Top 10 Advances in GI Pathology

David Lewin MD
Medical University of South Carolina

MUSC Health
DIGESTIVE DISEASE CENTER
No Disclosures
Overview

• Top Articles/ presentations in the following areas
  – Imaging (3)
  – Molecular (2)
  – Therapeutics (3)
  – Surgical pathology (2)
Most Significant GI Advances are not Presented at Pathology Meetings or Journals

• Digestive Disease Week
  – Combined meeting of AGA, AASLD, ASGE, SSAT
  – 15,000+ attendees
    • 4331 Posters
      – 340 (searching for “pathology”)

• ASCO
  – 30,000+ attendees
    • 21,000 abstracts
    • 970 GI

• USCAP
  – 1960 Posters
    • 137 GI Posters
    • 94 Liver and Pancreas Posters

• Impact Factor
  – NEJM: 53.48
  – Gastroenterology: 12.03
  – Hepatology: 10.885
  – Gut: 10.61
  – J. Hepatology: 7.4
  – Am J Hepatology: 6.882
  – Am J Pathology: 5.224
  – AJSP: 4.106
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#10 to # 8

- Imaging abstracts
- Toward a “Optical Biopsy”
- Threats to pathology
Validation of the Narrow Band Imaging International Colorectal Endoscopic (NICE) Classification for prediction of colorectal polyp histology

David G. Hewett; Douglas K. Rex; Tonya Kaltenbach; Thierry Ponchon; Yasushi Sano; Brian P. Saunders; Roy M. Soetikno; Shinji Tanaka

1. Indiana University School of Medicine, Indianapolis, IN, USA; 2. Hospital Edouard Herriot, Lyon, France; 3. Sano Hospital, Kobe, Japan; 4. St. Mark’s Hospital, London, UK; 5. Veterans Affairs Palo Alto Health Care System, Palo Alto, CA, USA; 6. Hiroshima University Hospital, Hiroshima, Japan.

### TABLE 1: NBI International Colorectal Endoscopic (NICE) classification

<table>
<thead>
<tr>
<th>TYPE 1</th>
<th>TYPE 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Color</strong></td>
<td>Same or lighter than background</td>
</tr>
<tr>
<td><strong>Vessels</strong></td>
<td>None, or isolated lacy vessels may be present coursing across the lesion</td>
</tr>
<tr>
<td><strong>Surface pattern</strong></td>
<td>No pattern or dark spots surrounded by white</td>
</tr>
<tr>
<td><strong>Most likely pathology</strong></td>
<td>Hyperplastic</td>
</tr>
</tbody>
</table>

**FIGURE 1: Representative exemplar images**

- Exemplar hyperplastic polyp
- Exemplar adenoma
- Exemplar surface patterns:
  - No vessels
  - Isolated lacy vessels coursing across the lesion
  - Thick brown vessels surrounding white structures
Narrow Band Imaging

• Short wavelength, narrow-bandwidth “blue light”
  – Provided at a push of the button on scope
• Enhances mucosal detail and vascular structures
  – Allows assessment of microvascular density
    • Increased angiogenesis appears darker
Barrett Esophagus

Barrett's Epithelium - esophagus

Barrett's Epithelium - esophagus
**Figure 1.** Endoscopic narrow-band imaging photographs of adenomas. A, Polyp from training images (Appendix, page 36, available online at www.gejournal.org). B, Polyp 17 from posttest images (Appendix, page 51). Features include overall brown color, with thick brown vessels surrounding tubular, oval, and variable-shaped white structures (these white structures are presumed to correspond to pits).

