

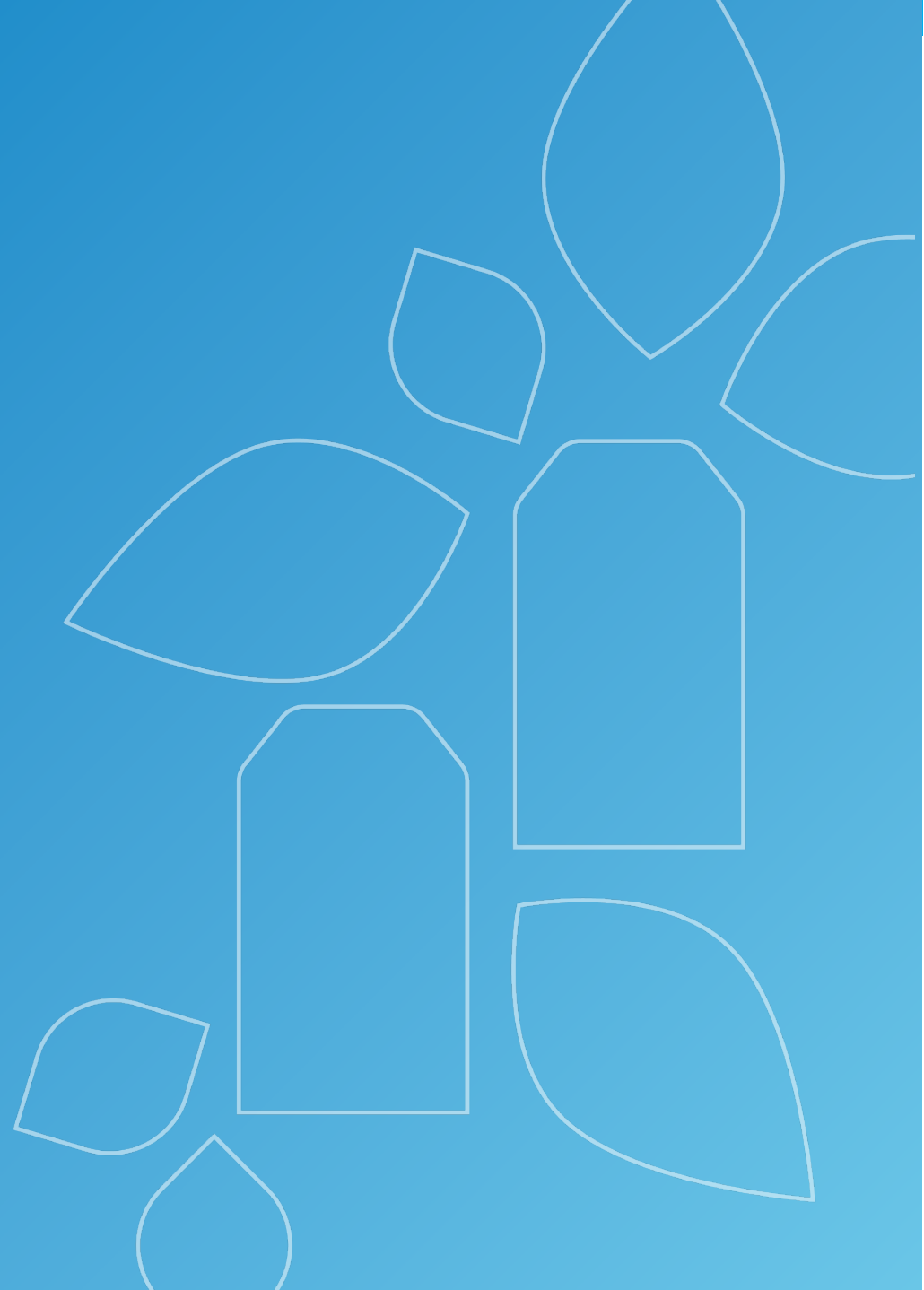


Southeastern Multidisciplinary Approaches to Cancer Symposium

Optimizing Screening in Gastrointestinal Malignancies

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City of Hope Atlanta



Disclosures

I do not have any relevant financial relationships.

This presentation and/or comments will provide a balanced, non-promotional, and evidence-based approach to all diagnostic, therapeutic and/or research related content.



Cultural Linguistic Competency (CLC) & Implicit Bias (IB)

STATE LAW:

The California legislature has passed Assembly Bill (AB) 1195, which states that as of July 1, 2006, all Category 1 CME activities that relate to patient care must include a cultural diversity/linguistics component. It has also passed AB 241, which states that as of January 1, 2022, all continuing education courses for a physician and surgeon **must** contain curriculum that includes specified instruction in the understanding of implicit bias in medical treatment.

The cultural and linguistic competency (CLC) and implicit bias (IB) definitions reiterate how patients' diverse backgrounds may impact their access to care.

EXEMPTION:

Business and Professions Code 2190.1 exempts activities which are dedicated solely to research or other issues that do not contain a direct patient care component.

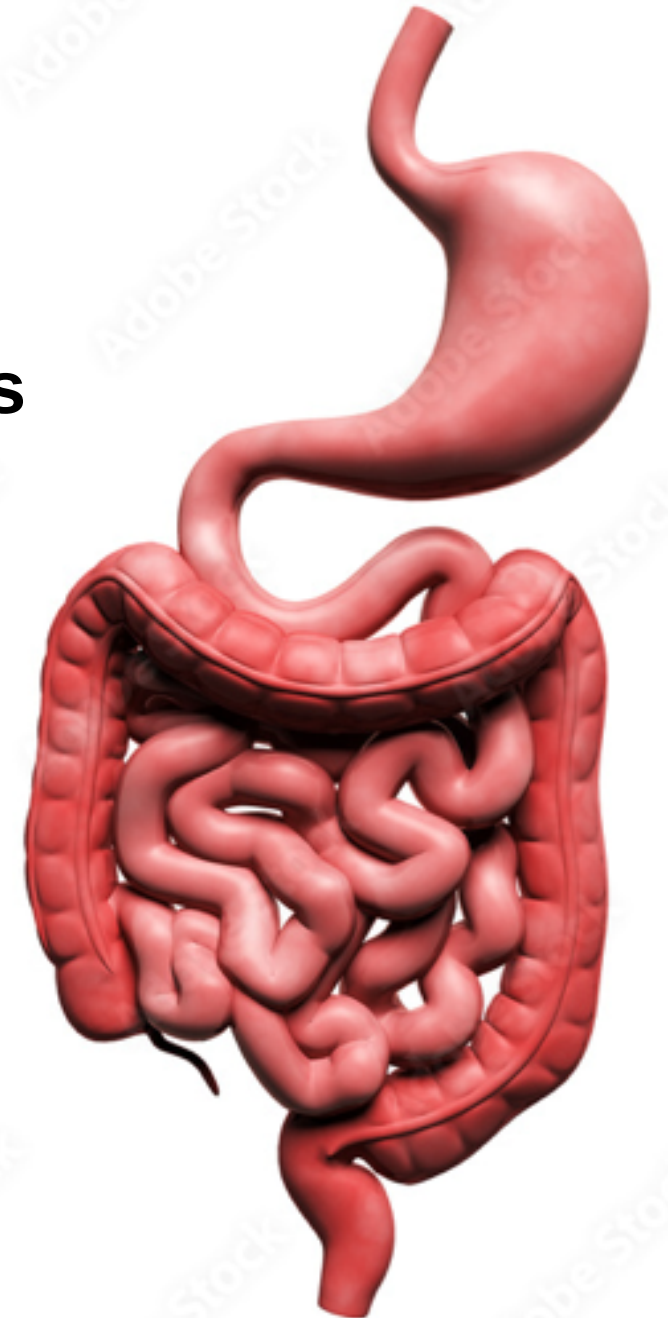
The following CLC & IB components will be addressed in this presentation:

- *Promote culturally and linguistically responsive screening strategies to reduce disparities and improve access for diverse patient populations.*
- *Recognize and mitigate implicit bias in screening practices to ensure equitable delivery of GI cancer prevention and early detection.*



Objectives:

- **Esophageal Cancer / Barrett's Esophagus**
- **Gastric Cancer**
- **Pancreatic / HPB Cancer Screening**
- **Colorectal Cancer Screening**
- **New Advances in AI**



	<u>Esophageal</u>	<u>Gastric</u>	<u>Pancreatic</u>	<u>Colorectal</u>
<u>General Population</u>	USA - No	USA - No	USA - No	USA - Yes
<u>Family History</u>	YES – BE age >40	YES	YES	YES
<u>Special Populations</u>	(SCC) Achalasia; Fanconi anemia (s/p BMT); Personal Hx of Head & Neck CA Achalasia; Previous esophageal caustic injury (EAC) White*; Male*(BE); History of Head/Neck Cancers; History of GERD*; Truncal Obesity;	H. Pylori; Gastric Intestinal Metaplasia 1st Generation Immigrants from (East Asia, Eastern Europe, Andean Latin America) Hereditary Cancer Syndromes (CDH1 – associated hereditary diffuse gastric caner, FAP	Chronic Pancreatitis	Avg Risk Screening 45 High Risk: - Inflammatory Bowel Disease - Family History - Polyposis Syndromes
<u>Genetic Mutations</u>	(SCC) RHBDF2 mutation (Tylosis) – EGD q 1-2 years starting at age 20-30 (SCC) Fanconi anemia – EGD yearly; starting at 18-20 or 10 years s/p BMT	Peutz-Jeghers (STK11) Juvenile polyposis Li-Fraumeni (TP53)	BRCA1 BRCA2 PALB2 ATM CDKN2A MLH1 MSH2 MSH6 PMS2 EPCAM Peutiz-Jeghers (STK11)	Lynch syndrome (LS), Familial adenomatous polyposis (FAP) Attenuated familial adenomatous polyposis (AFAP) <i>MUTYH</i> -associated polyposis (MAP) Cowden’s Syndrome
<u>Method of Screening</u>	- EGD (High definition- white light (HD-WLE) and Narrow Band Imaging (NBI) - Swallowable capsule sponge	EGD at 45 (bundle with Colonoscopy)	EUS	Colonoscopy
<u>Key Limitations</u>	Cost Effectiveness;	Relative Low Incidence	No	Insurance; Non Invasive

Objectives:

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- Gastric Cancer
- Pancreatic / HPB Cancer Screening
- Colorectal Cancer Screening
- New Advances in A.I. for GI



The British Journal of Surgery, BARRETT yr:1950 vol:38 iss:150

pg:175-182
FIG. 234.—This painting is of a typical carcinoma of the œsophagus causing obstruction. It is depicted to emphasize the contrast between this type of stricture and that caused by 'reflux œsophagitis'. The mucous membrane below this squamous-cell carcinoma is squamous-cell in type—that is, the stricture has normal œsophagus proximal and distal to the lesion.

Objectives:

- Esophageal Cancer / Barrett's Esophagus
 - Squamous Cell Cancer
 - Adenocarcinoma



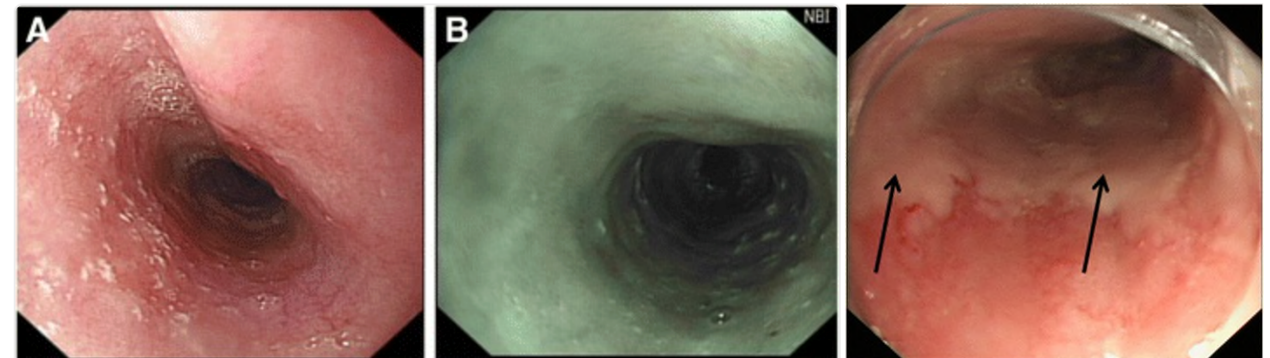
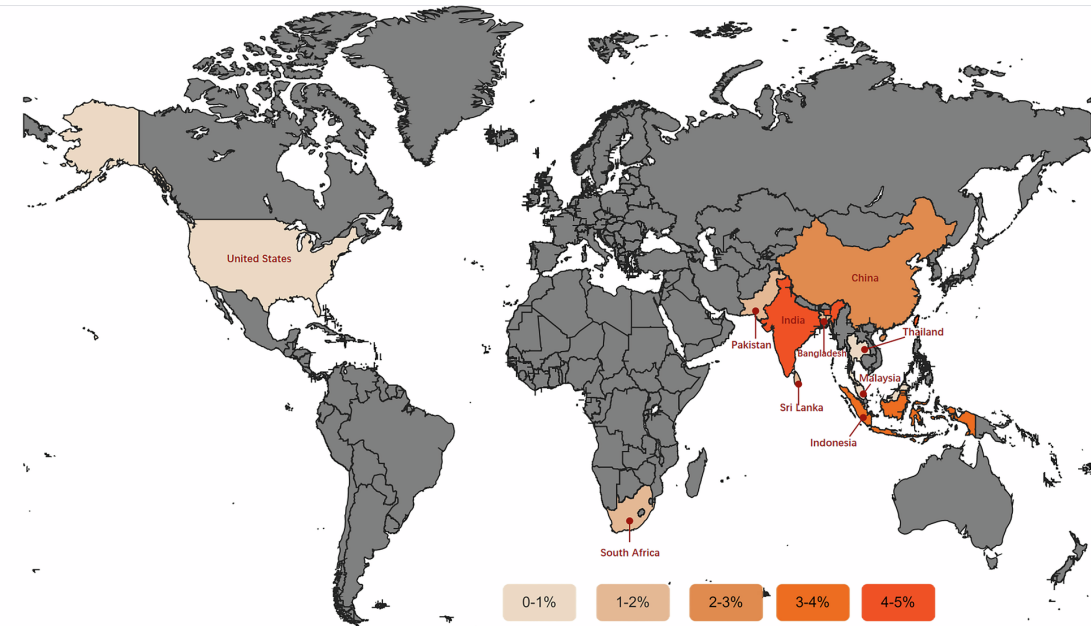
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Epidemiology of Esophageal Cancer (SCC):

Squamous cell carcinoma (SCC)

- Associated with **smoking and EtOH**; (betel nut)¹
- **Fanconi anemia (s/p BMT)**
- **Tylosis (RHBDF2 mutation) (rare)**²
- **Bloom Syndrome (rare)**³
- **Personal Hx of Head & Neck CA**
- **Achalasia**
- **Previous esophageal caustic injury**



¹ Shao, M., Zhuang, L., Xie, S. et al. Understanding betel nut addiction: a review of harmful consequences, underlying neurobiology, and emerging intervention strategies. Transl Psychiatry 16, 94 (2026). <https://doi.org/10.1038/s41398-026-03875-0>

² Ellis A, Risk JM, Maruthappu T, Kelsell DP. Tylosis with oesophageal cancer: Diagnosis, management and molecular mechanisms. Orphanet J Rare Dis. 2015 Sep 29;10:126. doi: 10.1186/s13023-015-0346-2. PMID: 26419362; PMCID: PMC4589029.

³ Arora H, Chacon AH, Choudhary S, McLeod MP, Meshkov L, Nouri K, Izakovic J. Bloom syndrome. Int J Dermatol. 2014 Jul;53(7):798-802. doi: 10.1111/ijd.12408. Epub 2014 Mar 6. PMID: 24602044.



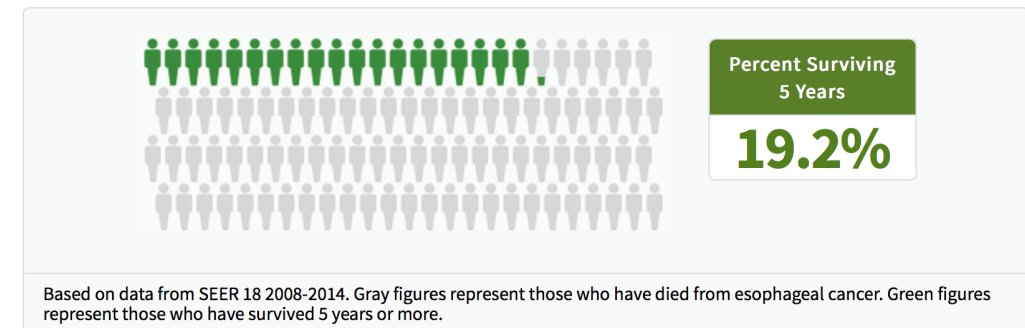
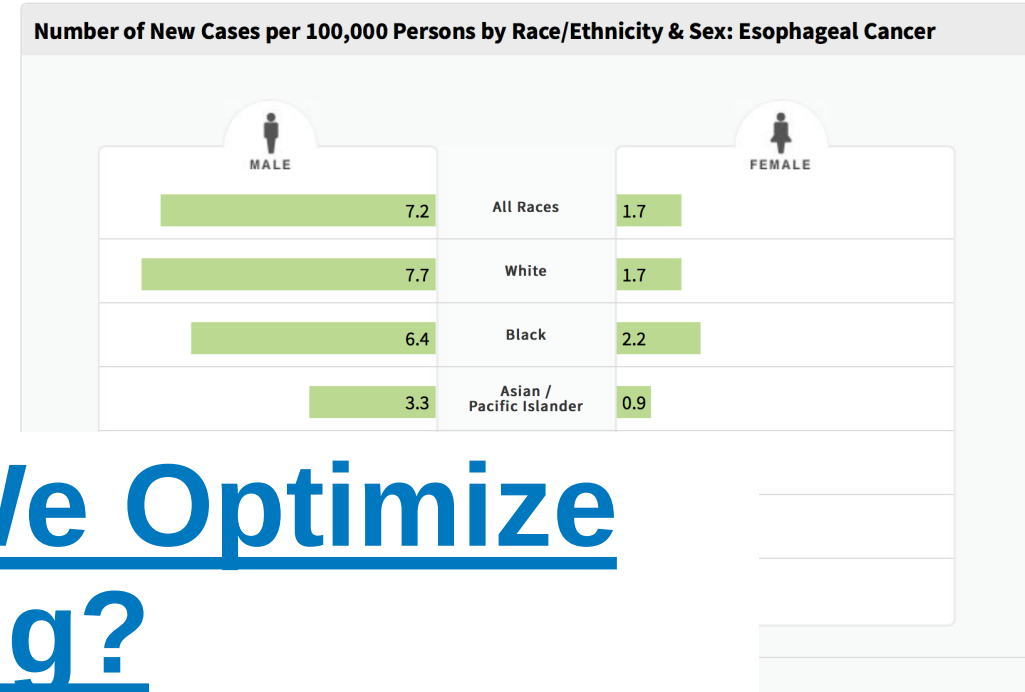
Epidemiology of Esophageal Cancer (EAC):

Esophageal Adenocarcinoma¹

- Most common form of esophageal
 - Family Hx; h/o GERD; truncal obesity; White* ; Male*
- Prevalence of BE in the adult population estimated between 0.4 – 6.8%^{2,3}

- ## Who & How Do We Optimize Screening?

