin1

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Taylor C Brown1, Jianliang Man1, Norman G Nicolson1, Reju Korah1, Tobias Carling1

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Isabelle Holscher1, Anton F. Engelsman1, Els J.M. Nieveen van Dijkum1

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Philip W Smith1, Adriana Ramirez1, Anna Fashandi1, John B Hanks1, John R Potts2

1Surgery, University of Virginia Medical Center, 2Accreditation Council for Graduate Medical Education

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Kareem M Ibraheem1, Marcus Allan Hoo2, Lena A Hummel2, Hania Adib2, Mohamed I Abdelgawad1, Thomas M Yusin2, Therese M Nguyen2, Mary I Killacky1, Emad A Kandil1

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1NorthShore University

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Tal Yalon1, Asher Rottenberg2, MARIYA NEYMARK3, Liat Appelbaum4, Yoram Kluger3,5, Haggi Mazeh6, Michal Mekel3,5

1Chaim Sheba Medical Center, 2Hadassah-Hebrew University, 3Rambam-Health Care Campus, 4Hadassah-Hebrew University Medical Center, Ein Kerem, 5Technion-Israel Institute of Technology, 6Hadassah-Hebrew University Medical Center, Mount Scopus

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Dirk-Jan van Beek1, Sjoerd Nell1, Pierre Goudet, on behalf of the GTE2, Detlef K. Bartsch3, Nancy D. Perrier4, Maria Luisa Brandi5, Naris Nilubol6, Laurent Brunaud7, Jesse D. Pasternak8, Cord Sturgeon9, Inne H.M. Borel Rinke10, Gerlof D. Valk, on behalf of the DutchMEN study group (DMSG)10, Menno R. Vriens1

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1Department of Endocrine Surgical Oncology, University Medical Center Utrecht, 2Department of Endocrine Oncology, University Medical Center Utrecht, 3Department of Internal Medicine, Erasmus Medical Center Rotterdam, 4Department of Endocrinology, Radboud
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Alexandria MdDow¹, Megan Sauke¹, Susan C Pitt²

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Frances T. Lee¹, Anil Dangi², Melanie Burnette², Xunrong Luo¹,³

¹Northwestern University, ²Nephrology, Duke University, ³Duke University

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Angelica M Silva Figueroa¹, Kenneth R Hess², Si-Yuan Wu³, Dhaval T Patel⁴, Naris Niliubol⁴, Sa T Nguyen⁵, Kelly L McCoy⁵, Sally E Carty⁵, Sarah B Fisher⁶, Michelle Williams⁷, Elizabeth G Grubbs³, Paul H Graham³, Jeffrey E Lee³, MacKenzie Shindorf⁴, William F Simonds⁷, Jenny E Blau⁷, Naifa L Busaidy³, Nancy D Perrier³

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Brian C Ruhle¹, Scott Grant², Salman Alsafran¹, Tanaz Vaghaiwalla¹, Edwin Kaplan¹, Peter Angelos¹, Raymon Grogan³

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Yufei Chen1, Carolyn Seib2, Jessica Gosnell2, Wen Shen2, Quan-Yang Duh2, Insoo Suh2

1Cedars-Sinai Medical Center, 2Surgery, University of California San Francisco

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1Surgery, Weill Cornell Medical Center, 2Weill Cornell Medical Center, 3NewYork-Presbyterian Brooklyn Methodist Hospital

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Lindsay E. Kuo1, Sarah Bird2, Carrie Lubitz2, T.K. Pandian2, Sareh Parangi2, Richard Hodin2, Antonia Stephen2

1Temple University, 2Massachusetts General Hospital

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Shravan Leonard-Murali1, Tommy Ivanics1, Xiaoxia Han2, Christopher P Steffes3, David S Kwon1, Rupen Shah3

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1Endocrine Surgery, University of California San Francisco, 2Radiology, University of California San Francisco, 3University of Utrecht

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Catherine Denkler1, Chang Liu1, Erica Emery1, Devon Collins1, Anthony Visioni1

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Steven Craig¹, Andrew Bysice², Shamir Chandarana³, Janice Pasieka⁴

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Deepak Abraham¹ Swarna Azaria¹, Anish Cherian¹, Paul Jacob¹, Pranay Gaikwad¹

¹Christian Medical College, Vellore, India

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Danilea M Carmona Matos¹ Jason Whitt², Nicole E Avalon², Bill J Baker², Herbert Chen², Renata Jaskula-Sztul²