**Figure 2.** Endoscopic narrow-band imaging photographs of hyperplastic polyps. A, Polyp 4 from pretest images (Appendix, page 3). B, Polyp 21 from posttest images (Appendix, page 53). Features include pale color (compared with surrounding mucosa), black dot pattern, and absence of vessels.
### Results

**TABLE 2: Performance characteristics of the NICE classification for predicting adenomatous vs hyperplastic histology (medical student raters, n=25)**

<table>
<thead>
<tr>
<th>Criterion</th>
<th>Accuracy</th>
<th>Sensitivity</th>
<th>Specificity</th>
<th>PPV</th>
<th>NPV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Color</td>
<td>71%</td>
<td>49%</td>
<td>93%</td>
<td>88%</td>
<td>65%</td>
</tr>
<tr>
<td>Vessels</td>
<td>86%</td>
<td>79%</td>
<td>92%</td>
<td>92%</td>
<td>83%</td>
</tr>
<tr>
<td>Surface</td>
<td>86%</td>
<td>81%</td>
<td>90%</td>
<td>91%</td>
<td>85%</td>
</tr>
</tbody>
</table>

**TABLE 3: Performance characteristics of the NiCE classification with gastroenterology fellow raters (n=19)**

<table>
<thead>
<tr>
<th>Criterion</th>
<th>Accuracy</th>
<th>Sensitivity</th>
<th>Specificity</th>
<th>PPV</th>
<th>NPV</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>All predictions</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Color</td>
<td>88%</td>
<td>84%</td>
<td>92%</td>
<td>92%</td>
<td>87%</td>
</tr>
<tr>
<td>Vessels</td>
<td>90%</td>
<td>86%</td>
<td>94%</td>
<td>94%</td>
<td>88%</td>
</tr>
<tr>
<td>Surface</td>
<td>91%</td>
<td>88%</td>
<td>94%</td>
<td>94%</td>
<td>89%</td>
</tr>
<tr>
<td>Overall prediction</td>
<td>91%</td>
<td>89%</td>
<td>93%</td>
<td>93%</td>
<td>90%</td>
</tr>
<tr>
<td><strong>High confidence predictions</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Color</td>
<td>93%</td>
<td>90%</td>
<td>97%</td>
<td>96%</td>
<td>93%</td>
</tr>
<tr>
<td>Vessels</td>
<td>96%</td>
<td>93%</td>
<td>98%</td>
<td>98%</td>
<td>94%</td>
</tr>
<tr>
<td>Surface</td>
<td>96%</td>
<td>94%</td>
<td>98%</td>
<td>98%</td>
<td>95%</td>
</tr>
<tr>
<td>Overall prediction</td>
<td>96%</td>
<td>95%</td>
<td>97%</td>
<td>97%</td>
<td>96%</td>
</tr>
</tbody>
</table>
Optical diagnosis of small colorectal polyps at routine colonoscopy (Detect InSpect ChAracterise Resect and Discard; DISCARD trial): a prospective cohort study

Ana Ignjatovic, James E East, Noriko Suzuki, Margaret Vance, Thomas Guenther, Brian P Saunders
Figure 1: An adenoma as seen with white light (A) and narrow-band imaging (B) and a hyperplastic polyp as seen with white light (C) and narrow-band imaging (D)
## Results

<table>
<thead>
<tr>
<th></th>
<th>Polyps ≤ 5 mm N (%)</th>
<th>Polyps 6–9 mm N (%)</th>
<th>p value*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>296</td>
<td>67</td>
<td></td>
</tr>
<tr>
<td>Optical diagnosis made</td>
<td>271 (92%)</td>
<td>52 (78%)</td>
<td>0.002</td>
</tr>
<tr>
<td>Polyps not retrieved</td>
<td>37 (13%)</td>
<td>4 (6%)</td>
<td>0.22</td>
</tr>
<tr>
<td>Histology reported as normal</td>
<td>26 (9%)</td>
<td>0 (0%)</td>
<td>0.001</td>
</tr>
<tr>
<td>Correct optical diagnosis</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adenomas</td>
<td>144/155 (sensitivity 93%)</td>
<td>42/43 (sensitivity 98%)</td>
<td>0.46</td>
</tr>
<tr>
<td>Hyperplastic polyps</td>
<td>51/58 (specificity 88%)</td>
<td>4/4 (specificity 100%)</td>
<td>1.00</td>
</tr>
<tr>
<td>Accuracy of optical diagnosis</td>
<td>92%</td>
<td>98%</td>
<td>0.21</td>
</tr>
</tbody>
</table>

*Fisher’s exact test.

