Participating in the Webinar

All attendees will be muted and will remain in Listen Only Mode.

Type your questions here so that the moderator can see them. Not all questions will be answered but we will get to as many as possible.
How to Receive CME and MOC Points

LIVE VIRTUAL GRAND ROUNDS WEBINAR
ACG will send a link to a CME & MOC evaluation to all attendees on the live webinar.

ABIM Board Certified physicians need to complete their MOC activities by December 31, 2021 in order for the MOC points to count toward any MOC requirements that are due by the end of the year. No MOC credit may be awarded after March 1, 2022 for this activity.

MOC QUESTION

If you plan to claim MOC Points for this activity, you will be asked to: Please list specific changes you will make in your practice as a result of the information you received from this activity.

Include specific strategies or changes that you plan to implement. THESE ANSWERS WILL BE REVIEWED.
ACG Virtual Grand Rounds

Join us for upcoming Virtual Grand Rounds!

Week 20, 2021
ACG Clinical Guidelines: Colorectal Cancer Screening 2021
Aasma Shaukat, MD, MPH, FACG
May 20, 2021 at Noon Eastern

Week 21, 2021
Assessing for Eating Disorders: A Primer for Gastroenterologists
Monia E. Werlang, MD
May 27, 2021 at Noon Eastern

Visit gi.org/ACGVGR to Register

Disclosures:

Speaker:
Somashekar G. Krishna, MD, MPH, FACG
Study Grant: Mauna Kea Technologies, Paris, France

Moderator:
Mohit Girotra, MD
Dr. Girotra, faculty for this educational event, has no relevant financial relationship(s) with ineligible companies to disclose.

*All of the relevant financial relationships listed for these individuals have been mitigated.*
An Update on the Accurate Diagnosis of Pancreatic Cystic Lesions

Somashekar Krishna, MD, MPH, FACG
Associate Professor of Medicine
Division of Gastroenterology, Hepatology and Nutrition
The Ohio State University Wexner Medical Center

Global Prevalence of PCLs

- MRI/MRCP only
  95% CI: 10-48%
- 25% (of 8,000) PCLs
- 8% (of 49,000) PCLs
- CT or MRI in asymptomatic subjects
  95% CI = 4-14%

Zerboni et al., Pancreatology 2019
Pancreatic Cystic Lesions

Pancreatic Cystic Lesions 15-20%

Pancreatic Intraepithelial Neoplasia 75-80%

Pancreatic Adenocarcinoma

Ayoub et al., JAMA 2021

Pancreatic Cysts

Mucinous Cyst

Mucinous Cystic Neoplasm

IPMN

Cystic Neuroendocrine Tumor

Solid Pseudopapillary Neoplasm

Serous Cystadenoma

Pseudocyst

Also rare, squamous epithelium lined PCLs
Pancreatic Cysts

**Mucinous Cyst**
- Most common
- F=M
- 6-7th decade
- 70% Head
- Multifocal
- BD/Mixed

**Non-mucinous Cyst**
- Mixed solid-cystic lesion
- 2-3rd decade
- 95% Female

**Cystic Neuroendocrine Tumor**
- Malignant potential

**Solid Pseudopapillary Neoplasm**
- Malignant potential

**Cystic NET**
- F=M
- Secondary cystic degeneration
- Prominent / vascular wall
- FNA with immunostaining

**Functional lesions and those > 2 cm need resection**

**IPMN**
- Progressive dysplasia to adenoCa
- Can transform to adenoCa

**Pseudocyst**
- Most common
- F>M 95%
- 4-5th decade
- 95% body/tail
- Associated w/ chronic inflammation

Image source: https://stanfordhealthcare.org
Pancreatic Cysts

- Non-mucinous Cyst
  - F>M 70%
  - 5-6th decade
  - 50% body/tail
  - CT: Stellate scar
  - Macro/Microcystic

- Serous Cystadenoma
  - Less than 1% risk of malignancy

- Pseudocyst
  - Benign, inflammatory

Serous cystadenoma

Image source: https://stanfordhealthcare.org

Diagnostic Evaluation of PCLs

Differentiation into mucinous vs. non-mucinous PCLs

- Cross-sectional imaging: CT and MRI/MRCP
- EUS and FNA of cyst: Cyst fluid CEA (> 192 ng/mL)
  - Accuracy 65-70%
- Cytology alone from EUS-FNA (+ mucin) –
  - Accuracy 50-60%
- Cyst fluid CEA with cytology
  - Accuracy 70-75%