- EMR (NOT EOS) allows for early staging pTis,PT1a, superficial pT1b - Endoscopic Therapy (EMR; RFA) preferred treatment for pT1a lesions
- 5 year survival approx. 20%³



¹ Wani, S., et al. (2025). "AGA Clinical Practice Guideline on Surveillance of Barrett's Esophagus." Gastroenterology 169(6): 1184-1231.

² Hayeck et al. Diseases of the Esophagus 2010, Ronkainen et al. Gastroenterology 2005;129:1825-31; Lyday et al. Endoscopy 2010;42:272-8

³ SEER Cancer Statistics updated 11/10/2011



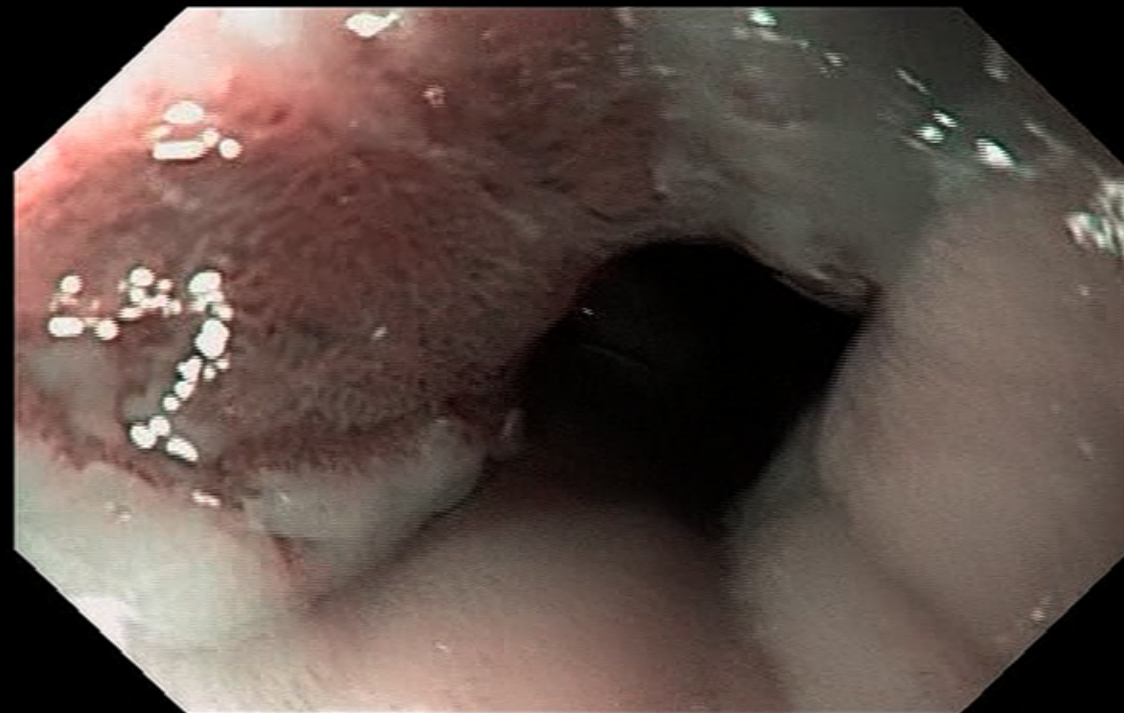
We Don't Biopsy What We Cant See

High Resolution



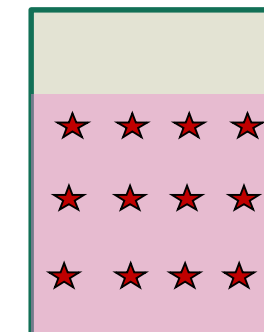
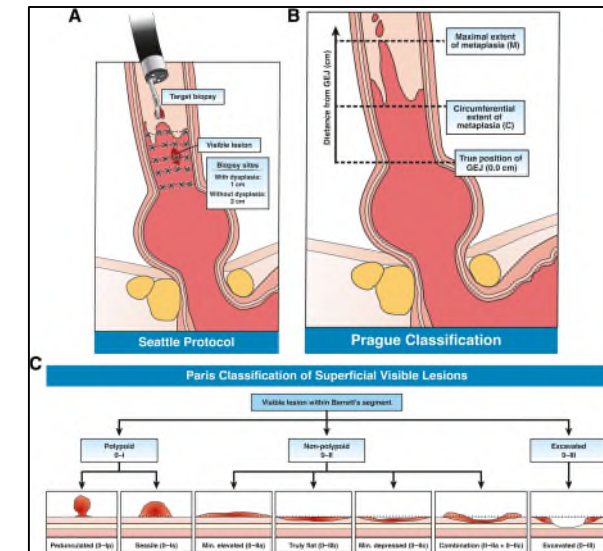
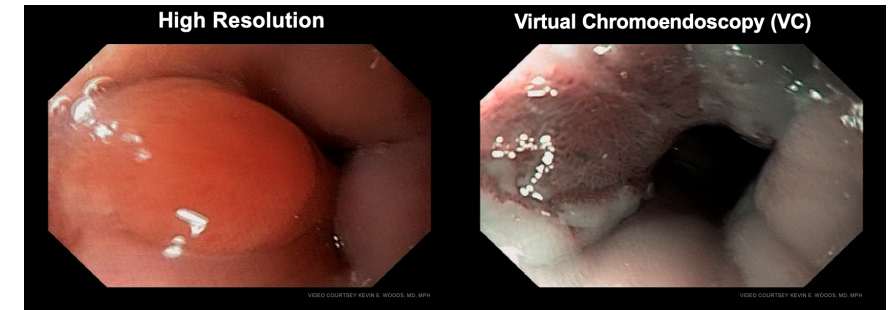
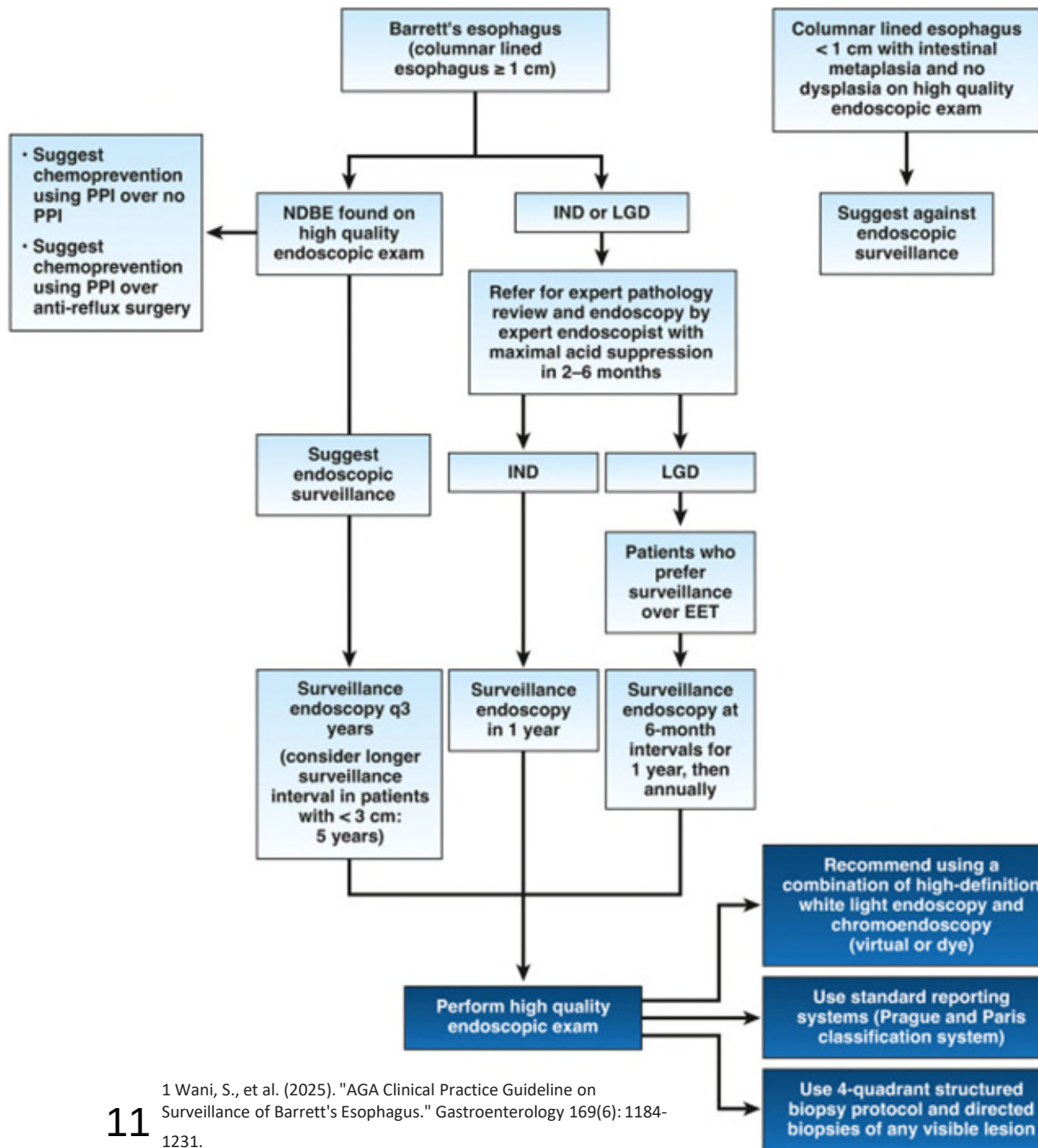
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Virtual Chromoendoscopy (VC)



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Meta- Analysis (14 studies (843pts))
(VC) Increased diagnostic yield by 34% (95%CI 20-56%, $p < 0.0001$)



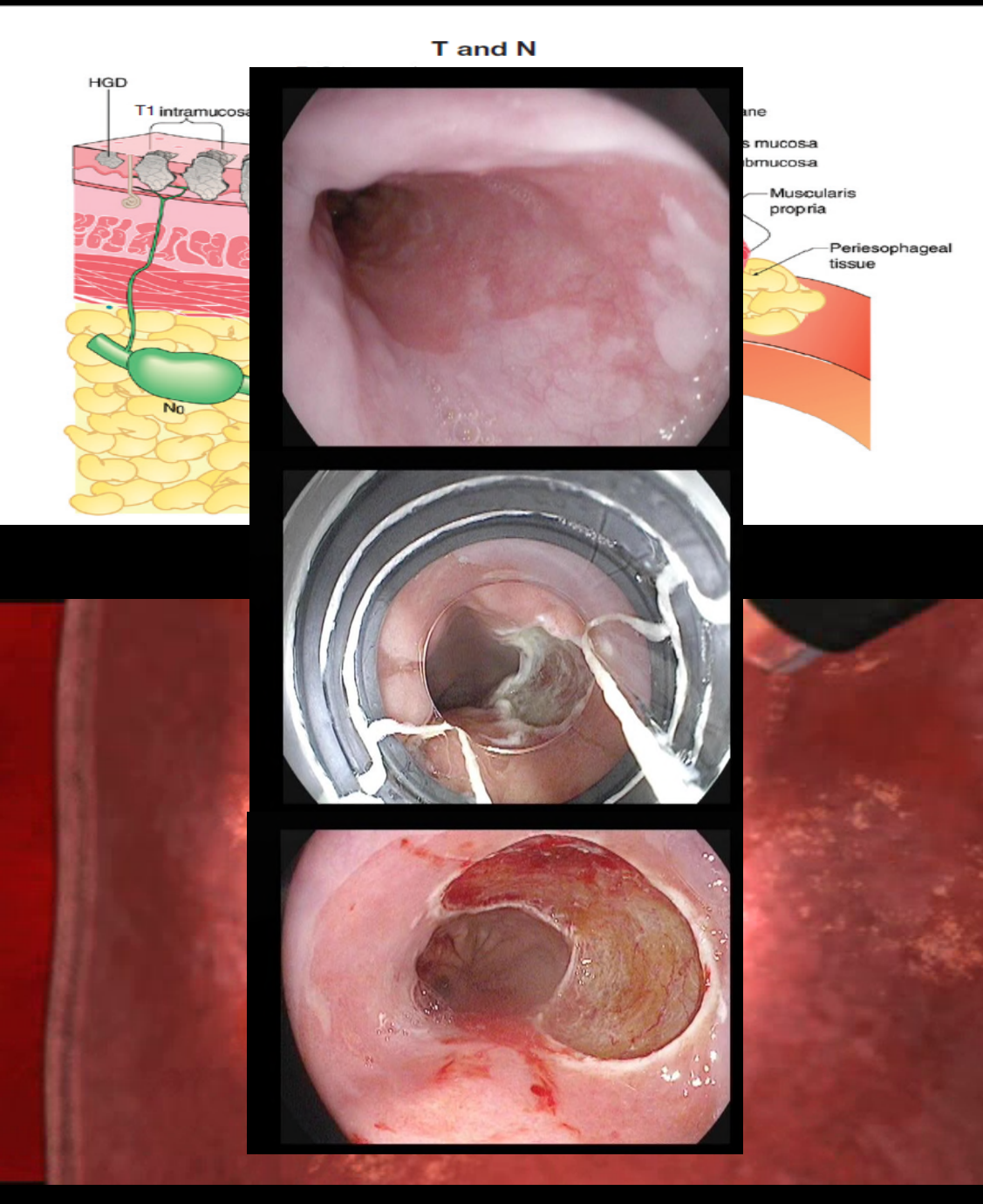
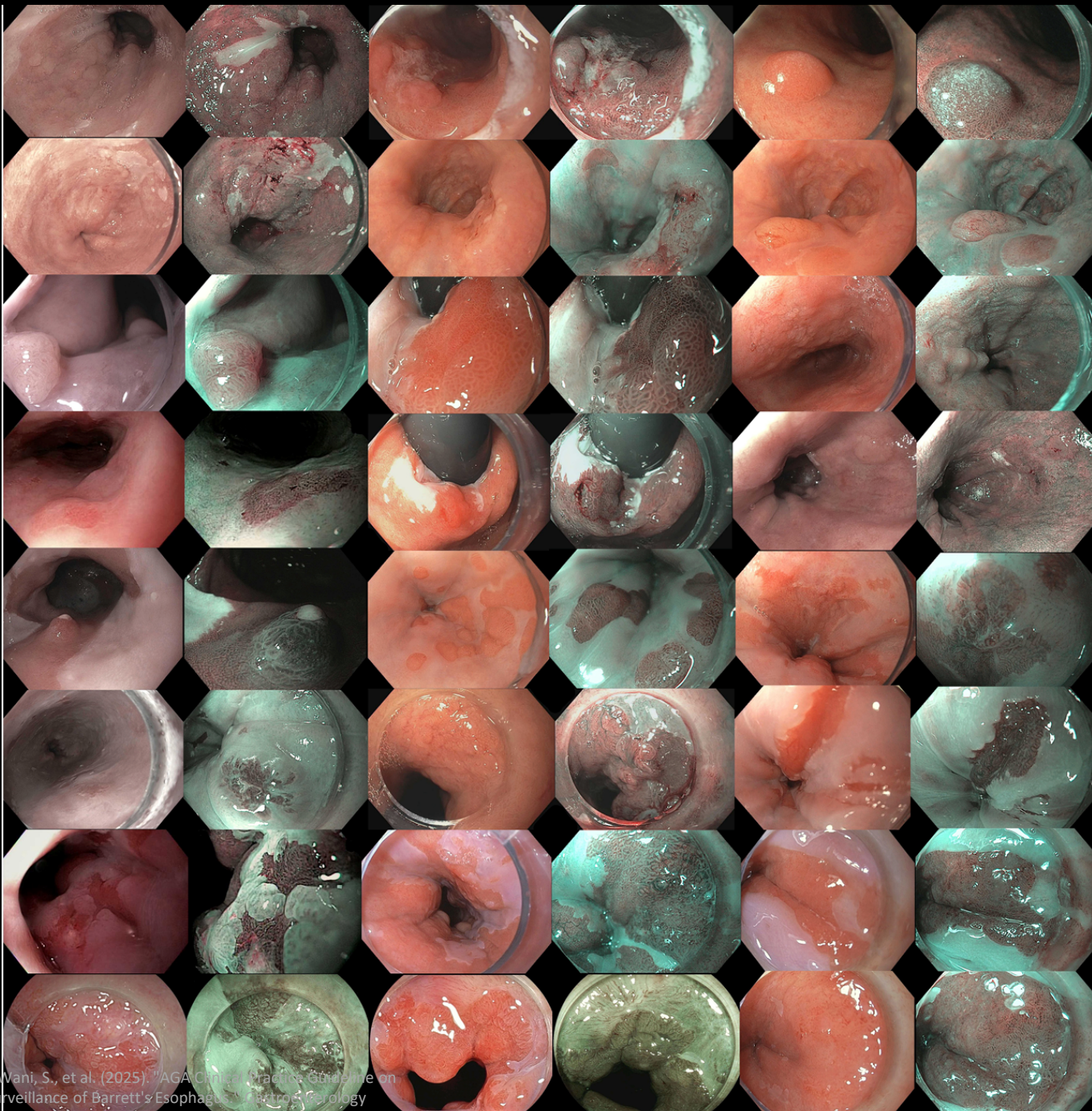


Figure 4. Representative images of visible lesions in patients with BE.