*Table 3: Difference in diagnosis according to polyp size (only polyps with optical and histological diagnosis included)*

82 patients

- 80 patients by BSG and 78 by US guidelines had a surveillance interval the same using optical diagnosis and histopathology
- 2 patients by BSG and 1 by US guidelines had a later follow-up after formal histopathology*
- 0 patients by BSG and 3 by US guidelines had a shorter follow-up after formal histopathology
Comparison of Probe-Based Confocal Laser Endomicroscopy With Virtual Chromoendoscopy for Classification of Colon Polyps

ANNA M. BUCHNER,* MUHAMMAD W. SHAHID,* MICHAEL G. HECKMAN,‡ MURLI KRISHNA,§ MARWAN GHABRIL,¶ MUHAMMAD HASAN,* JULIA E. CROOK,‡ VICTORIA GOMEZ,‖ MASSIMO RAIMONDO,* TIMOTHY WOODWARD,* HERBERT C. WOLFSEN,* and MICHAEL B. WALLACE*

*Department of Gastroenterology and Hepatology, ‡Biostatistics Unit, §Departments of Pathology and ‖Internal Medicine, Mayo Clinic, Jacksonville, Florida; and ¶Department of Gastroenterology and Hepatology, Indiana University, Indianapolis, Indiana
Figure 1. Confocal microscopy probe based system (Cellvizio).
Figure 3. Confocal images of colonic lesions. (A) Normal colon mucosa (probe-based confocal laser endomicroscopy [pCLE] view). (B) Hyperplastic lesion (endoscopic view). (C) Hyperplastic lesion (H&E staining). (D) Hyperplastic lesion (pCLE view, mosaic image).

Figure 2. Images of tubular adenoma. (A) Endoscopic image. (B) FICE image. (C) Confocal image. (D) Histopathology image.
Results

<table>
<thead>
<tr>
<th>Measure</th>
<th>GS simplified</th>
<th>Virtual chromoendoscopy</th>
<th>Difference: pCLE – virtual</th>
<th>$P$ value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Fraction (%)</td>
<td>95% CI</td>
<td>Fraction (%)</td>
<td>95% CI</td>
</tr>
<tr>
<td>GS simplified</td>
<td>74/81 (91)</td>
<td>83–96</td>
<td>62/81 (77)</td>
<td>66–85</td>
</tr>
<tr>
<td>Sensitivity</td>
<td>29/38 (76)</td>
<td>60–89</td>
<td>27/38 (71)</td>
<td>54–85</td>
</tr>
<tr>
<td>Specificity</td>
<td>80/91 (88)</td>
<td>79–94</td>
<td>69/91 (76)</td>
<td>66–84</td>
</tr>
<tr>
<td>Specificity</td>
<td>25/28 (89)</td>
<td>72–98</td>
<td>24/28 (86)</td>
<td>67–96</td>
</tr>
</tbody>
</table>

NOTE. $P$ values result from McNemar’s test. Simplified histopathology is identical to modified histopathology, except hyperplastic lesions on simplified histopathology of size ≥10 mm were considered as neoplastic lesions on modified histopathology.

CI, confidence interval; GS, gold standard; pCLE, probe-based confocal laser endomicroscopy.

GS = Gold standard
Simplified = compared to histology
Modified = Neoplastic = adenoma + all polyps greater than 1 cm
# 7 and 6

- Molecular
  - KRAS and HER2/neu
- Opportunities for pathology
Cetuximab and Chemotherapy as Initial Treatment for Metastatic Colorectal Cancer

Eric Van Cutsem, M.D., Ph.D., Claus-Henning Köhne, M.D., Erika Hitre, M.D., Ph.D., Jerzy Zaluski, M.D., Chung-Rong Chang Chien, M.D., Anatoly Makhson, M.D., Ph.D., Geert D’Haens, M.D., Ph.D., Tamás Pintér, M.D., Robert Lim, M.B., Ch.B., György Bodoky, M.D., Ph.D., Jae Kyung Roh, M.D., Ph.D., Gunnar Folprecht, M.D., Paul Ruff, M.D., Christopher Stroh, Ph.D., Sabine Tejpar, M.D., Ph.D., Michael Schlichting, Dipl.-Stat., Johannes Nippgen, M.D., and Philippe Rougier, M.D., Ph.D.
• Phase 3 trial: Cetuximab combined with Irinotecan in first-line therapy for metastatic colorectal cancer (CRYSTAL)
  – FOLFIRI (irinotecan, fluorouracil, leucovorin)
  – Cetuximab (Erbitux): Immunoglobulin G1 monoclonal antibody against epidermal growth factor receptor (EGFR)