Brugge et al., NEJM 2004;
Gaddam S et al., GIE 2015
Current Standard of Care is Suboptimal

**Mucinous vs. non-mucinous**

- Cyst morphology, fluid CEA, & cytology
- Accuracy ~ 60-70%
- Need for improved/novel diagnostics

**Risk stratification of IPMNs**

- Cyst morphology, fluid CEA, & cytology
- Accuracy ~ 50%
- Need for novel imaging/molecular biomarkers

Brugge et al, NEJM 2014; Sharib et al, Surgery 2018

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65 y/o man, HOP cyst, asymptomatic
CT: 42 mm, unilocular, no main duct dilation
EUS 46 mm, unilocular cyst, no communication with main duct, CEA: 5, amylase 50, cytology – no mucin

50 y/o woman, body cyst, no h/o pancreatitis
CT: 17 mm, increased over 3 years to 34 mm, unilocular
EUS: 32 mm, unilocular cyst, focal dilation of main PD in tail (< 5mm), wall thickness, debris, CEA 845, Amylase 6K, cytology-mucin

37 y/o man, tail cyst, no h/o pancreatitis
MRI: 60 mm cyst, no communication with main duct
EUS: 60 mm; partial wall thickness, CEA 10, Amylase 65K, cytology - no mucin
Various guidelines

- American Society of Gastrointestinal Endoscopy guidelines 2005
- International Consensus Guidelines 2006 (Sendai)
- American College of Gastroenterology (ACG) guidelines 2007
- International Consensus Guidelines (Fukuoka) 2012
- American Gastroenterology Association guidelines 2015
- Revised International Consensus Guidelines (Fukuoka) 2017
- ACG guidelines 2018

High Risk Features of Mucinous Cyst
2017 International Consensus Guidelines

- D Dilated duct ≥ 10 mm
- O Obstruction of bile duct
- N Nodule enhancing ≥ 5 mm
Worrisome Features of Mucinous Cyst
2017 International Consensus Guidelines

- D Dilated duct (5-9 mm)
- A Acute Pancreatitis
- N Nodule – <5 mm or non-enhancing
- C Caliber change of PD
- E Enhancing cyst wall
- S Size > 3 cm
- L Lymphadenopathy
- E Elevated CA 19-9
- G Growth of cyst > 5 mm/2 years

Diagnostic Evaluation of PCLs

- Cross-sectional imaging: CT and MRI/MRCP
- EUS and FNA of cyst: Cyst fluid CEA – accuracy 65-70%
- Cytology alone from EUS-FNA – accuracy 50-60%
- Cyst fluid CEA with cytology – accuracy 70-75%
- Addition of cyst fluid glucose
Cyst Fluid Glucose has Higher Accuracy than Cyst Fluid CEA

Meta-analysis
Various reference standards (surgery, nCLE, cytology)
566 patients; 7 studies

Mucinous vs. Non-mucinous
Low glucose values (cut-off 50mg/dL)
(4 studies-glucometer)

Pooled Analysis
Sensitivity 90% (95% CI 87-93%)
Specificity 85% (95% CI 77-91%)

Mohan et al., Jnl of Clinical Gastro 2021

Current Standard of Care is Suboptimal

Mucinous vs. non-mucinous
Cyst morphology, fluid CEA, & cytology
Addition of glucose
Accuracy ~ 90%
Improved diagnostics

Risk stratification of IPMNs
Cyst morphology, fluid CEA, & cytology
Accuracy ~ 50%
Need for novel imaging/molecular biomarkers

Mohan et al., Jnl of Clinical Gastro 2021
Suboptimal Risk Stratification of IPMNs

- **Key issue**: Surgical Overtreatment
  - Resection of IPMNs with low-grade dysplasia
  - 40-50% of IPMNs resected at large tertiary care hospitals have low-grade dysplasia