Predictors of Progression to EAC

Clinical Predictors

- Age >40
- Gender – Male gender
- Race – White
- History of GERD
- BMI
- Smoking
- Diet
- NSAIDs, ASA, PPI use

Endoscopic Predictors

- Length of BE
- Hiatal hernia length
- Nodularity and visible lesions

Histology Predictors

- Grade of Dysplasia*
- HGD >5 crypts or multifocal

Genetic Predictors

- p53 positive; loss of heterozygosity
- DNA content abnormalities: aneuploidy/tetraploidy



Predictors of Progression to EAC

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Histology Predictors

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Genetic Predictors

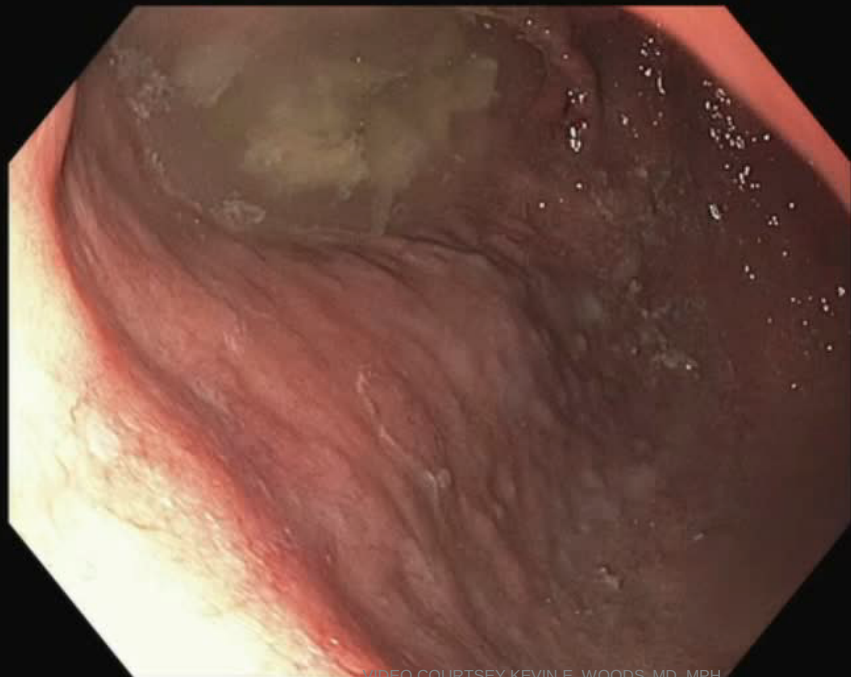
- p53 positive; loss of heterozygosity
- DNA content abnormalities: aneuploidy/tetraploidy



Case Presentation:

- 88 year old F, life time non smoker; no family history of esophageal CA, with at least a three year h/o Barrett's Esophagus, Afib (Coumadin); HTN; lives alone and independent
- Referred in 6/2014 after an EGD found high-grade dysplasia and focal intramucosal adenocarcinoma.
- Depth of invasion not reported by the pathologist
- Denies reflux symptoms; Prilosec 20mg PO daily
- 20lbs unintentional weight loss over the past few years
 - PET / CT performed -> unremarkable for distant disease
 - Patient refused surgical referral to discuss options



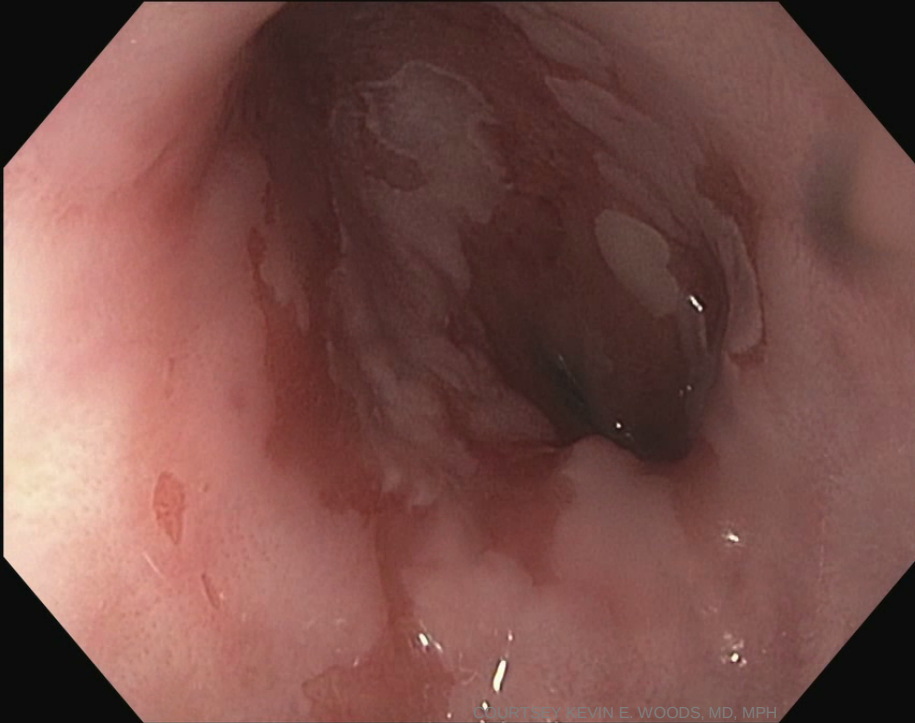


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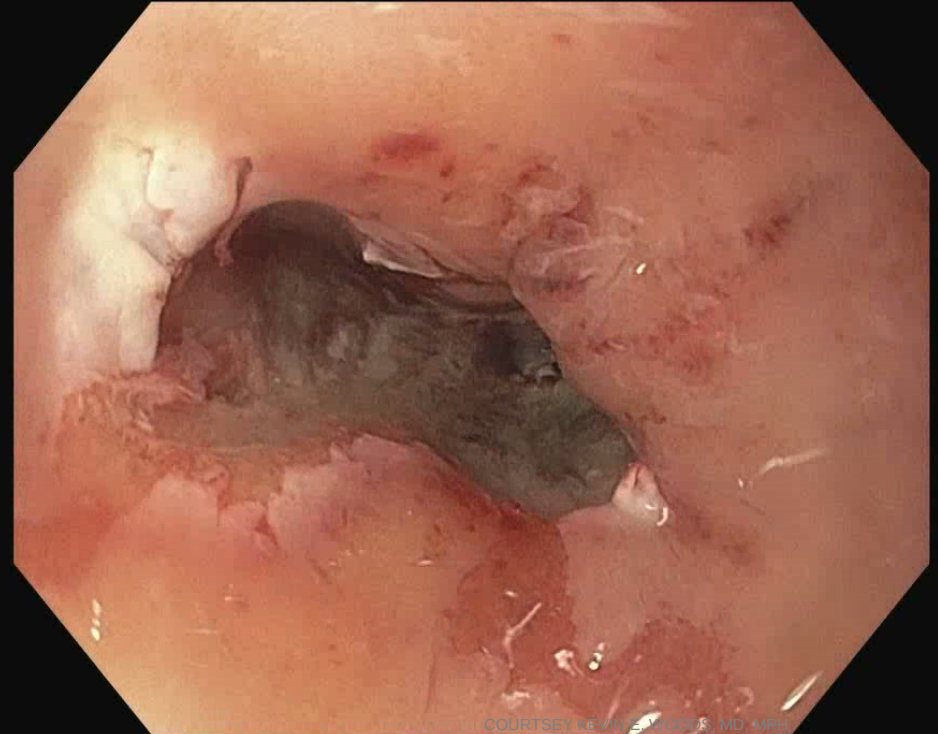
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BEFORE EMR



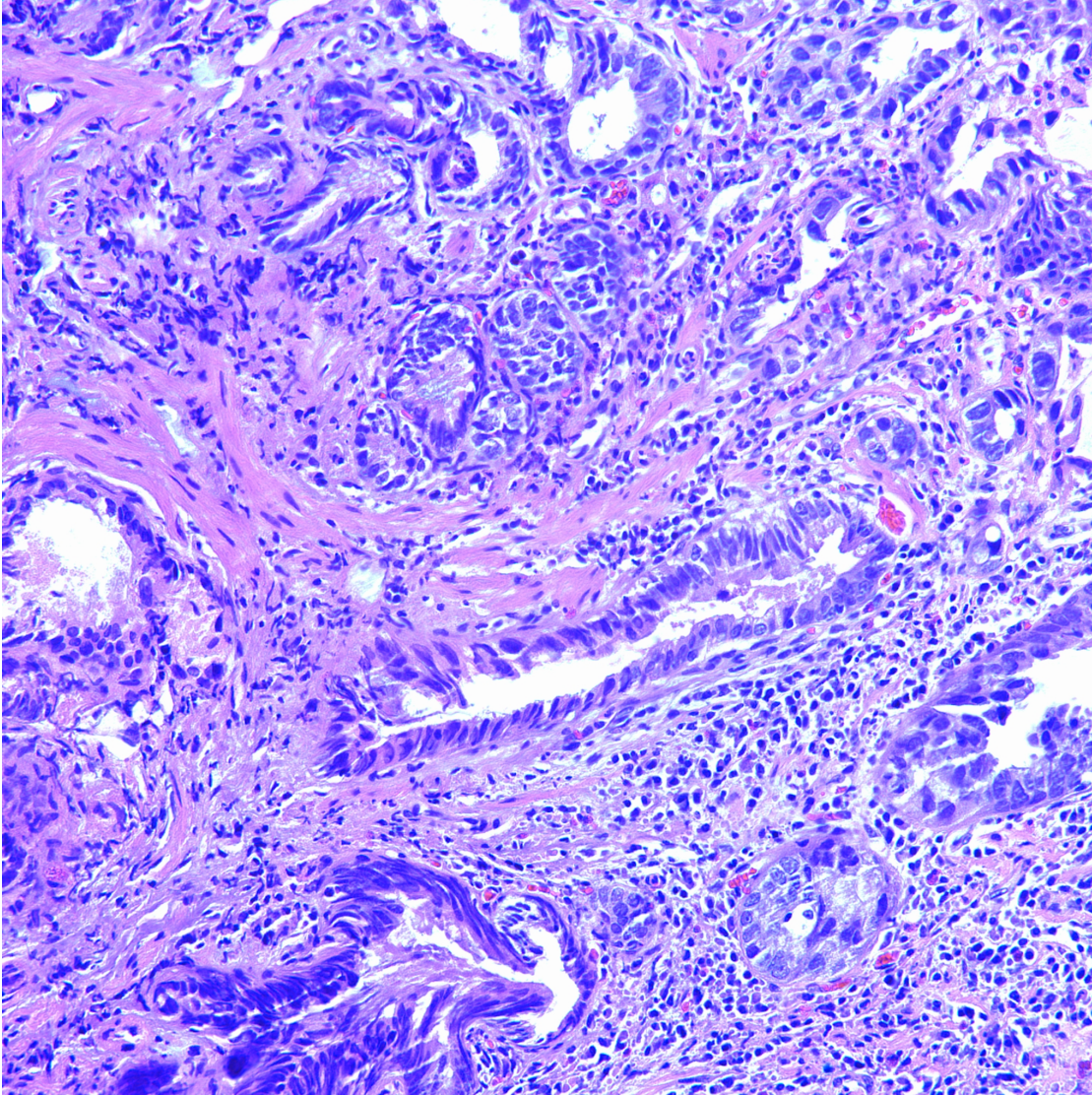
COURTESY KEVIN E. WOODS, MD, MPH

AFTER EMR



COURTESY KEVIN E. WOODS, MD, MPH

RESULTS



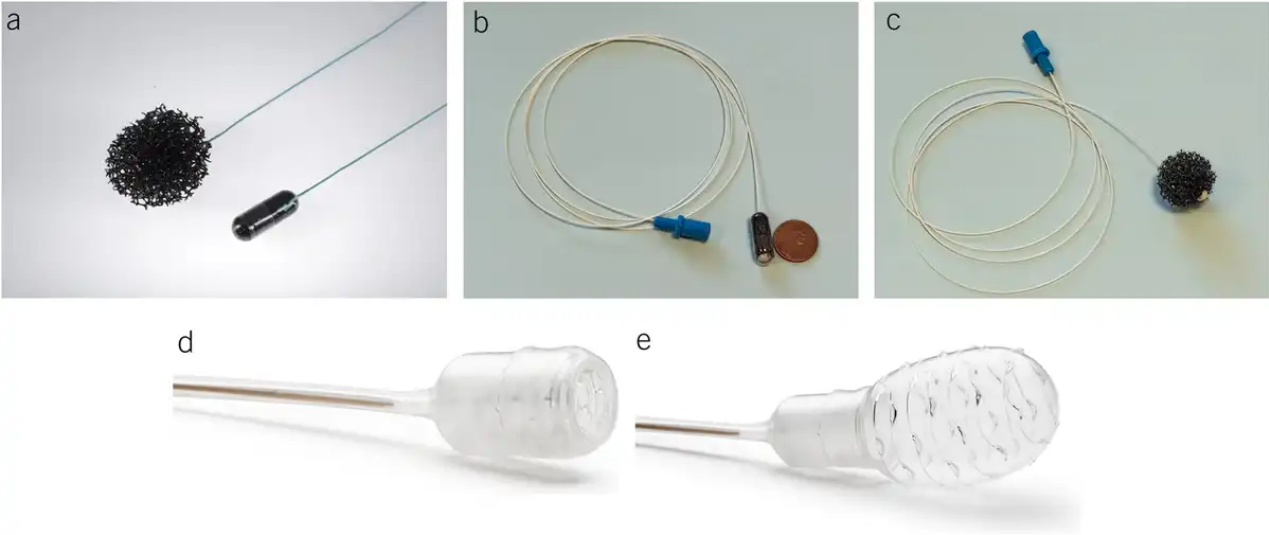
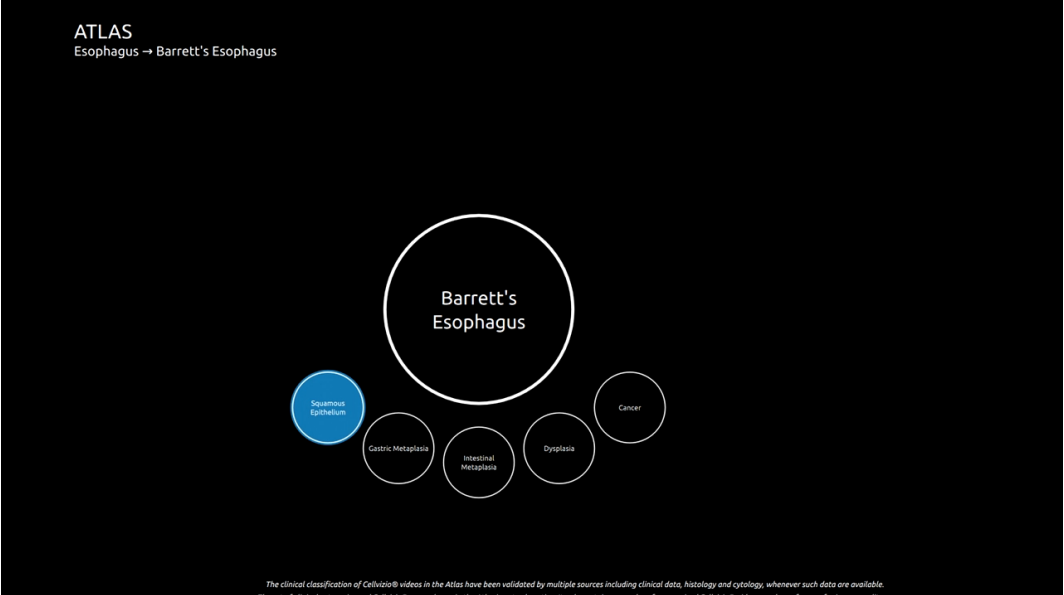
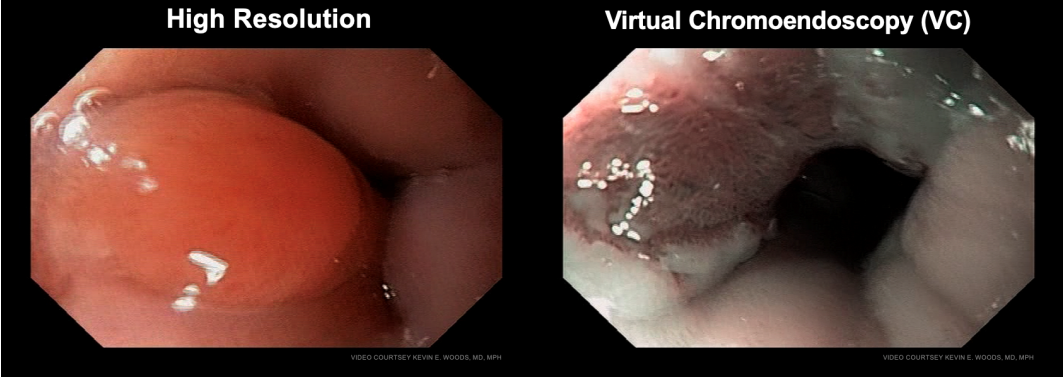
Final Pathologic Diagnosis

**A. ESOPHAGUS, 27 CM, 6-10 O'CLOCK, ENDOSCOPIC MUCOSAL RESECTION:
HIGH-GRADE DYSPLASIA/CARCINOMA-IN-SITU.
LATERAL MARGINS INVOLVED BY HIGH-GRADE DYSPLASIA.**

**B. ESOPHAGUS, 27 CM, 6-3 O'CLOCK, ENDOSCOPIC MUCOSAL RESECTION:
INVASIVE ADENOCARCINOMA.
SIZE: 1 MM.
MICROSCOPIC TUMOR EXTENSION: CARCINOMA INVADES LAMINA PROPRIA (PT1A).
GRADE: WELL-DIFFERENTIATED.**

**MARGIN: ADENOCARCINOMA IS FOCALLY PRESENT AT LATERAL AND DEEP MARGINS.
NO LYMPHOVASCULAR INVASION IS PRESENT.**

HIGH-GRADE DYSPLASIA AND INTESTINAL METAPLASIA IS PRESENT IN ADJACENT TISSUE.