• Subgroup analysis for KRAS mutational status
  – 540 patients (of 1200 from initial study)
    • 64% wild-type KRAS
    • KRAS mutations in codons 12 and 13 via PCR
Bottom Line

- For tumor response: Significant benefit in KRAS wild type tumors ($p=0.3$)
- No significant benefit for progression free survival ($p=0.7$) or over-all survival ($p=0.44$)
Trastuzumab in combination with chemotherapy versus chemotherapy alone for treatment of HER2-positive advanced gastric or gastro-oesophageal junction cancer (ToGA): a phase 3, open-label, randomised controlled trial

Prof Yung-Jue Bang MD a †✉, Prof Eric Van Cutsem MD b †, Andrea Feyereislova MD c, Prof Hyun C Chung MD d, Prof Lin Shen MD e, Akira Sawaki MD f, Florian Lordick MD g, Atsushi Ohtsu MD h, Yasushi Omuro MD i, Taroh Satoh MD i, Giuseppe Aprile MD k, Evgeny Kulikov MD l, Julie Hill PhD m, Michaela Lehle PhD c, Prof Josef Rüschoff MD n, Prof Yoon-Koo Kang MD o, for the ToGA Trial Investigators†
• Trastuzumab: monoclonal antibody against human epidermal growth factor receptor 2 (HER2 or ERBB2)
• 594 pts randomized to standard chemo (capecitabine or fluorouracil + cisplatin) vs standard chemo + iv trastuzumab
• HER2 + by 3+ immunohistochemistry or FISH + — 22% (810 of 3665 cancers)
Table 1. Immunohistochemistry scoring for HER2 in gastric and gastro-oesophageal junction cancer, by type of diagnostic specimen

<table>
<thead>
<tr>
<th>Surgical specimen staining pattern</th>
<th>Biopsy specimen staining pattern</th>
<th>HER2 overexpression assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 No reactivity or membranous reactivity in &lt;10% of tumour cells</td>
<td>No reactivity or no membranous reactivity in any tumour cell</td>
<td>Negative</td>
</tr>
<tr>
<td>1+ Faint or barely perceptible membranous reactivity in ≥10% of tumour cells; cells are reactive only in part of their membrane</td>
<td>Tumour cell cluster with a faint or barely perceptible membranous reactivity irrespective of percentage of tumour cells stained</td>
<td>Negative</td>
</tr>
<tr>
<td>2+ Weak to moderate complete, basolateral or lateral membranous reactivity in ≥10% of tumour cells</td>
<td>Tumour cell cluster with a weak to moderate complete, basolateral or lateral membranous reactivity irrespective of percentage of tumour cells stained</td>
<td>Equivocal</td>
</tr>
<tr>
<td>3+ Strong complete, basolateral or lateral membranous reactivity in ≥10% of tumour cells</td>
<td>Tumour cell cluster with a strong complete, basolateral or lateral membranous reactivity irrespective of percentage of tumour cells stained</td>
<td>Positive</td>
</tr>
</tbody>
</table>

HER2 = human epidermal growth factor receptor 2 (also known as ERBB2).
# 5 to 3

- Endoscopic Therapy
  - Endoscopic resections
    - Specimens we will receive
  - Radiofrequency Ablation
    - Treatment and alteration of specimens may receive
  - NOTES (natural orifice translumenal endoscopic surgery)
    - Future?
Clinical outcome of endoscopic submucosal dissection versus endoscopic mucosal resection of large colorectal tumors as determined by curative resection

Yutaka Saito · Masakatsu Fukuzawa · Takahisa Matsuda · Shusei Fukunaga · Taku Sakamoto · Toshio Uraoka · Takeshi Nakajima · Hisatomo Ikehara · Kuang-I Fu · Takao Ito · Takahiro Fujii
Methods/ Results