- **Key issue**: Missed advanced neoplasia (high-grade dysplasia or cancer)

Risks of Pancreatic Surgery in IPMNs

- **AGA technical review**, prevalence of surgical complications following resection of PCLs (pooled data)
  - Mortality = 2.1% (95% CI: 1.5-2.7%)
  - Morbidity = 30% (95% CI: 25-35%)

- Specifically in low-grade dysplasia IPMNs:
  - Cohort of patients from UCSF and MD Anderson Cancer Center; 129 of 251 (51%) patients with low-grade IPMNs underwent resection.
    - 66 (51%) patients had surgical complications
    - 33 (26%) patients developed diabetes

Scheiman et al., Gastroenterology 2015; Sharib et al., Surgery 2018
Why is Accurate Diagnosis and Risk Stratification Necessary?

While differentiation of cyst type into mucinous vs non-mucinous is important.

- Diagnosis of specific cyst type – definitive treatment vs. cease surveillance
- Risk stratification of IPMNs
  - To prevent morbidity associated with surgery and avoid missed cancers

Pancreatic Cystic Lesions

- Can we effectively classify cysts as –
  - Low Risk
  - High Risk
How to Balance – Low Risk PCLs

- Cost effectiveness of surveillance
- Low risk of progression to cancer
- Increasing prevalence
- Cyst fluid CEA and glucose
- Increasing cost of novel diagnostics

How to Balance – High-Risk

- Standard of care
- Novel Markers for risk stratification
- IPMNs are the most common precancerous cystic neoplasms
- Novel diagnostics for evaluating PCLs
- Stop surveillance of benign cysts

American College of Gastroenterology
Novel Diagnostic Tests for PCLs

Economical; but lack of differentiation of IPMNs/diagnosis of specific type of PCL

- Consensus Guidelines – Cyst morphology
- Standard of care – CEA, Cytology
- Cyst glucose

Diagnose individual cyst type with potential for risk-stratification of IPMNs

- Cyst fluid molecular analysis
- EUS-guided needle based confocal laser endomicroscopy
- Through the Needle Biopsy (Microforceps Bx)

EUS Cyst Fluid Molecular Analysis
### Cyst Fluid Molecular Analysis

**Molecular markers detected in fluid from pancreatic cysts**

<table>
<thead>
<tr>
<th></th>
<th>IPMN</th>
<th>MCN</th>
<th>SCA</th>
<th>SPN</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>All PCLs</strong></td>
<td>KRAS+ or GNAS+</td>
<td>KRAS + &amp; GNAS -</td>
<td>VHL +</td>
<td>CTNNB1+</td>
</tr>
<tr>
<td><strong>PCLs with Advanced Neoplasia</strong></td>
<td>TP53, PIK3CA, PTEN, APC, SMAD4, CDKN2A</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*No markers for Cystic-NET and none seen in pseudocysts*

PCL: Pancreatic Cystic Lesions

*Singhi et al., Gut 2018; Sakhdari et al., Oncotarget 2019; Ren, Krishna SG Mod Pathology 2021*

---

### Cyst Fluid Molecular Analysis – Meta-analysis

**Pooled data**

<table>
<thead>
<tr>
<th></th>
<th>Sensitivity (95% CI)</th>
<th>Specificity (95% CI)</th>
<th>Accuracy (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mucinous Cyst</strong>&lt;br&gt;(n = 231)&lt;br&gt;(KRAS + GNAS)</td>
<td>80% (65-90)</td>
<td>99% (75-100)</td>
<td>96% (94-98)</td>
</tr>
<tr>
<td><strong>IPMN</strong>&lt;br&gt;(n = 256)&lt;br&gt;(KRAS + GNAS)</td>
<td>96% (78-99)</td>
<td>90% (58-98)</td>
<td>97% (95-98)</td>
</tr>
</tbody>
</table>

*McCarty et al., GIE 2021*
Cyst Fluid Molecular Analysis for Risk Stratification of IPMNs