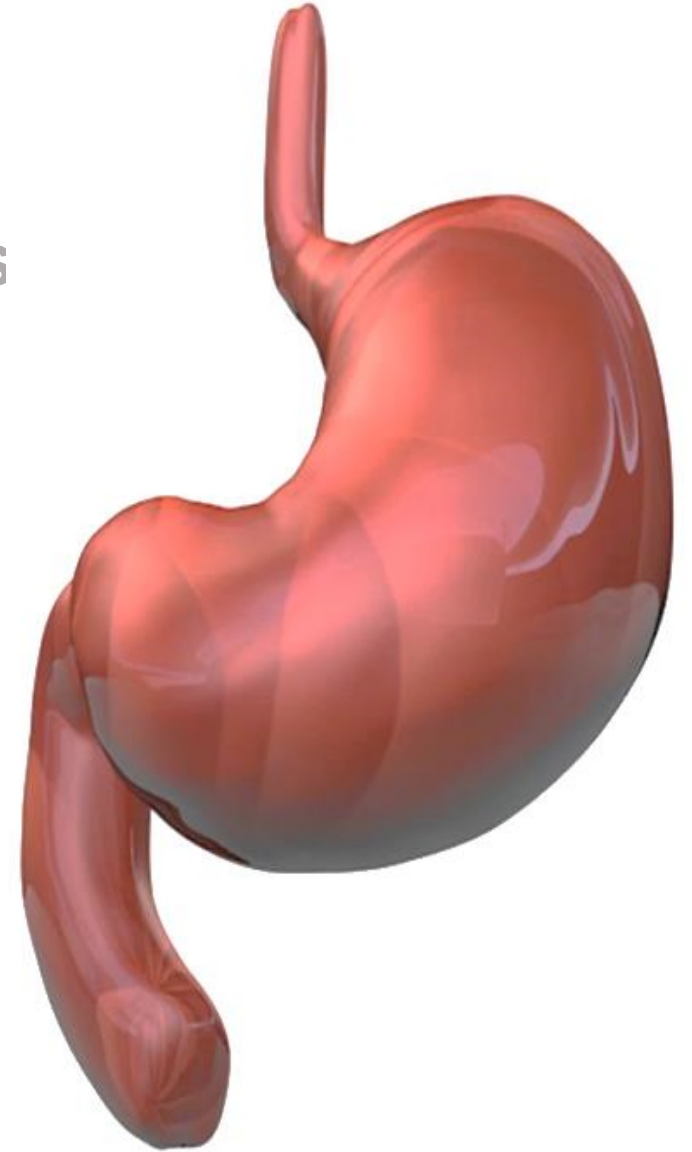


HDWLE + pCLE
SENS 94% ; SPEC 67%; PPV 56%; NPV 96%



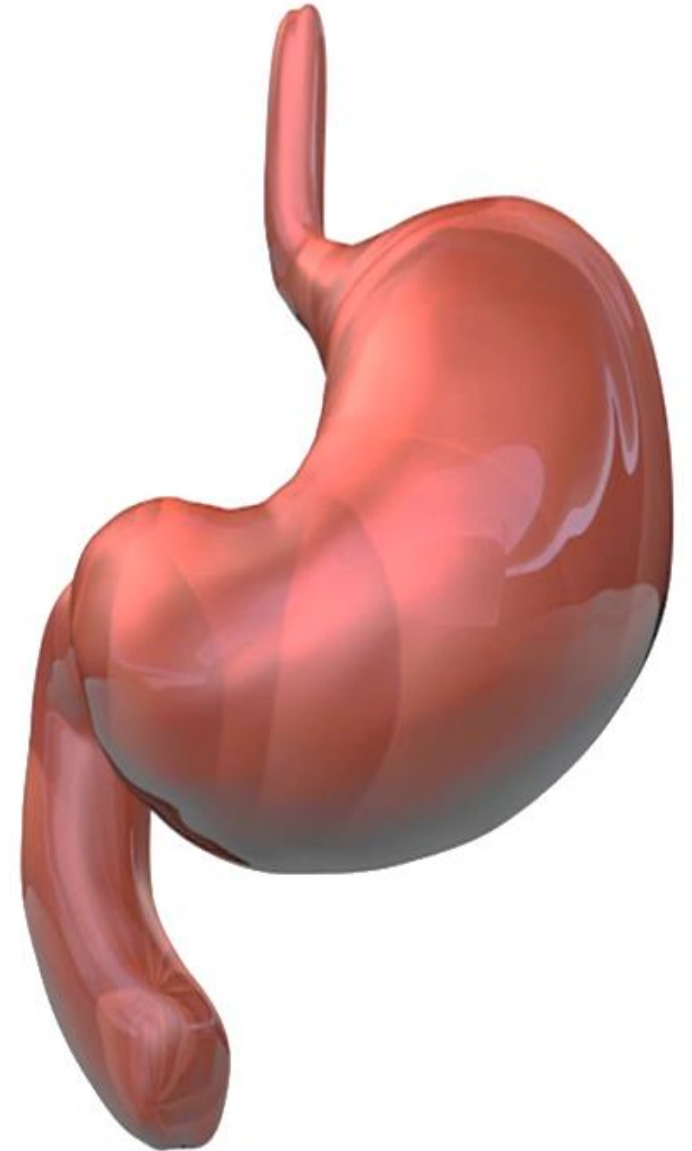
Objectives:

- Esophageal Cancer / Barrett's Esophagus
- **Gastric Cancer**
- Pancreatic / HPB Cancer Screening
- Colorectal Cancer Screening
- New Advances in A.I. for G.I.



Gastric Cancer:

- **H. Pylori Eradication is Essential**
- **Gastric Intestinal Metaplasia (GIM)**
- **1st Generation Immigrants from (East Asia, Eastern Europe, Andean Latin America)**
- **Hereditary Cancer Syndromes**
 - CDH1 – associated hereditary diffuse gastric cancer
 - FAP
 - Peutz-Jeghers (STK11)
 - Juvenile polyposis
 - Li-Fraumeni (TP53)
- **EGD at 45 (bundle with Colonoscopy)**



Objectives:

- Esophageal Cancer / Barrett's Esophagus
- Gastric Cancer
- **Pancreatic / HPB Cancer Screening**
- Colorectal Cancer Screening
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Echoendoscopes (EUS)

Curvilinear-array (linear array)

Generates an US image in a single plane parallel to the long axis of the endoscope.

Oblique optics for luminal viewing

Allows for EUS guided Fine needle aspiration / biopsy (FNA/B)

Radial scanning

Generates a 360-degree radial US image perpendicular to the long axis of the endoscope

Oblique optics for luminal viewing

No ability to perform FNA

Forward view - Curvilinear-array

Generates an US image in a single plane parallel to the long axis of the endoscope.

Forward viewing optics for luminal viewing

Allows for EUS guided Fine needle aspiration (FNA)

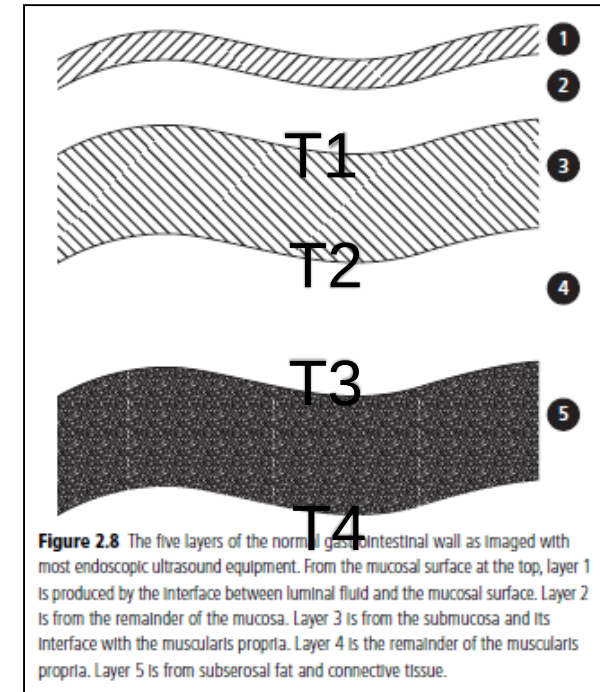
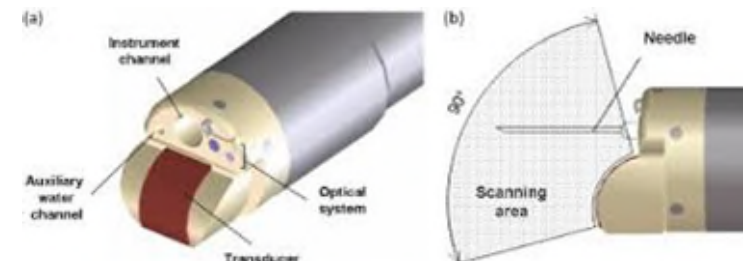
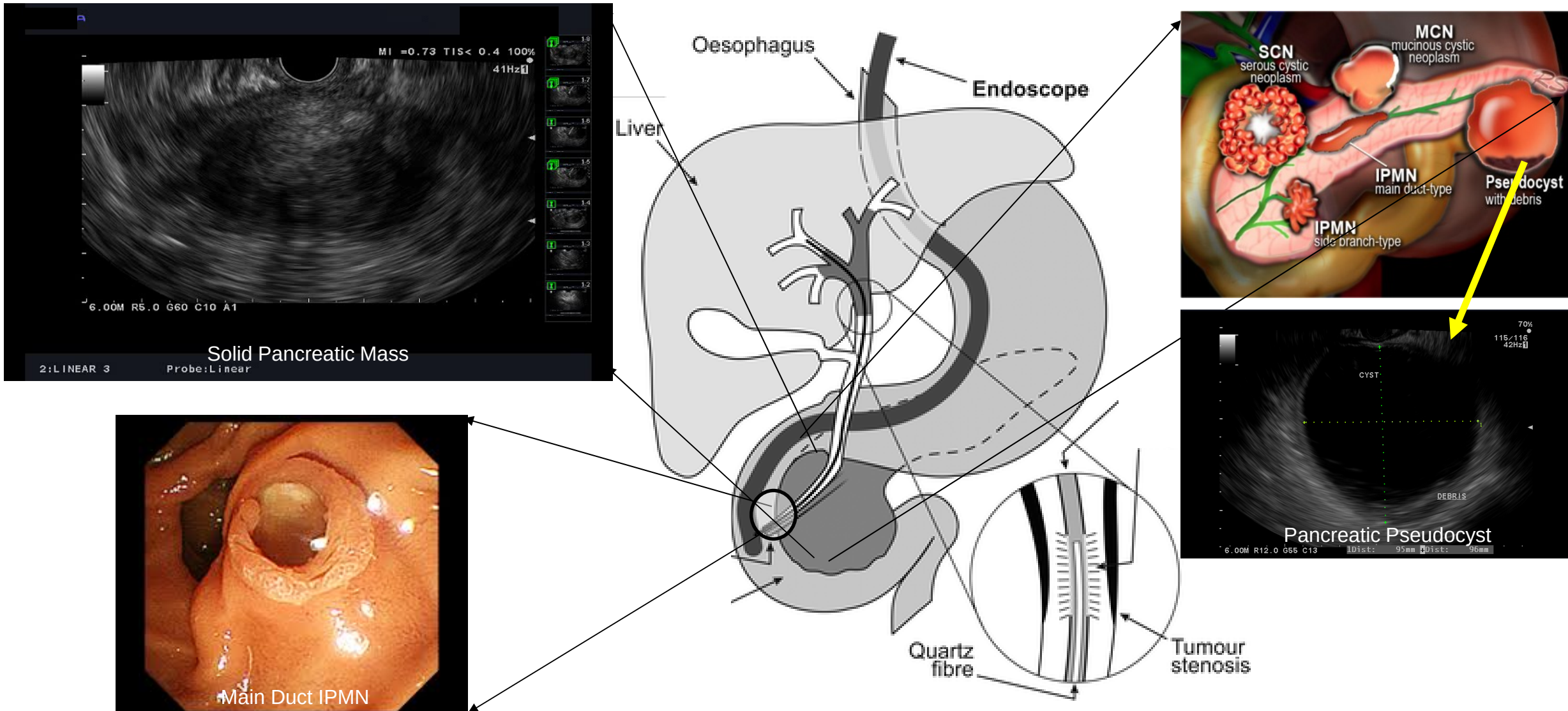


Figure 2.8 The five layers of the normal gastrointestinal wall as imaged with most endoscopic ultrasound equipment. From the mucosal surface at the top, layer 1 is produced by the interface between luminal fluid and the mucosal surface. Layer 2 is from the remainder of the mucosa. Layer 3 is from the submucosa and its interface with the muscularis propria. Layer 4 is the remainder of the muscularis propria. Layer 5 is from subserosal fat and connective tissue.

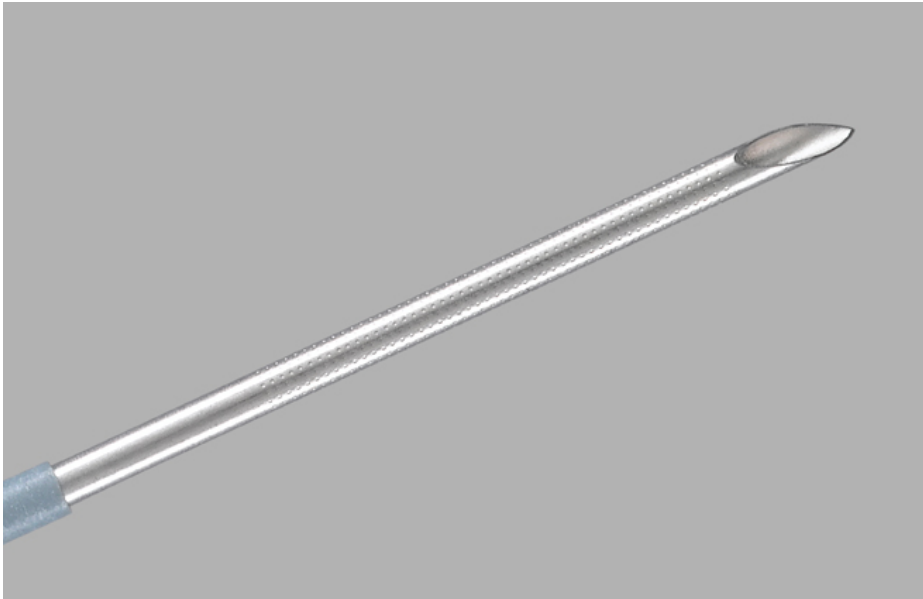


Role of ERCP and EUS – Pancreatic Mass / Cyst

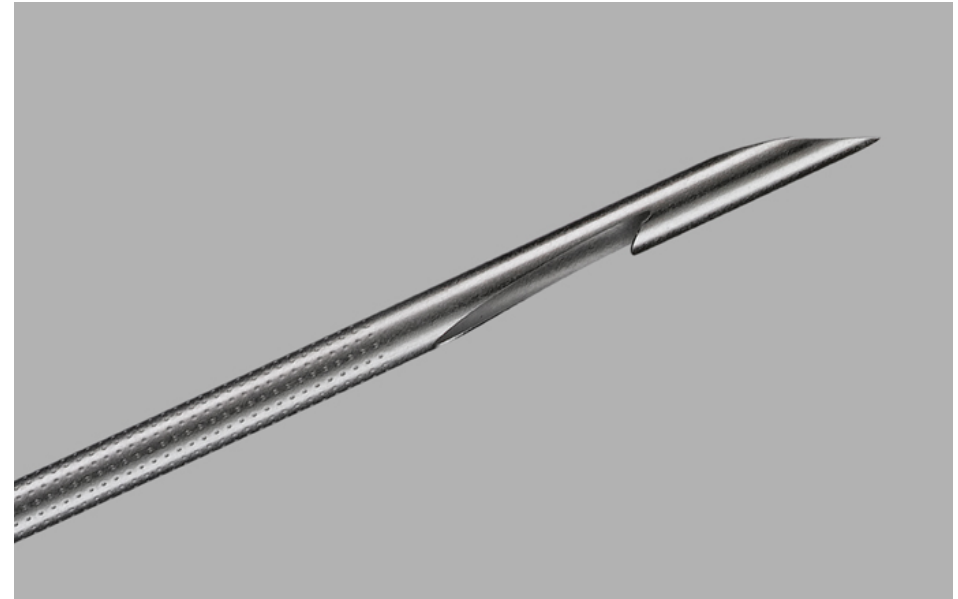


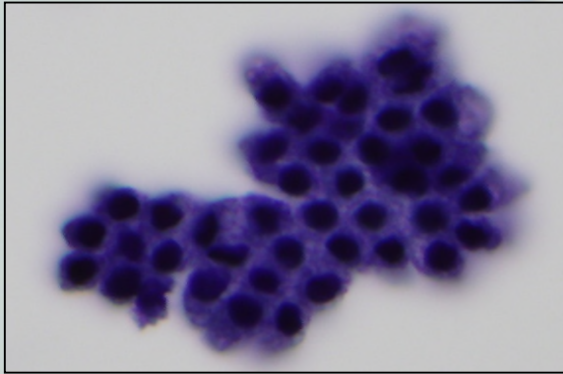
Optimization of Sampling: FNA versus FNB

Fine Needle Aspiration (FNA)

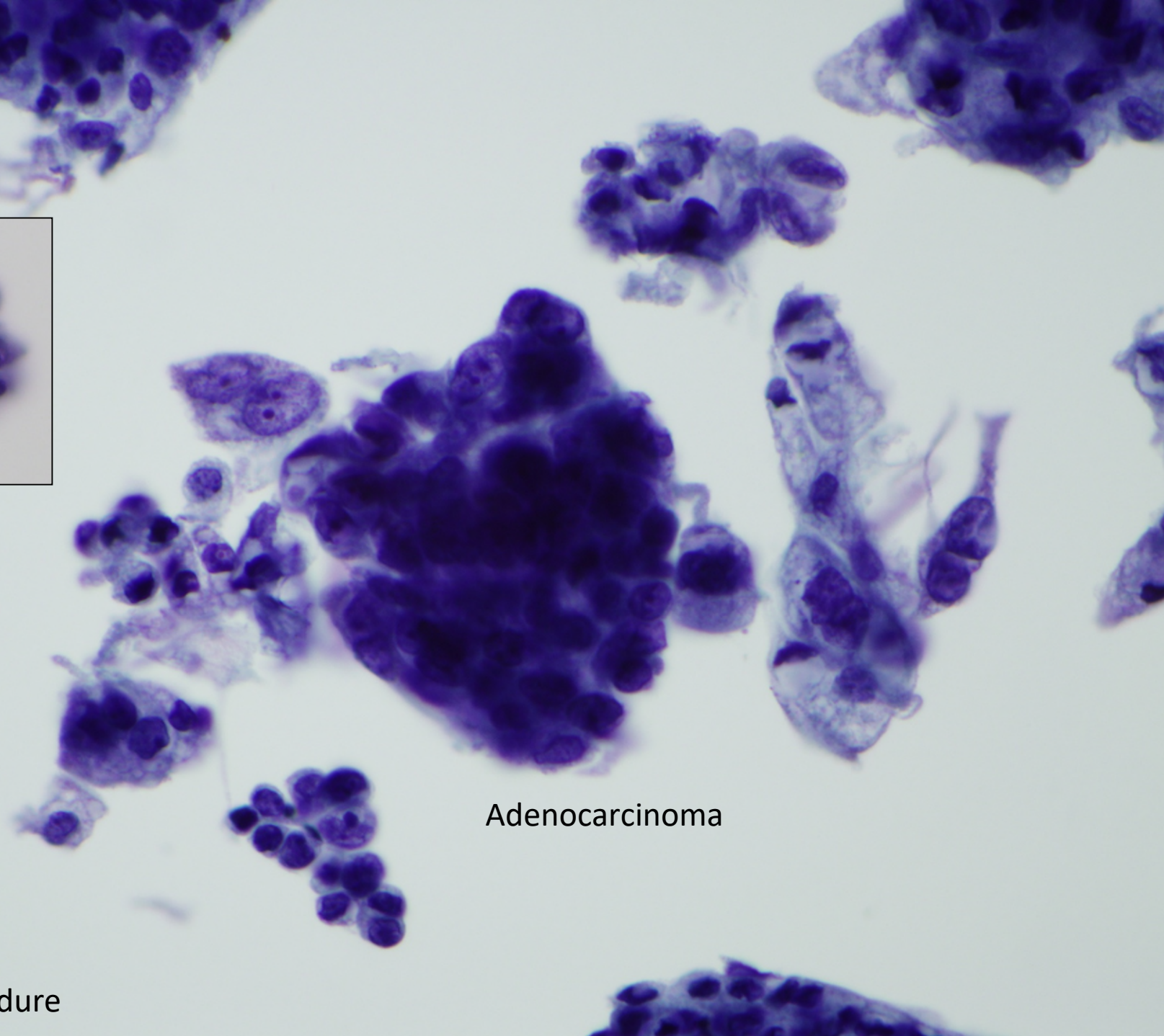


Fine Needle Core Biopsy (FNB)