• 145 colorectal tumors treated by ESMD
• 228 treated by EMR
• ESMD
  – Longer procedure time (108 vs 29 min)
  – Higher en bloc resection rate (84% v 33%)
  – Larger resection specimens (37 vs 28 mm)
  – 2 recurrences (2%) vs 33 (14%) with EMR
  – Perforation rate (6%) vs 1.3% with EMR
• 31-34% Adenomas, 66-69% Carcinomas (sm1)
  – sm1 = no invasion deeper than 1,000 um from muscularis mucosa
ESMD
Fig. 3 Conventional endoscopic mucosal resection (EMR) procedures. Conventional EMRs were usually performed using an inject and cut technique with a single-channel colonoscope and snare. Glycerol® was injected into the submucosa of the lesion with a 23-gauge needle and then the lifted lesion was resected using a round snare. A A 35-mm laterally spreading tumor granular (LST-G)-type lesion located in the rectum. B An LST-G between 20 and 40 mm can be treated by endoscopic piecemeal mucosal resection (EPMR) rather than ESD with the area including the large nodule resected first followed by the remaining tumor. C The ulcer bed after a three-piece resection.
Radiofrequency Ablation in Barrett’s Esophagus with Dysplasia

Methods

• Use of HALO (BARRX Medical)
• 191 eligible for review by central pathology
  – 22 did not meet entry criteria
    • 6 upgraded to cancer, 14 downgraded (indef or no dys), 2 neg for IM
• 169 met pathology criteria (LGD or HGD)
• 127 randomized (64 LGD, 63 HGD)
  – 2:1 RF vs sham
Figure 3. Primary Outcomes in the Intention-to-Treat Analysis.

The primary outcomes were complete histologic eradication of intestinal metaplasia in all patients and complete eradication of dysplasia in the subgroup with low-grade dysplasia and in the subgroup with high-grade dysplasia at 12 months.
Implications

• A treatment modality for low grade and high grade dysplasia in BE

• Subsquamous intestinal metaplasia
  – 5.1% after RF
    • Still need screening endoscopy post RF with biopsy of the previous BE segment
NOTES (Natural Orifice Translumenal Endoscopic Surgery)

• First described in a survival porcine model in 2000 at DDW.

• 429 human NOTES case have been published to date
  – 316 transvaginal, 113 transgastric
    • Most with laparoscopic assistance

• DDW 2011
  – 26 abstracts presented
Abstract Topics DDW 2011

• Navigation (9 studies)
  – Visualization of peritoneal cavity and mediastinum
• Closure (5 studies)
  – Endoscopic closure of access to the peritoneal cavity
• Complications (2 studies)
• Tolerance (2 studies)
• Development of therapeutic interventions
  – Cholecystectomy, appendectomy, adhesiolysis, tubal ligation, oophorectomy, gastroenterostomy
  • Ultimate indication has not been found
Direct incision versus submucosal tunneling as the method of creating transgastric accesses for NOTES peritoneoscopy: A randomized controlled trial.

Anthony YB Teoh, Philip WY Chiu, Shannon M Chan, Tiffany CL Wong, James YW Lau, Enders KW Ng

Department of Surgery and Institute of Digestive Diseases, Faculty of Medicine, Prince of Wales Hospital, Chinese University of Hong Kong, Hong Kong SAR, China
Top 2

• Changes in pathology nomenclature and grading
• Neuroendocrine tumors of the gastrointestinal tract
# New WHO 4th edition Classification of Tumours of the Digestive System

**WHO 1980** | **WHO 2000** | **WHO 2010**
---|---|---
I. Carcinoid | 1. Well-differentiated endocrine tumor (WDET)  
2. Well-differentiated endocrine carcinoma (WDEC)  
3. Poorly differentiated endocrine carcinoma/ small cell carcinoma (PDEC) | 1. NET G1 (carcinoid)  
2. NET G2*  
3. NEC G3  
a) large –cell or small cell type

II. Mucocarcinoid


IV. Pseudotumor lesions | 5. Tumor-like lesions (TLL) | 5. Hyperplastic and preneoplastic lesions

---

NET = neuroendocrine tumor- well differentiated; NEC = neuroendocrine carcinoma- poorly differentiated; G = grade; * If Ki67 index exceeds 20%, this NET may be labeled G3