<table>
<thead>
<tr>
<th>IPMNs with Advanced Neoplasia</th>
<th>Sensitivity (95% CI)</th>
<th>Specificity (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>N: 102 Surgical Resections</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TP53, PIK3CA and/or PTEN alterations</td>
<td>88% (0.62 - 0.98)</td>
<td>95% (0.88 - 0.98)</td>
</tr>
<tr>
<td>KRAS/GNAS mutations with TP53, PIK3CA and/or PTEN alterations</td>
<td>88% (0.62 - 0.98)</td>
<td>97% (0.89 - 0.99)</td>
</tr>
</tbody>
</table>

Singhi et al., Gut 2018

Challenges with Cyst Fluid Molecular Analysis

- Handling bio-specimens and costs, insurance coverage
- Not available at all academic centers and commercial laboratories
- Increased costs when processed at commercial laboratories
- Need for multicenter data in risk stratification of IPMNs
  - Real world sensitivity data
Confocal laser endomicroscopy (CLE)

- Real-time endoscopy guided microscopy facilitating *in vivo* characterization of histopathology

EUS-nCLE in PCLs
**EUS-nCLE Image Patterns of Pancreatic Cysts**

1. **Step 1:** Epithelial bands or papillae – IPMN/MCN
   (if none go to Step 2)

2. **Step 2:** Clusters of cells w/out RBCs: Trabecular network – Cystic-NET/SPN
   (if none go to Step 3)

3. **Step 3:** Network of blood vs with RBCs: Fern-pattern of vascularity – SCA
   (if none go to Step 4)

4. **Step 4:** Dark background with inflammatory cells - Pseudocyst

**Diagnostic Accuracy of EUS-nCLE**

**Epithelial patterns have high specificity for mucinous PCLs**

<table>
<thead>
<tr>
<th>Year</th>
<th>Investigator</th>
<th>Study</th>
<th>N (Surgery)</th>
<th>SN</th>
<th>SP</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>Konda VJ et al.</td>
<td>INSPECT</td>
<td>57 (14)</td>
<td>59%</td>
<td>100%</td>
<td>71%</td>
</tr>
<tr>
<td>2015</td>
<td>Nakai Y et al.</td>
<td>DETECT</td>
<td>18 (2)</td>
<td>80%</td>
<td>100%</td>
<td>89%</td>
</tr>
</tbody>
</table>

**Discovery of nCLE patterns in IPMNs**

**Discovery of nCLE patterns in MCNs**

<table>
<thead>
<tr>
<th>Year</th>
<th>Investigator</th>
<th>Study</th>
<th>N (Surgery)</th>
<th>SN</th>
<th>SP</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018</td>
<td>Napoleon B et al.</td>
<td>CONTACT 2</td>
<td>78 (39)</td>
<td>95%</td>
<td>100%</td>
<td>97%</td>
</tr>
<tr>
<td>2019</td>
<td>Krishna SG et al.</td>
<td>INDEX</td>
<td>113 (65)*</td>
<td>98%</td>
<td>94%</td>
<td>97%</td>
</tr>
</tbody>
</table>

N: Total number of patients with definitive diagnosis (clinical follow-up, cytology, molecular analysis, surgical histopathology)

*Diagnostic parameters for n=65 (patients with surgical histopathology)

SN: Sensitivity, SP: Specificity
EUS-nCLE - Meta-analysis

<table>
<thead>
<tr>
<th>Pooled data</th>
<th>% (95% CI)</th>
<th>Sensitivity</th>
<th>Specificity</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mucinous Cyst N = 324 patients 7 studies</td>
<td>85% (71-93)</td>
<td>99% (90-100)</td>
<td>99% (98-100)</td>
<td></td>
</tr>
</tbody>
</table>

Konjeti et al., J Clin Gastro 2020
Low vs. High-Grade Dysplasia in IPMN

- Low grade dysplasia: Papillae are not large. Papillary epithelium is not thick, or dark; thickness 10-20 μ
- High grade dysplasia: Large papillae. Papillary epithelium is thicker and darker; thickness of 40-50 μ
Low vs. High-Grade Dysplasia in IPMN

- Low grade dysplasia: Small well-defined papillae with narrow epithelium; <10 μ
- AdenoCa and High-grade dysplasia: Irregular / interrupted border, thick and dark epithelium of papillae; 30-40 μ