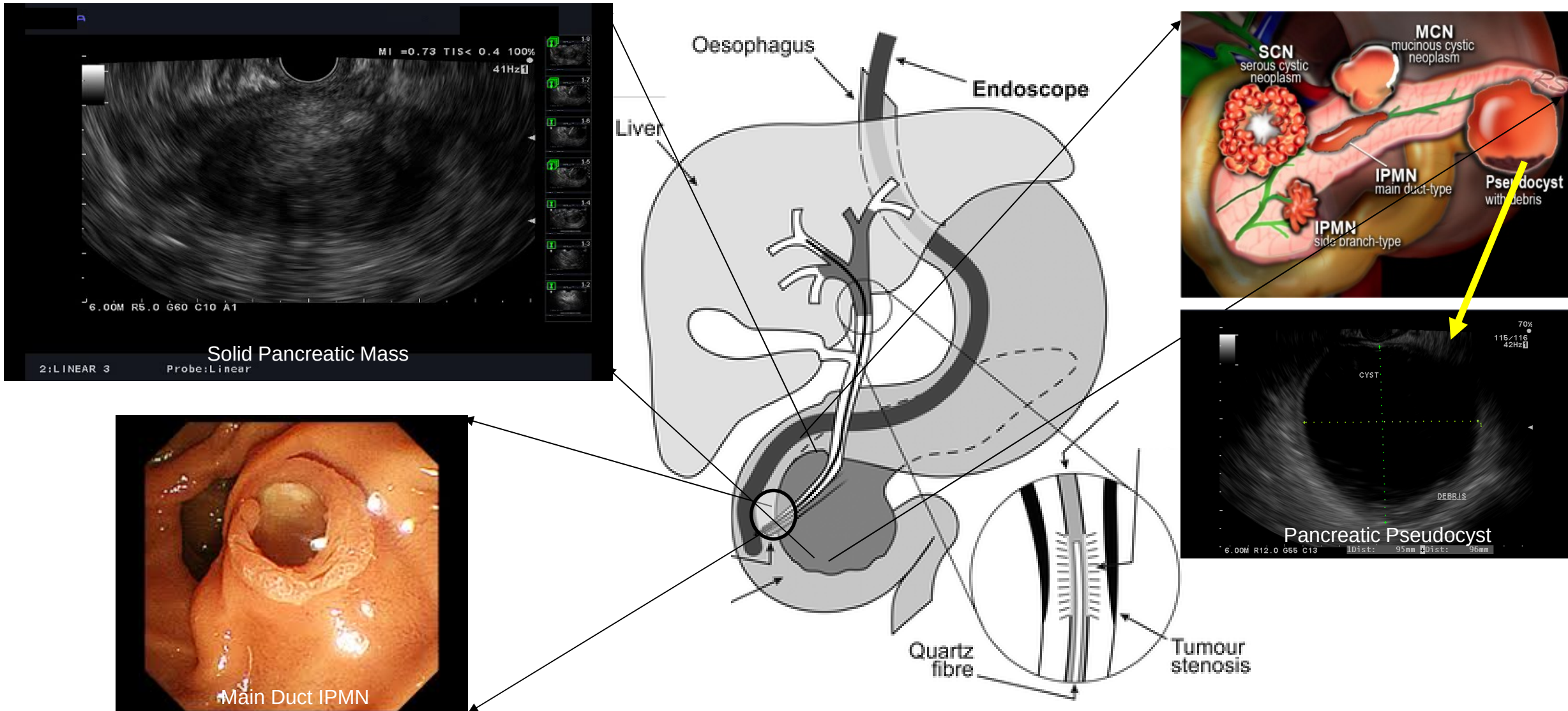


Normal

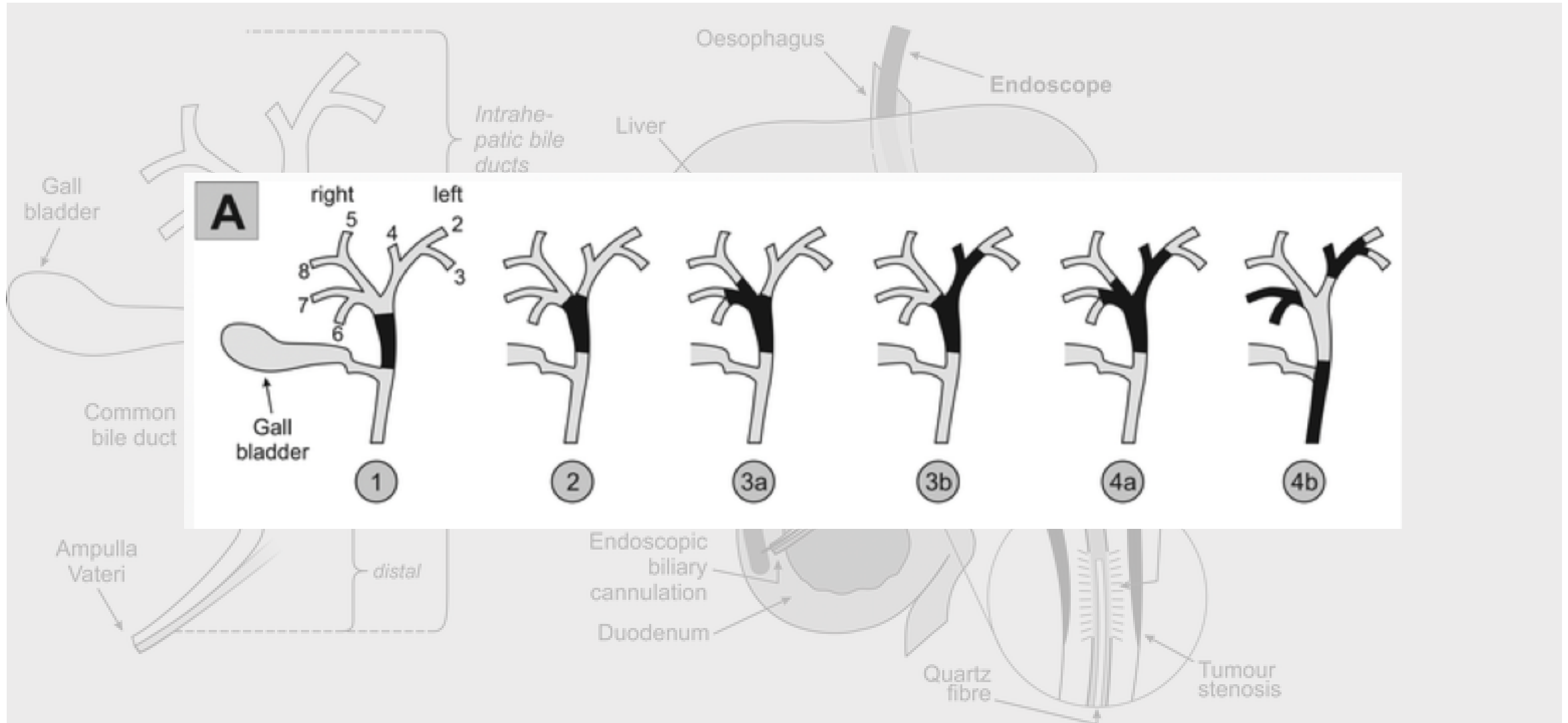


Adenocarcinoma

Role of ERCP and EUS – Pancreatic Mass / Cyst

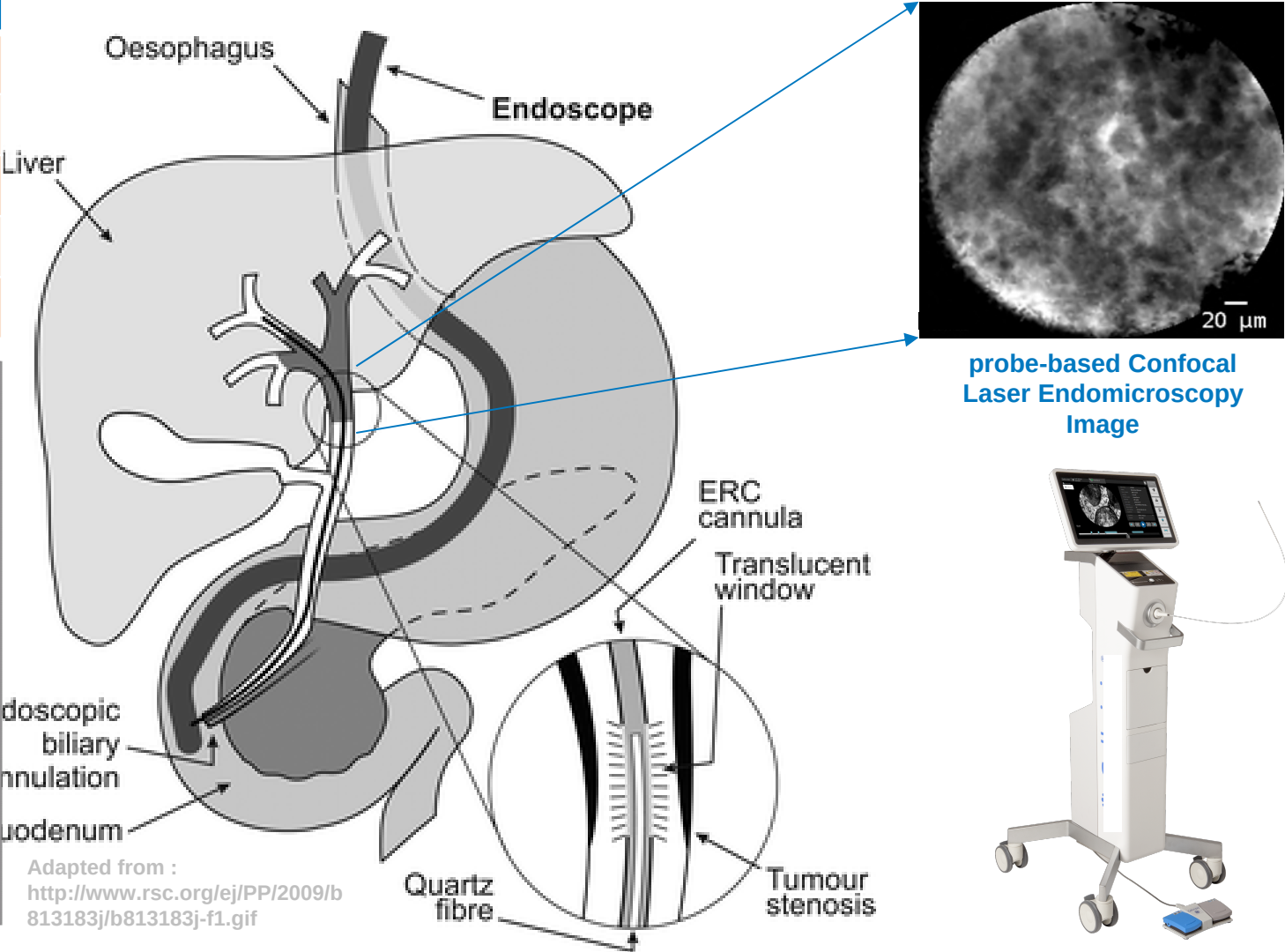
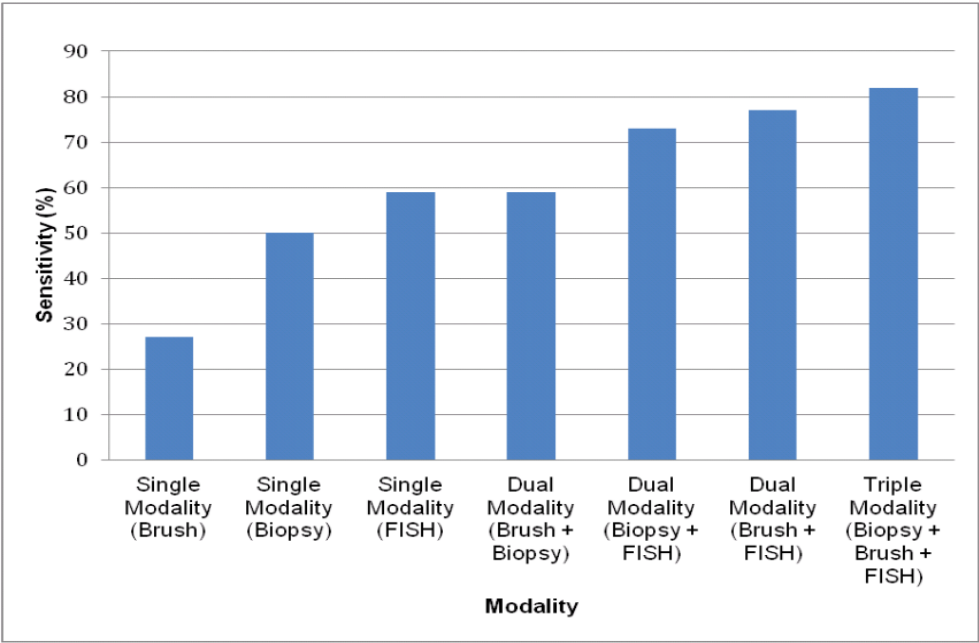


Role of ERCP and EUS – Cholangiocarcinoma



Cholangiocarcinoma

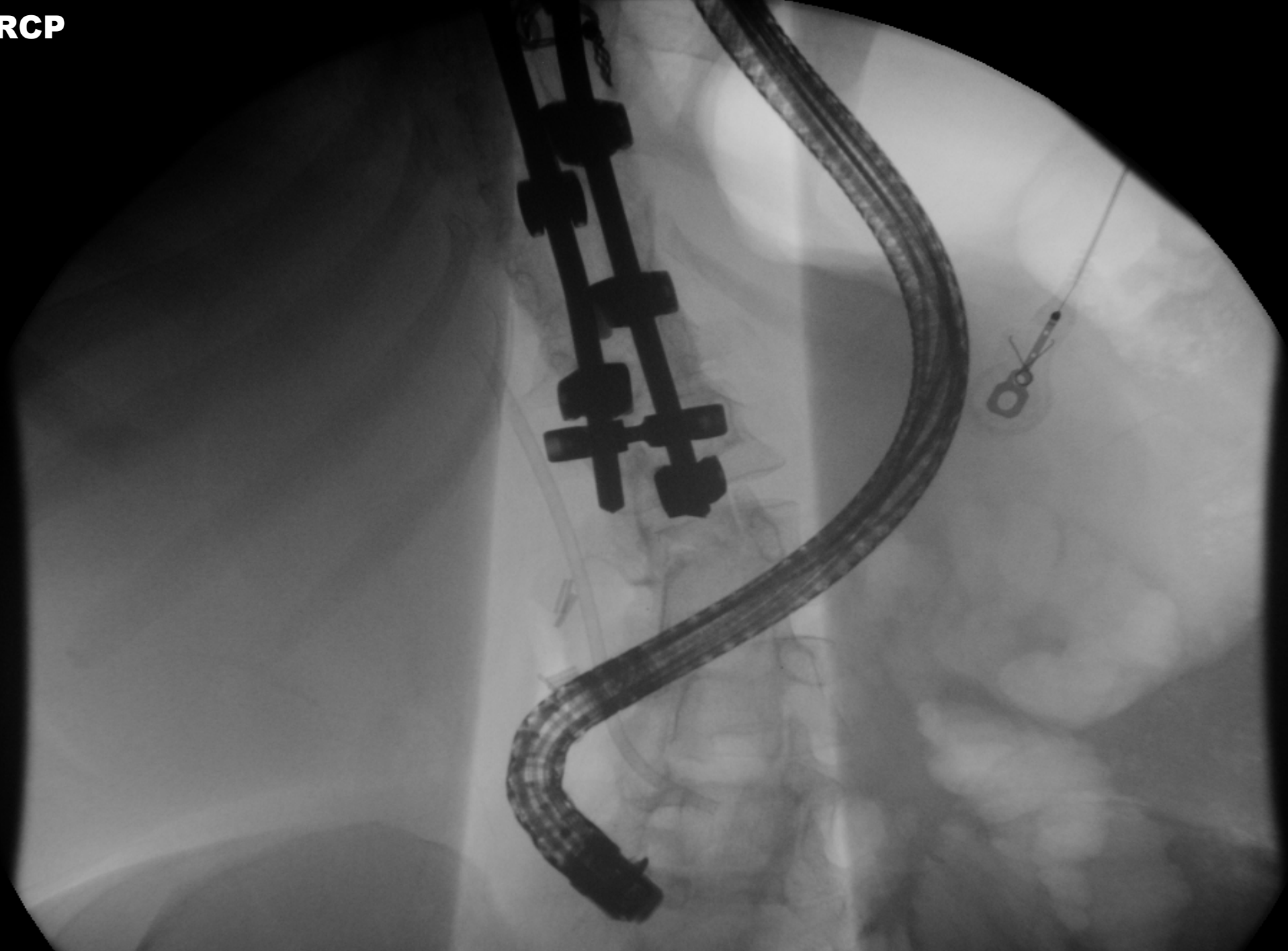
Solitary Sampling Method	Diagnostic Sensitivity Range
EUS guided fine needle aspiration (FNA)	26 – 62%
Brush cytology	30 – 57%
Indirect forceps biopsy	43 – 81%
F.I.S.H.	35 – 60%
PB Optical Endomicroscopy (pCLE)	What is This? What Does this add?



¹ Nanda A, Brown JM, Berger SH, Lewis MM, Barr Fritcher EG, Gores GJ, Keilin SA, Woods KE, Cai Q, Willingham FF. Triple modality testing by endoscopic retrograde cholangiopancreatography for the diagnosis of cholangiocarcinoma. Ther Adv Gastroenterol. 2015 Mar;8(2):56-65. doi: 10.1177/1756283X14564674. PMID: 25729431; PMCID: PMC4314305.