¹Surgery, University o Alabama at Birmingham School of Medicine, ²Surgery, University of Alabama at Birmingham School of Medicine, ³Chemistry, University of South Florida

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Matilda Annebäck¹ Jakob Hedberg¹, Peter Stålberg¹, Olov Norlén¹

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Jessica Limberg¹, Timothy M Ullmann¹, Dessislava Stefanova¹, Jessica L Buicko¹, Brendan M Finnerty¹, Rasa Zarnegar¹, Thomas J Fahey¹, Toni Beninato²

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Irene Lou¹ Anna Aronova¹, Gustavo Fernandez-Ranvier¹, Hyunsuk Suh¹,² Aida Taye¹,³, Randall P Owen¹, William B Inabnet¹,²

¹Mount Sinai Hospital, ²Mount Sinai Beth Israel, ³Mount Sinai West
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Jessica Y Liu1,2, Snehal G Patel1, Collin J Weber1, Neil D Saunders1, Jyotirmay Sharma1
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Luca Sessa1, Carmela De Crea2, Serena Elisa Tempera1, Celestino Pio Lombardi2, Marco Raffaelli2, Rocco Bellantone2
1Fondazione Policlinico Universitario A. Gemelli IRCCS, 2Division of Endocrine and Metabolic Surgery, Fondazione Policlinico Universitario A. Gemelli IRCCS, Università Cattolica del Sacro Cuore

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1General Surgery, Mayo Clinic Arizona, 2Transplant Surgery, Mayo Clinic Arizona, 3Endocrinology, Mayo Clinic Arizona

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Joon-Hyop Lee1, Yoo Seung Chung1, Ka Hee Yi2, Young Jun Chai3
1Surgery, Gachon University College of Medicine, 2Internal Medicine, Seoul National University Boramae Medical Center, 3Surgery, Seoul National University Boramae Medical Center

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1New York Presbyterian Hospital: Weill Cornell Medical Center, 2Department of Surgery, Weill Cornell Medicine, 3Weill Cornell Medicine, 4Boyle Thompson Institute Mass Spectrometry Center, Cornell University
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41. ASSESSING PROVIDER ACCURACY AND DECISION-MAKING FOR EXTENT OF SURGERY IN INDETERMINATE THYROID NODULES

Alexandria D McDow¹, Joseph R Imbus¹, Priya H Dedhia¹, Susan C Pitt¹, Kristin L Long¹, Rebecca S Sippel¹, David F Schneider¹

¹Surgery, University of Wisconsin

42. COMPLETION THYROIDECTOMY FOR PAPILLARY THYROID CANCER: ARE TWO OPERATIONS BETTER THAN ONE?

Priya H Dedhia¹, Alexandria D McDow¹, Susan C Pitt¹, David F Schneider¹, Rebecca S Sippel¹, Kristin L Long¹

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43. SURGERY FOR LOCO-REGIONAL RECURRENCE OF DIFFERENTIATED THYROID CANCER CAN OFFER LONG-TERM CONTROL EVEN IN SETTING OF DISTANT METASTATIC DISEASE

Kara K Rossfeld¹, Sahana Rao¹, Pamela Brock¹, Lawrence A Shirley¹, John E Phay¹

¹The Ohio State University Wexner Medical Center

44. ADVANCED MACHINE LEARNING IMPROVES PREDICTION OF PATIENT-LEVEL OUTCOMES AFTER THYROIDECTOMY

Carolyn D Seib¹, James Roose², Alan E Hubbard², Wen T Shen¹, Jessica E Gosnell¹, Sanziana A Roman³, Julie Ann Sosa³, Quan-Yang Duh³, Insoo Suh³

¹Department of Surgery, University of California, San Francisco, ²Department of Biostatistics, University of California, Berkeley, ³University of California, San Francisco

45. SPECIALIZED PREOPERATIVE CERVICAL ULTRASOUND IS NECESSARY TO DETERMINE THE EXTENT OF SURGERY FOR APPARENT LOW-RISK PAPILLARY THYROID CANCER

Fnu Shashpal¹, Denise Carneiro-Pla², Timothy Lyons¹, Louis Luttrell¹, Mahsa Javid²

¹Endocrinology, Medical University of South Carolina, ²Surgery, Medical University of South Carolina
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