---

Neuroendocrine Tumors

• Histology:
  – Well or Poorly Differentiated
  – Mitotic Count (per 10 HPF)
    • G1 = 2
    • G2 = 2-20
    • G3 = > 20

• Immunohistochemistry:
  – Expression of neuroendocrine markers (chromogranin or synaptophysin)
  – Proliferative activity via Ki-67
    • G1 = < 2%
    • G2 = 2 – 20%
    • G3 = > 20%

• Stage
Pancreatic endocrine tumors: improved TNM staging and histopathological grading permit a clinically efficient prognostic stratification of patients

Aldo Scarpa¹,², William Mantovani³, Paola Capelli¹, Stefania Beghelli¹,², Letizia Boninsega⁴, Rossella Bettini⁴, Francesco Panzuto⁵, Paolo Pederzoli⁴, Gianfranco delle Fave⁵ and Massimo Falconi⁴

¹Department of Pathology, University of Verona, Verona, Italy; ²ARC-NET Center for Applied Research on Cancer, Verona, Italy; ³Department of Medicine and Public Health, University of Verona, Verona, Italy; ⁴Department of Surgical and Gastroenterological Sciences, University of Verona, Verona, Italy and ⁵Department of Digestive and Liver Disease, II School of Medicine, University ‘La Sapienza’, Rome, Italy
Modified TNM
### Table 6 Differences in T code and stage definitions between modified ENETS and AJCC staging systems

<table>
<thead>
<tr>
<th>Code</th>
<th>Modified ENETS–TNM</th>
<th>AJCC–TNM</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td>Limited to the pancreas, &lt; 2 cm</td>
<td>Limited to the pancreas, ≤ 2 cm</td>
</tr>
<tr>
<td>T2</td>
<td>Limited to the pancreas, 2–4 cm</td>
<td>Limited to the pancreas, &gt; 2 cm</td>
</tr>
<tr>
<td>T3</td>
<td>Limited to the pancreas, &gt; 4 cm</td>
<td>Beyond the pancreas, no involved arteries&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>T4</td>
<td>Beyond the pancreas&lt;sup&gt;b&lt;/sup&gt;</td>
<td>Involvement of arteries (unresectable)&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Stage</th>
<th>Modified ENETS–TNM</th>
<th>AJCC–TNM</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>T1–T2 (limited to pancreas, ≤ 4 cm)</td>
<td>T1–T2 (limited to pancreas, any dimension)</td>
</tr>
<tr>
<td>II</td>
<td>T3 (limited to pancreas, &gt; 4 cm)</td>
<td>T3 or N1 (outside of the pancreas)</td>
</tr>
<tr>
<td>III</td>
<td>T4 or N1 (outside of the pancreas)</td>
<td>T4 (involving large arteries, unresectable)</td>
</tr>
<tr>
<td>IV</td>
<td>M1</td>
<td>M1</td>
</tr>
</tbody>
</table>

<sup>a</sup>Celiac axis or the superior mesenteric artery.

<sup>b</sup>Involving any nonpancreatic anatomical structure (including duodenum, bile duct and fat).

### Table 7 Differences in 5- and 10-year survival between modified ENETS and AJCC staging systems

<table>
<thead>
<tr>
<th>Survival</th>
<th>5-year (%)</th>
<th>10-year (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Modified ENETS–TNM</td>
<td>AJCC–TNM&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Stage I</td>
<td>100</td>
<td>75</td>
</tr>
<tr>
<td>Stage II</td>
<td>93</td>
<td>64</td>
</tr>
<tr>
<td>Stage III</td>
<td>65</td>
<td>60</td>
</tr>
<tr>
<td>Stage IV</td>
<td>35</td>
<td>20</td>
</tr>
</tbody>
</table>

<sup>a</sup>AJCC age-adjusted data from Table 24.3 of the AJCC cancer staging manual<sup>22</sup> that is the same Table 2 of Bilimoria<em> et al.</em><sup>23</sup> Percentages have been rounded to the nearest integer.
Summary

• Top Articles/presentations in the following areas
  – Imaging (3)
  – Molecular (2)
  – Therapeutics (3)
  – Surgical pathology (2)