²Meining et al, 2011 GIE 74: 5: 961-8

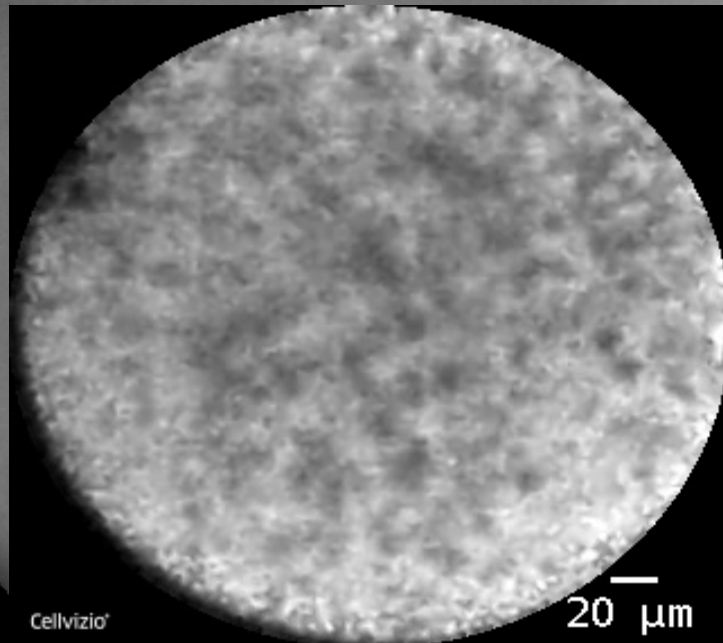
ERCP



Detection of Cholangiocarcinoma In Vivo Using Miniprobe-Based Confocal Fluorescence Microscopy

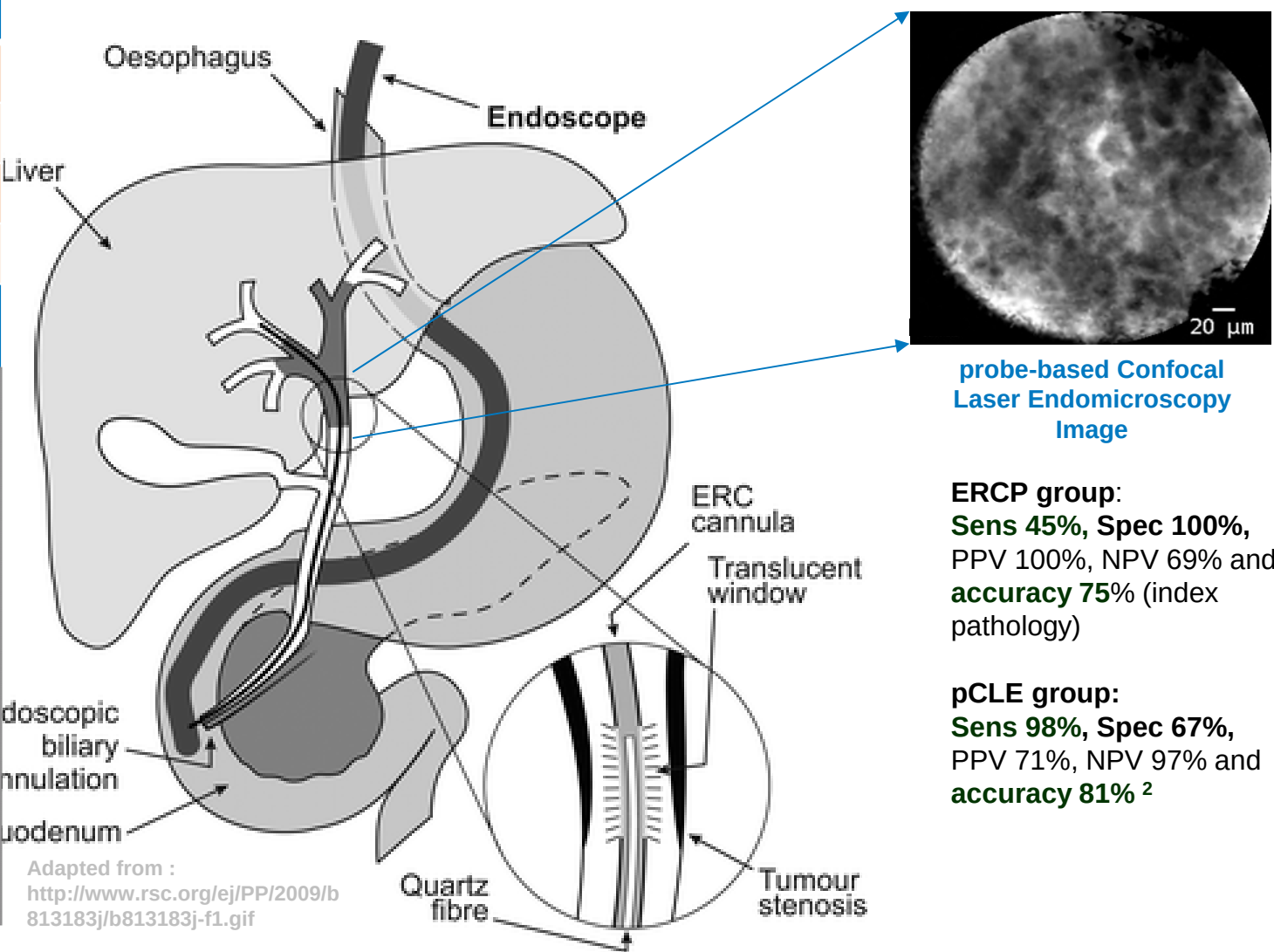
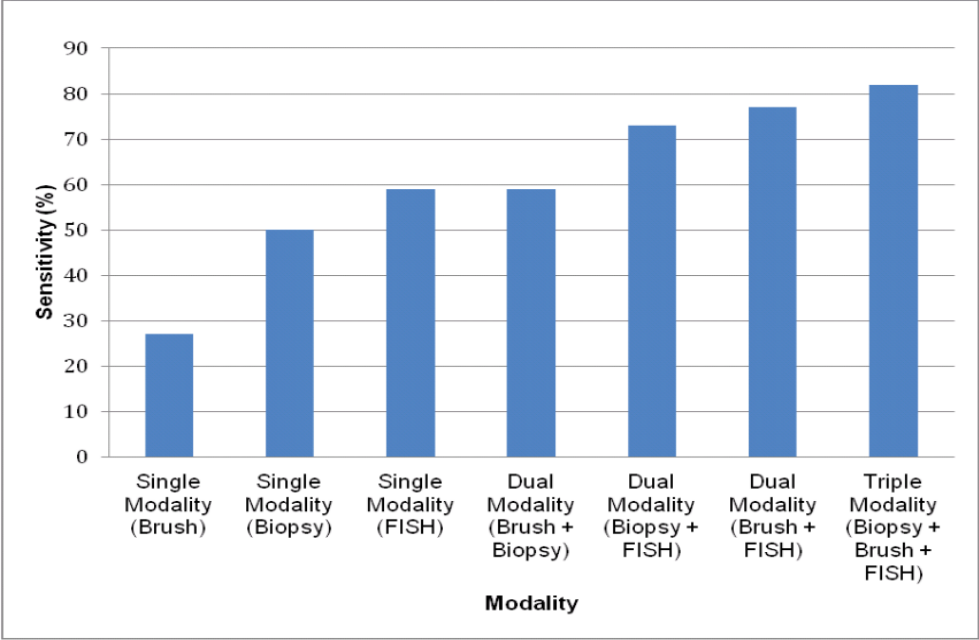
ALEXANDER MEINING,* ECKART FRIMBERGER,* VALENTIN BECKER,* STEFAN VON DELIUS,*
CLAUS HANN VON WEYHERN,[‡] ROLAND M. SCHMID,* and CHRISTIAN PRINZ*

**Department of Medicine II, and [‡]Department of Pathology, Technical University of Munich, Munich, Germany*



Optimizing Diagnosis of Cholangiocarcinoma

Solitary Sampling Method	Diagnostic Sensitivity Range
EUS guided fine needle aspiration (FNA)	26 – 62%
Brush cytology	30 – 57%
Indirect forceps biopsy	43 – 81%
F.I.S.H.	35 – 60%
PB Optical Endomicroscopy (pCLE)	98%



ERCP group:
Sens 45%, Spec 100%,
PPV 100%, NPV 69% and
accuracy 75% (index
pathology)

pCLE group:
Sens 98%, Spec 67%,
PPV 71%, NPV 97% and
accuracy 81%²

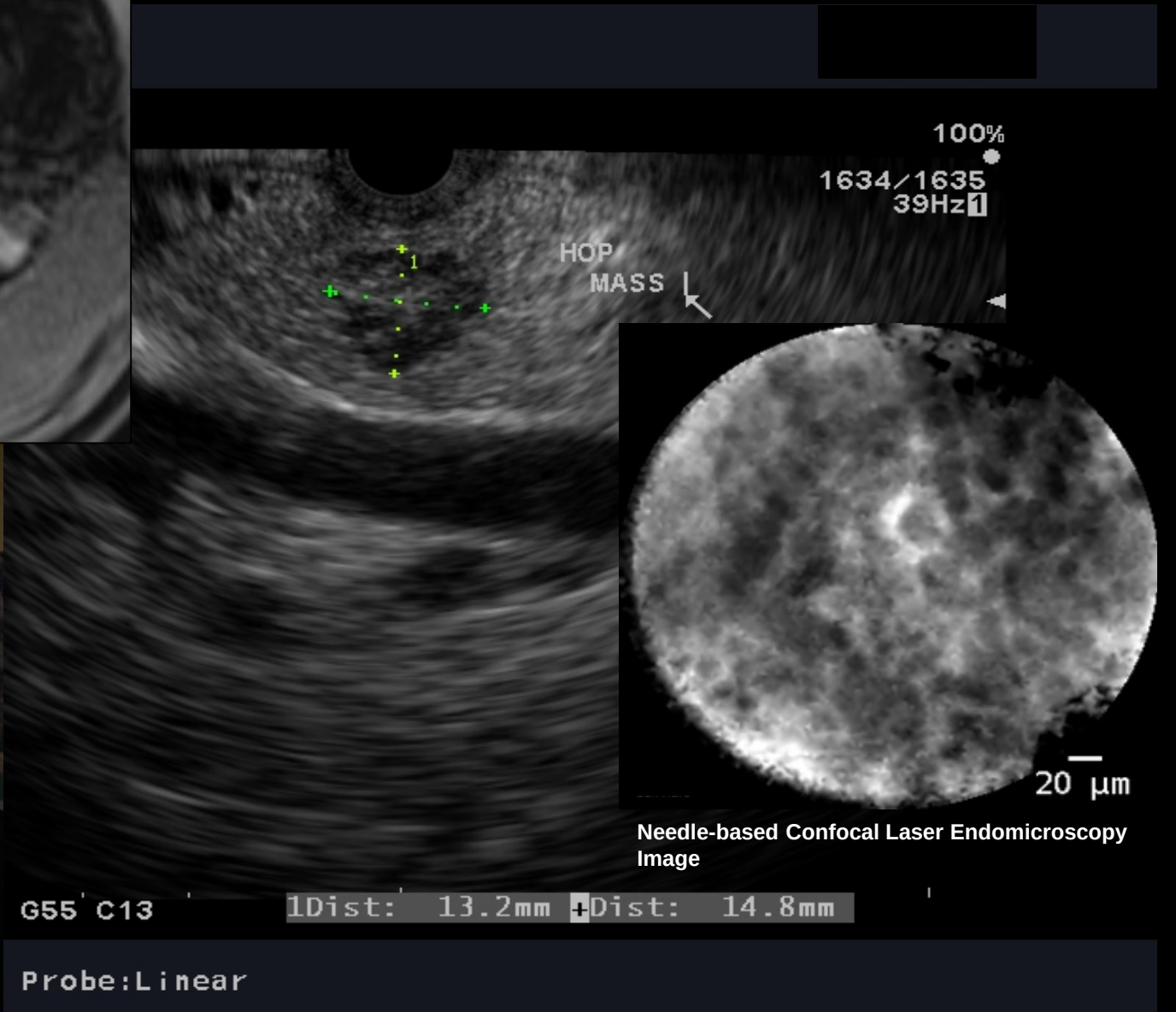
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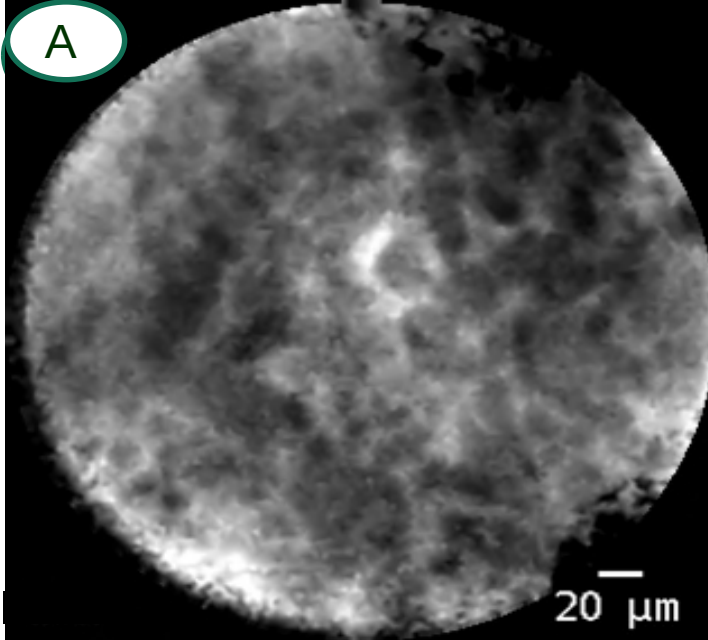
²Meining et al, 2011 GIE 74: 5: 961-8

Case Presentation:

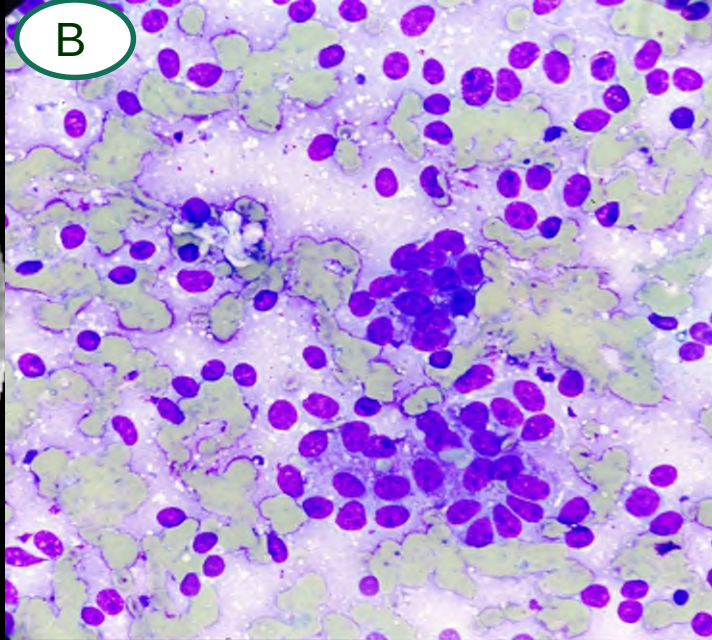
- **A previously healthy 21-year old was referred for an endoscopic ultrasound to evaluate an incidentally detected mass in the head of the pancreas.**
- **The mass was initially seen on an ultrasound obtained in the emergency department to evaluate a week of intermittent abdominal pain. She subsequently underwent MRI of the abdomen, which confirmed the finding of a 1.6 cm T1 and T2 hypo-intense mass in the head of the pancreas (Fig. 1)**
- **Aside from oral contraceptives, the patient did not take any other medications. There was no family history of pancreatic or autoimmune disease.**



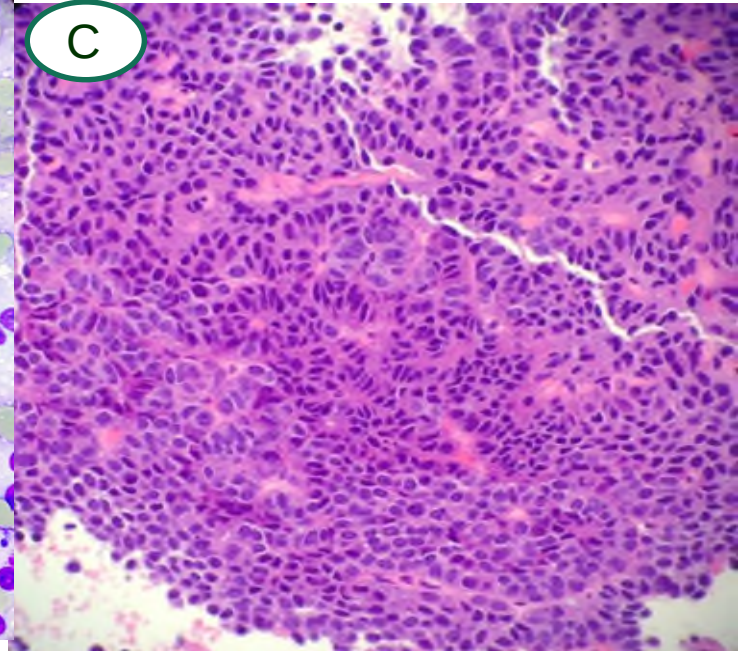




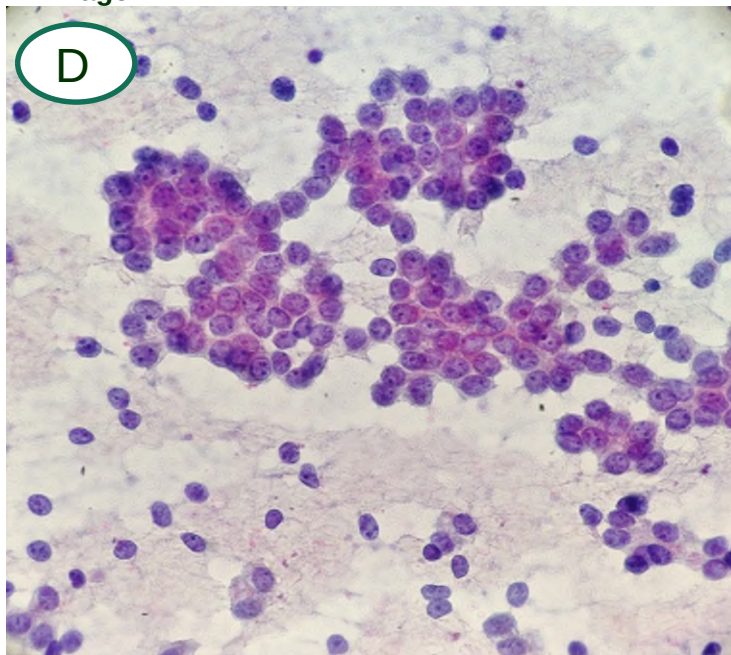
Needle-based Confocal Laser Endomicroscopy Image



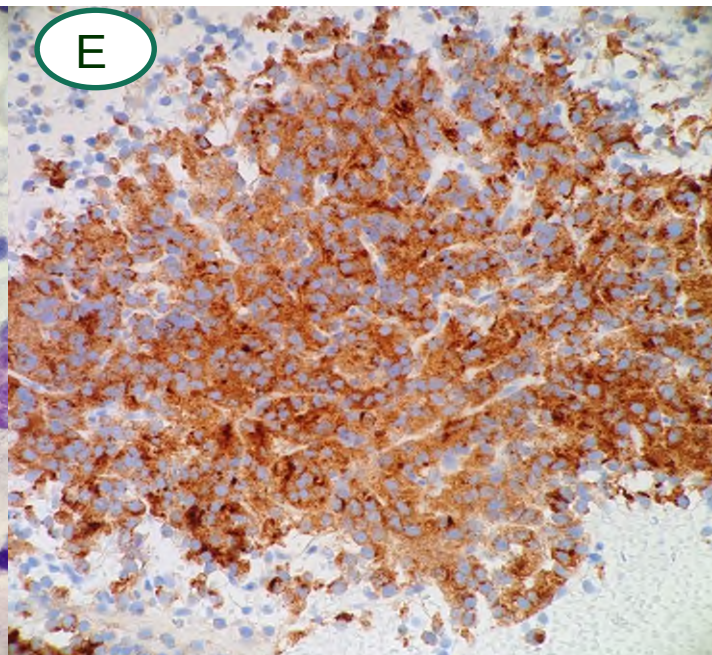
Diff Quik – 60x



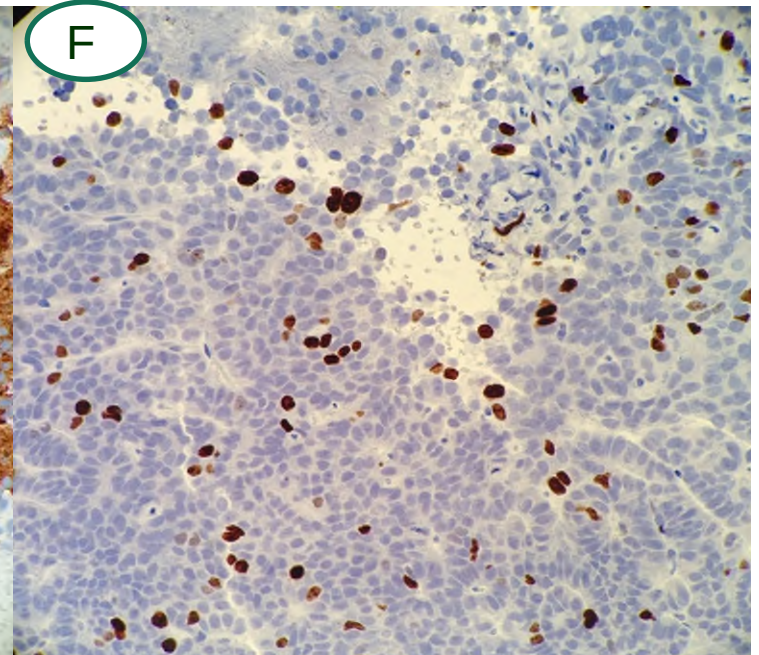
Hematoxylin and Eosin stain – 60x



Pap – 40 x (insert – 100x)



Synaptophysin stain



Ki-67 (MIB-1) Stain

COURTESY KEVIN E. WOODS, MD, MPH

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- Esophageal Cancer / Barrett's Esophagus
- Gastric Cancer
- Pancreatic / HPB Cancer Screening
- **Colorectal Cancer Screening**
- New Advances in A.I. for GI



Optimizing CRC Screening



Screening Age Reduced – Avg Risk 45

- **Optical Colonoscopy is the preferred modality**
- **Remember Special Population screen earlier**



- **Stool Based Screening**

- Cologuard Plus (Sens / Sped)

- **Available and Emerging Blood Based Test**

- **Guardant Shield (FDA/CMS Approved 2024) *****
- (ECLIPSE trial, n = 7,861): CRC sensitivity **83.1%**, specificity **89.6**, advanced precancerous lesion (APL) sensitivity **13.2%**.
- **Freenome Simple Screen**
- (PREEMPT CRC trial, n = 27,010): CRC sensitivity **79.2%**, specificity **91.5%**, APL sensitivity **12.5%**.
- Submitted to FDA for review as of mid-2026.
- Epi Pro Colon (Septin 9)





NCCN Guidelines Version 2.2026

Colorectal Cancer Screening

SCREENING MODALITY AND SCHEDULE

Screening Test	Recommended Testing Interval ^a	Neoplasia			
		Sensitivity ⁴		Specificity ⁴	
		Colon Cancer		Colon Cancer	
Colonoscopy	Every 10 years	94.7% ⁵	89%–95% (≥10 mm adenomas) 75%–93% (≥6 mm adenomas)	—	89% (≥10 mm adenomas) 94% (≥6 mm adenomas)
Flexible sigmoidoscopy ^b	Every 5 years	58%–75% ⁶	72%–86% ⁶	—	92% ⁷
CT colonography	Every 5 years	86%–100%	89% (≥10 mm adenomas) 86% (≥6 mm adenomas)	—	94% (≥10 mm adenomas) 88% (≥6 mm adenomas)
High-sensitivity guaiac-based test	Annually	50%–75%	7%–21% (advanced neoplasia) 6%–17% (advanced adenoma)	96%–98%	96%–99% (advanced neoplasia) 96%–99% (advanced adenoma)
Quantitative FIT ^c (using OC-Sensor)	Annually	74%	25% (advanced neoplasia) 23% (advanced adenoma)	94%	96% (advanced neoplasia) 96% (advanced adenoma)
Quantitative FIT ^c (using OC-Light)	Annually	81%	27% (advanced neoplasia) 28% (advanced adenoma)	93%	95% (advanced neoplasia) 94% (advanced adenoma)
Second generation mt-sDNA test ⁸	Every 3 years	95%	43% (advanced pre-cancerous lesions) 45% (advanced neoplasia)	87%	91% (advanced neoplasia) 89% (advanced adenoma)
mt-sRNA test ⁹	Every 3 years	94%	46% (advanced adenoma)	—	85% (advanced adenoma)
bb-ctDNA test ¹⁰	Every 3 years	83%	13% (advanced pre-cancerous lesions)	90%	90% (advanced neoplasia)

^a Frequency based upon normal (negative) results.

^b Data for the sensitivity and specificity of flexible sigmoidoscopy are for the entire colon and are based on the completion of colonoscopy for those found to have a distal colon lesion on flexible sigmoidoscopy.

^c Optimal FIT thresholds will vary across screening programs, taking into consideration available colonoscopy resources to investigate abnormal results, including false-positive tests.

Note: All recommendations are category 2A unless otherwise indicated.

[References on CSCR-A 3 of 7](#)



Objectives:

- Esophageal Cancer / Barrett's Esophagus
- Gastric Cancer
- Pancreatic / HPB Cancer Screening
- Colorectal Cancer Screening
- **New Advances in A.I. for GI**



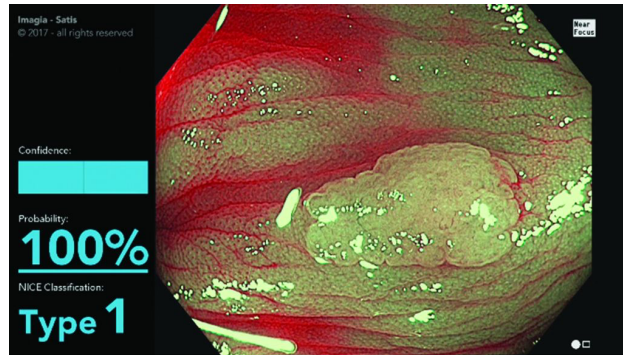
What is the Goal of Artificial Intelligence?

“How can people and computers be connected so that – collectively – they act more intelligently than any person, group or computer has done before?”

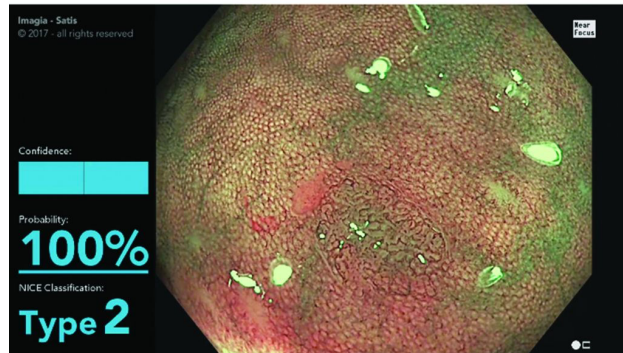
- Professor Tom Malone MIT



Timeline of AI in Gastroenterology



A



B

- Natural Language Processing (NLP) for Predicting CRC ¹
- Convolutional Neural Networks (CNN) in the Dx of H. Pylori based upon Endoscopic images ²
- Computer-Aided Diagnosis Based on (CNN) for colon rectal polyp classification ³
- Application of AI via (CNN) detecting gastric cancer in endoscopic images ⁴
- Endoscopic Surveillance of BE using VLE with AI Image Enhancement ⁵

1. Hoogandoom et al., (2016) Utilizing uncoded consultation notes from electronic medical records for predictive modeling of colorectal cancer. Artif Intell Med 69: 53-61
2. Schichijo et al, (2017) Application of Convolutional Neural Networks in the Diagnosis of Helicobacter pylori Infection Based on Endoscopic Images. EbioMedicine 25: 106-111
3. Komeda et al., (2017) Computer-Aided Diagnosis Based on Convolutional Neural Network System for Colorectal Polyp Classification: Preliminary Experience. Oncology 93 Suppl 1: 30-34
4. Hirasawa et al., (2018) Application of artificial intelligence using a convolution neural network for detecting gastric cancer in endoscopic images
5. Trinadade, et al. (2019) Endoscopic Surveillance of Barrett's Esophagus Using Volumetric Laser Endomicroscopy with AI Image Enhancement. Gastroenterology 157 (2).

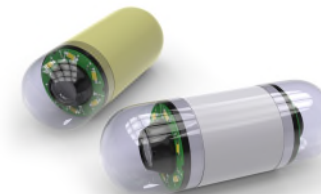
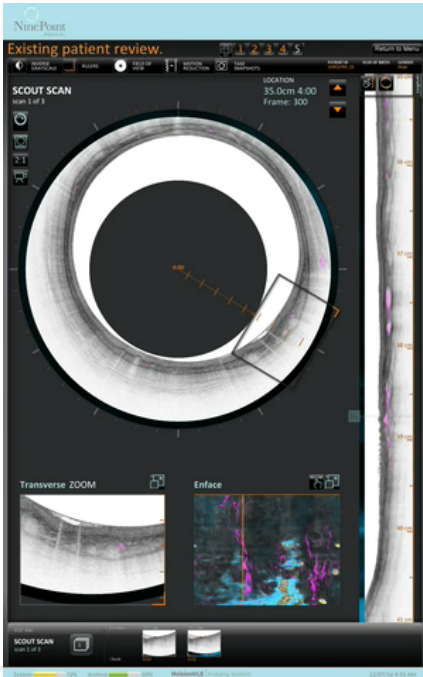


How AI is Changing Clinical Gastroenterology

...more facts

Many Advances have occurred over time we have software on non connected devices that aid us in diagnosis and aid us in common tasks during procedures.

Artificial Intelligence software allows for the detection of polyps, bleeding, dysplasia in the detection of mucosal neoplasia, but many technologies have not sustained its use and applications in clinical practice



Optimizing CRC Screening Modalities with A.I.



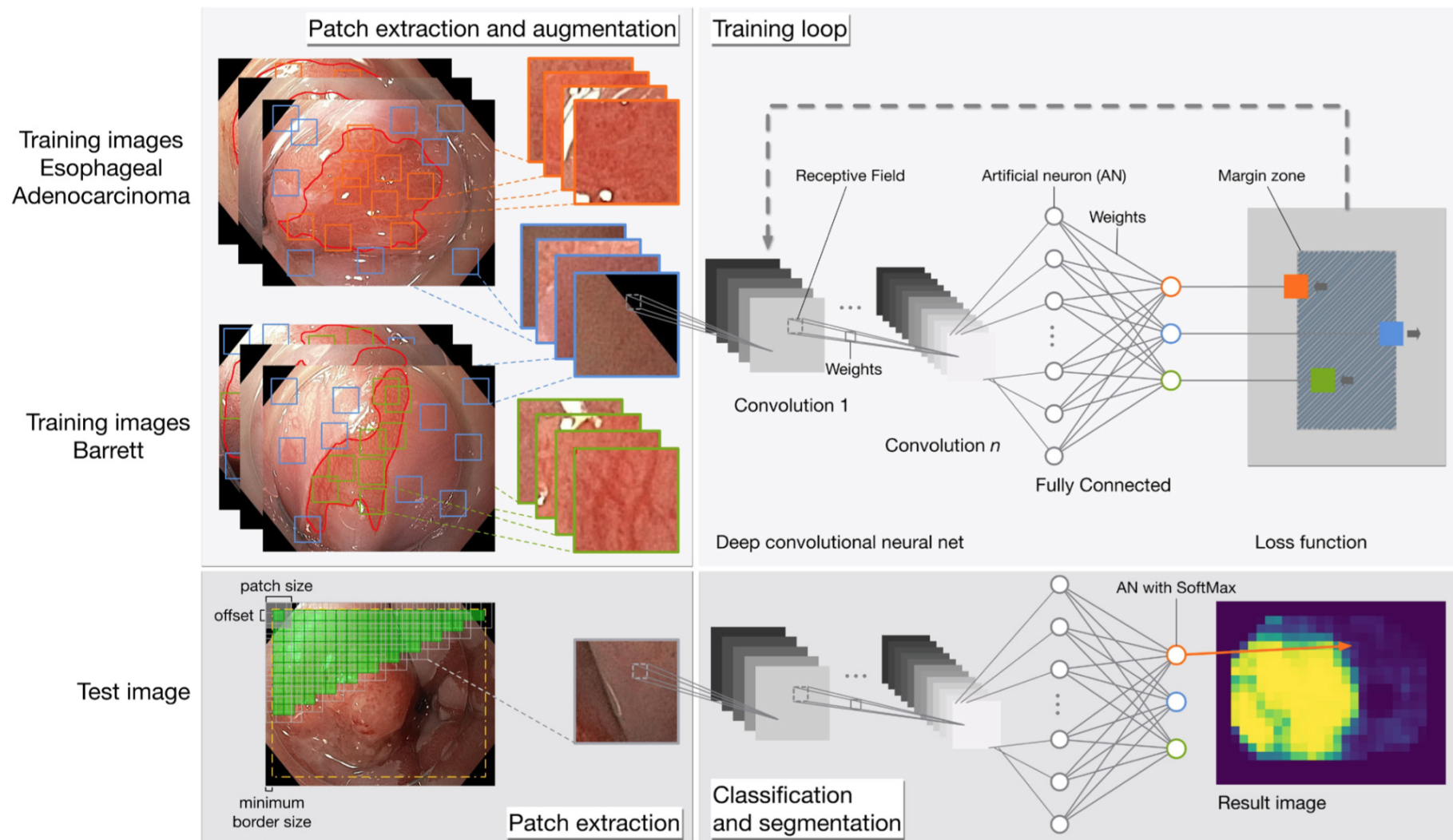


Figure 1 Illustration of the deep learning system. The training of the Augsburg data (top row) is done for three classes (EAC: orange; background: blue; and Barrett: green) after patch extraction and augmentation. The patch sampling for the test image is done equidistantly (bottom row) in contrast to the training patch extraction (top row). The probability of EAC class is stored in the image result for the size of the patch sampling offset. EAC, early oesophageal adenocarcinoma.

Can CAD (AI) Help Us in Endoscopy?

Table 1 Requirements for computer-aided diagnosis to be implemented into clinical practice

CAD should improve diagnostic performance

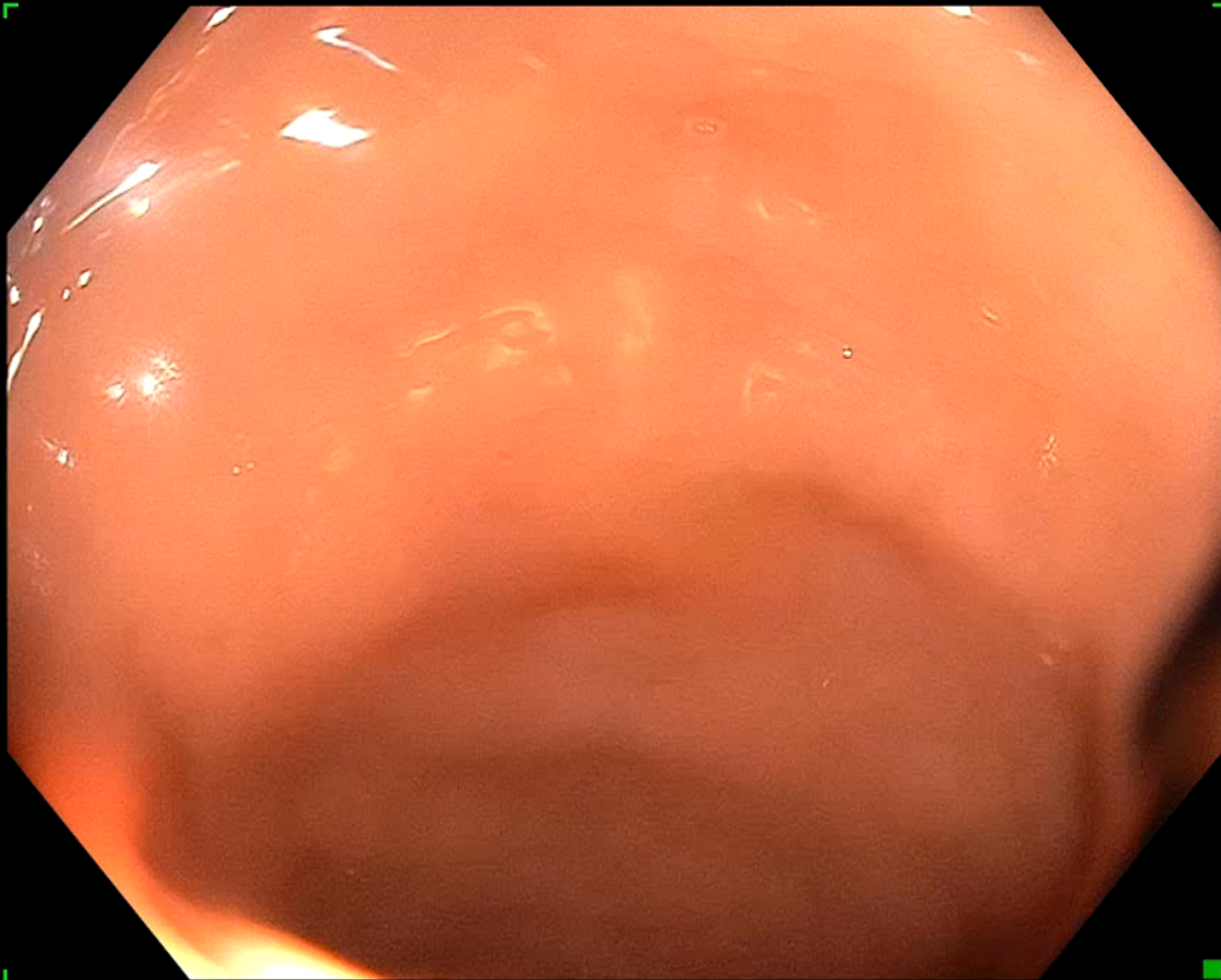
CAD should save time

CAD must be seamlessly integrated into the workflow

CAD should not impose liability concerns, and the incremental costs should be negligible or reimbursed

Adapted from van Ginneken B, Schaefer-Prokop CM, Prokop M. Computer-aided diagnosis: how to move from the laboratory to the clinic. Radiology 2011;261:719-32.





Clinical Impact of AI on AMR - RCT

Gastroenterology 2022;163:295–304

ARTIFICIAL INTELLIGENCE

Impact of Artificial Intelligence on Miss Rate of Colorectal Neoplasia



Michael B. Wallace,^{1,2} Prateek Sharma,³ Pradeep Bhandari,⁴ James East,⁵ Giulio Antonelli,^{6,7,8} Roberto Lorenzetti,⁶ Micheal Vieth,⁹ Ilaria Speranza,¹⁰ Marco Spadaccini,⁶ Madhav Desai,⁴ Frank J. Lukens,¹ Genci Babameto,¹¹ Daisy Batista,¹¹ Davinder Singh,¹¹ William Palmer,¹ Francisco Ramirez,¹² Rebecca Palmer,⁵ Tisha Lunsford,¹² Kevin Ruff,¹² Elizabeth Bird-Liebermann,⁵ Victor Ciofoaia,¹¹ Sophie Arndtz,⁴ David Cangemi,¹ Kirsty Puddick,⁴ Gregory Derfus,¹³ Amitpal S. Johal,¹⁴ Mohammed Barawi,¹⁵ Luigi Longo,¹⁶ Luigi Moro,¹⁶ Alessandro Repici,^{17,18} and Cesare Hassan^{17,18}



METHODS: 230 Patients undergoing CRC screening or surveillance were enrolled in **8 centers (Italy, UK, US)**, and randomized (1:1) to undergo 2 same-day, back-to-back colonoscopies with or without AI (deep learning computer aided diagnosis endoscopy) in 2 different arms, namely AI followed by colonoscopy without AI or vice- versa.

Primary End Point : **Adenoma miss rate (AMR)** was calculated as the number of histologically verified lesions detected at second colonoscopy divided by the total number of lesions detected at first and second colonoscopy.



Clinical Impact of AI on AMR - RCT

CONCLUSIONS:

AI First ARM : resulted in an approximately **2-fold reduction** in miss rate of colorectal neoplasia, supporting AI-benefit in reducing perceptual errors for small and subtle lesions

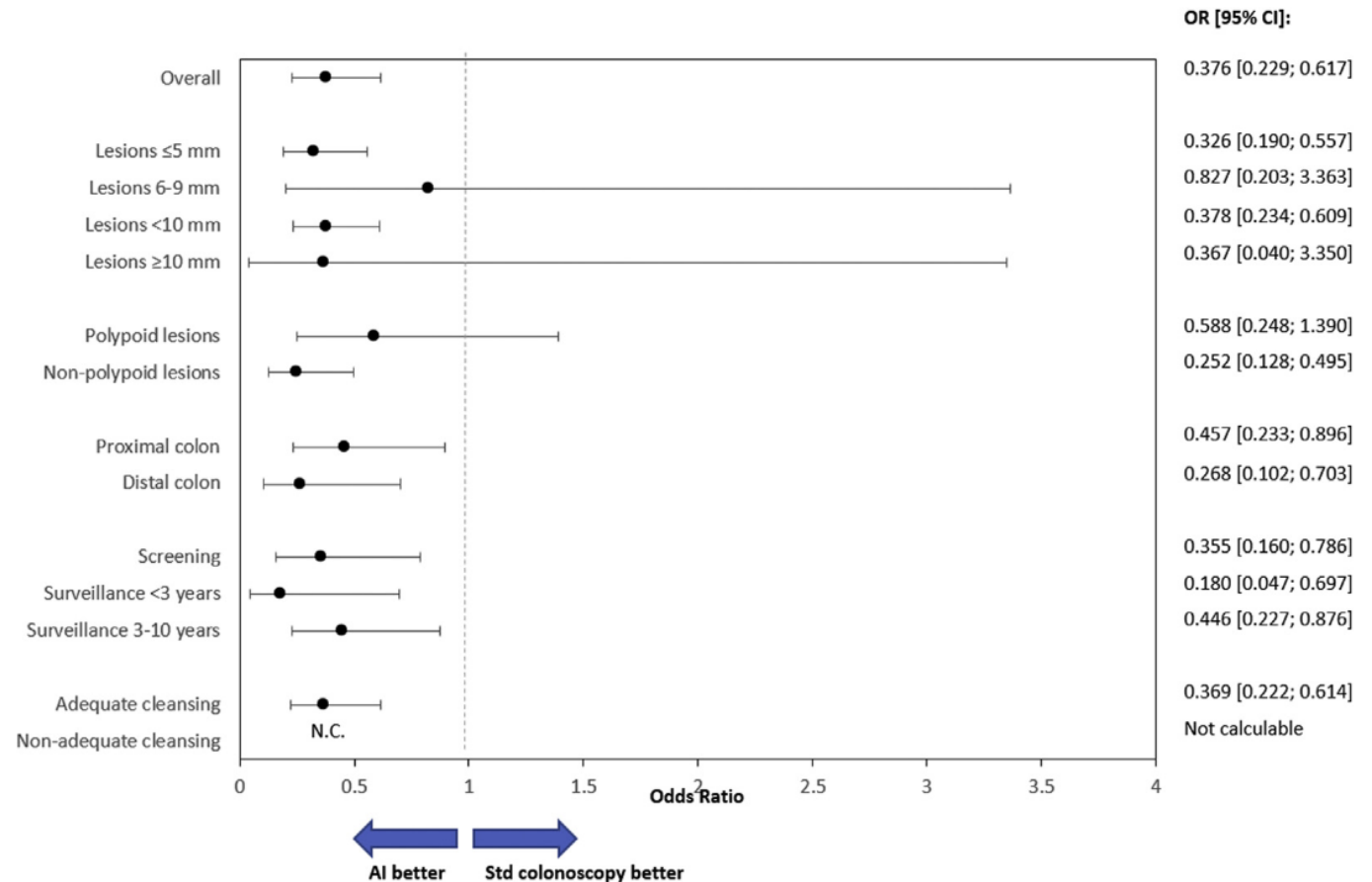


Figure 2. Forest plot of the AMR overall and by subgroup in the FAS population; the estimated OR and associated 2-sided 95% CIs for the comparison between AI first vs standard colonoscopy first, obtained through the logistic mixed model, are plotted in the graph. An OR <1 indicates that the AI first is superior to the standard colonoscopy first (ie, a lower miss rate).



POLICY CORNER

Development Pipeline and Geographic Representation of Trials for Artificial Intelligence/Machine Learning-Enabled Medical Devices (2010 to 2023)

Miquel Serra-Burriel , Ph.D.,^{1,2} Luca Locher , B.Sc.,¹ and Kerstin N. Vokinger , M.D., J.D., Ph.D.¹

Received: July 13, 2023; Revised: September 19, 2023; Accepted: September 29, 2023; Published: November 9, 2023

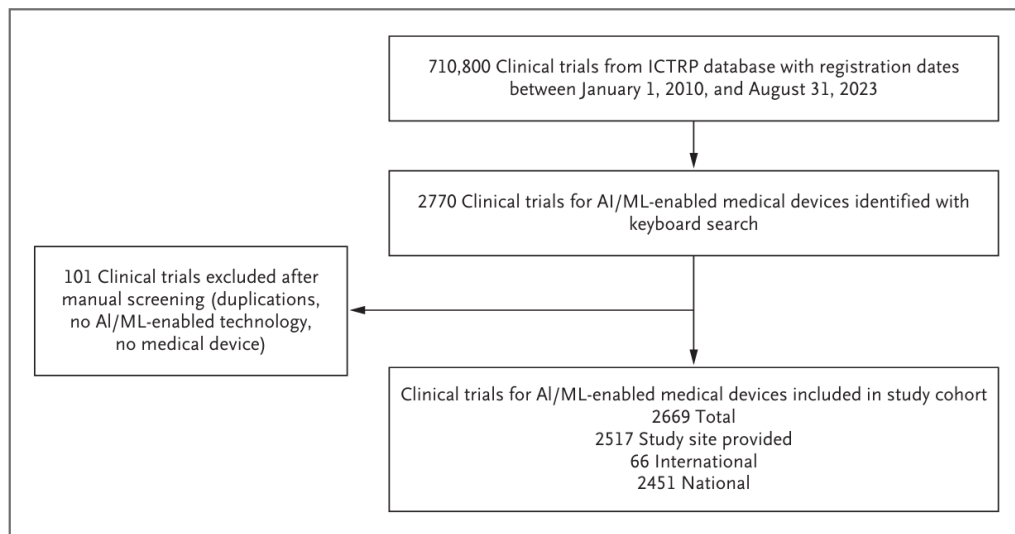


Figure 1. Flow Chart.

AI/ML denotes artificial intelligence/machine learning; and ICTRP, International Clinical Trials Registry Platform.

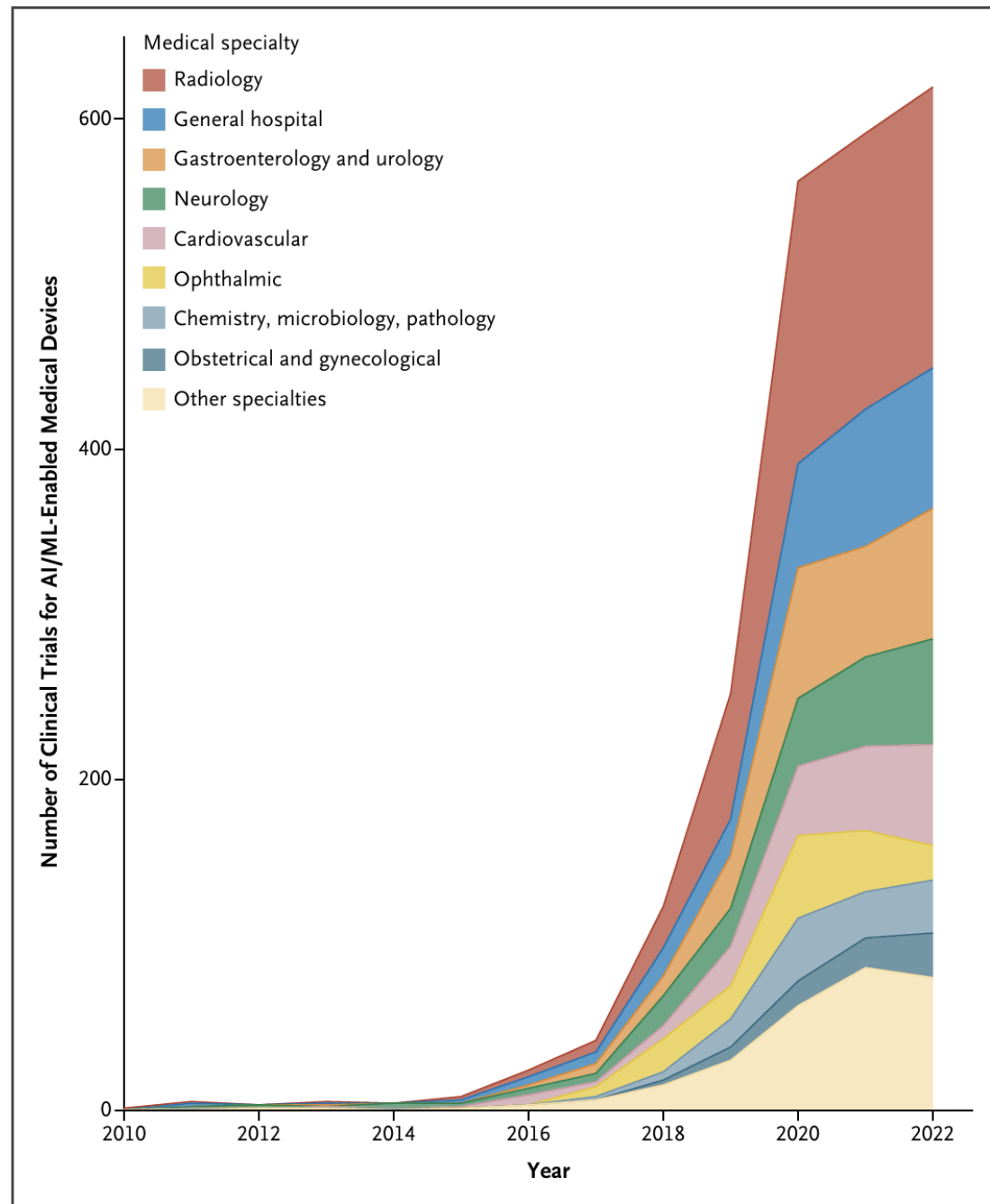


Figure 2. Temporal Trends for Clinical Trials by Medical Specialty.

GastroNet-5M: A Multicenter Dataset for Developing Foundation Models in Gastrointestinal Endoscopy

Martijn R. Jong,^{1,*} Tim G. W. Boers,^{2,*} Kiki N. Fockens,¹ Jelmer B. Jukema,¹ Carolus H. J. Kusters,² Tim J. M. Jaspers,² Rixta A. H. van Eijck van Heslinga,¹ Floor C. Slooter,¹ Maarten R. Struyvenberg,¹ Raf Bisschops,³ Joost A. van der Putten,² Peter H. N. de With,² Fons van der Sommen,² Albert J. de Groof,¹ and Jacques J. G. H. M. Bergman,¹ on behalf of the BONS-AI Consortium

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GastroNet-5M: A Dataset for Foundation Models in GI Endoscopy

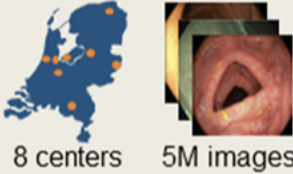


Annotated image data for endoscopic AI development is scarce and costly



Pretraining reduces data demand, but traditional datasets lack alignment

Collection GastroNet-5M



8 centers 5M images

Foundation Model development

GastroNet-5M
+
DINOv2
+
ViT-B



Comparison to state-of-the-art (N=8)



vs.

Fine-tune to specific tasks (N=17)



Pretraining with GastroNet-5M leads to:

- Improved diagnostic accuracy
- Reduced need for training data
- Robustness to data heterogeneity

Gastroenterology

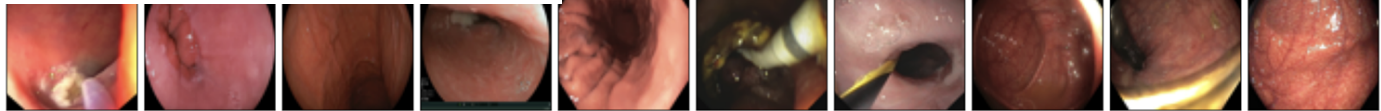


Figure 1. Example of endoscopic images featured in the GastroNet-5M dataset.

Consensus Statements on the Current Landscape of Artificial Intelligence in GI

Statement 1: Current advances in AI allow for the development of AI-based algorithms that can be applied to endoscopy to augment endoscopist performance in detection and characterization of endoscopic lesions.

Statement 2: Computer vision-based algorithms provide opportunities to redefine quality metrics in endoscopy using AI, which can be standardized and can reduce subjectivity in reporting quality metrics. Natural language processing-based algorithms can help with the data abstraction needed for reporting current quality metrics in GI endoscopy effortlessly.

Statement 3: AI technologies can support smart endoscopy suites, which may help optimize workflows in the endoscopy suite, including automated documentation.

Statement 4: Using AI and machine learning helps in predictive modeling, diagnosis, and prognostication. High-quality data with multidimensionality are needed for risk prediction, prognostication of specific clinical conditions, and their outcomes when using machine learning methods.

Statement 5: Big data and cloud-based tools can help advance clinical research in gastroenterology. Multimodal data are key to understanding the maximal extent of the disease state and unlocking treatment options.

Statement 6: Understanding how to evaluate AI algorithms in the gastroenterology literature and clinical trials is important for gastroenterologists, trainees, and researchers, and hence education efforts by GI societies are needed.

Statement 7: Several challenges regarding integrating AI solutions into the clinical practice of endoscopy exist, including understanding the role of human-AI interaction. Transparency, interpretability, and explainability of AI algorithms play a key role in their clinical adoption in GI endoscopy. Developing appropriate AI governance, data procurement, and tools needed for the AI lifecycle are critical for the successful implementation of AI into clinical practice.

Statement 8: For payment of AI in endoscopy, a thorough evaluation of the potential value proposition may help guide purchasing decisions in endoscopy.

Summary:

- **Esophageal Cancer / Barrett's Esophagus**
 - Highlighting the role of HD-WLE / NBI/ Optical Endomicroscopy
 - Importance of Endoscopic Treatment and staging of (<pT1a)
 - EUS does not stage early stage disease
- **Gastric Cancer**
 - Eradicate *H. pylori*
- **Pancreatic / HPB Cancer Screening**
 - Endoscopic Ultrasound / Direct Cholangioscopy / OE and FNB are key to early diagnosis
- **Colorectal Cancer Screening**
 - Screening for Avg Risk = 45
 - Optical Colonoscopy > Stool > Serum based screening
- **New Advances A.I. for GI**
 - New endoscopic tools are promising in the identification of early mucosal malignancies
 - Bias exist in the data sets





Optimizing Screening in Gastrointestinal Malignancies – Questions?



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