Detection of Advanced Neoplasia in IPMN

1. Epithelial thickness
2. Darkness of epithelium
3. Papillary size
4. Density of papillae
5. Intricate vascularity
6. Intracystic cellularity

Preoperative EUS-nCLE in resected IPMN lesions
Prediction of Advanced Neoplasia in IPMNs

**Human Observers (quantifiable variables)**

SN: 88%, SP: 100% (epithelial thickness or darkness)

**ICG (Fukuoka criteria)**

SN: 56%, SP: 100%

N = 26 IPMNs with surgical histopathology

*Krishna SG et al., GIE 2020*

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Prediction of Advanced Neoplasia in IPMNs

**Computer Aided Diagnosis* (quantifiable variables)**

SN: 83%, SP: 88%

**ICG (Fukuoka criteria)**

SN: 56%, SP: 94%

N = 35 IPMNs with surgical histopathology

1st iteration of an AI model

*Machicado J, Krishna SG et al., GIE 2021*
Challenges with EUS-nCLE

- The need for training and achieving optimal learning curve for high quality imaging
  - Technique
  - Interpretation
- Equipment (processor) and added procedural costs
- Can be prone to interobserver variation
- Risk of post-EUS acute pancreatitis
  - Ranges from 1% to 3%
  - Pooled analysis 1% (95% CI 0-3)
    - Konjeti et al., J Clin Gastro 2020

EUS-micro forceps biopsy (MFB) or through-the-needle-biopsy (TTNB)

- Through the 19-G needle
- Microforceps biopsy
Multiple meta-analyses for EUS-TTNB – Reference Diagnosis (Various)

- **Tacellie et al., Dig Endo 2020**
  - N=454
  - Diagnostic yield 70% (95%CI 59–80)
  - Mucinous PCL Sensitivity 89%
  - Specificity 95%

- **Westerveld et al., EIO 2020**
  - N=426
  - Diagnostic yield 73% (95%CI 61-83)
  - Mucinous PCL Sensitivity 90%
  - Specificity 94%

- **Facciorusso et al., GIE 2020**
  - N=490
  - Diagnostic yield 79% (95%CI 73–84)
  - Mean no. of passes = 3.1 for adequacy

Meta-analyses for EUS-TTNB – Surgical Histopathology

- **Rift et al., Pathol Res Pract, 2021**
  - N=99, 10 studies
  - Specific PCL Sensitivity 69%
  - Specificity 47%
  - Mucinous PCL Sensitivity 86%
  - Specificity 95%

  **HIGH RISK PCL**
  - IPMNs and MCNs with advanced neoplasia, SPN NETs
  - Sensitivity 78%
  - Specificity 99%
Challenges with EUS-TTNB

- Limited range of motion and intracystic reach
  - Risk stratification of IPMNs
- Challenges with tissue adequacy and standardization of technique
- Adverse events

Tacellie et al., Dig Endo 2020
N=454
Adverse event 9%
(95%CI 4-13)
Acute Pancreatitis = 6%

Westerveld et al., EIO 2020
N=426
Adverse event 7%
(95%CI 2-14)
Acute Pancreatitis = 5%

65 y/o man, HOP cyst, asymptomatic
- CT: 42 mm, unilocular, no main duct dilation
- **EUS**: 46 mm, unilocular cyst, no communication with main duct, CEA: 5, amylase 50, cytology – no mucin
- **NGS**: No KRAS/GNAS
- **EUS-nCLE**: Fern-pattern of vascularity.
- **Serous Cystadenoma**

50 y/o woman, body cyst, no h/o pancreatitis
- **CT**: 17 mm, increased to 34 mm in 3 yrs, unilocular
- **EUS**: 32 mm, focal dilation of main PD in tail, wall thickness, debris, CEA 845, Amylase 6K, Cytology-mucin
- **NGS**: no mutations
- **EUS-nCLE**: dark background w/ bright particles
- Surg path - **Pseudocyst**

37 y/o man, tail cyst, no h/o pancreatitis
- **MRI**: 60 mm cyst, no communication with main duct
- **EUS**: 60 mm; wall thickness; CEA 10, Amylase 65K; Cytology: No mucin
- **NGS**: No DNA detected
- **EUS-nCLE**: epithelial bands
- **Surg path**: **MCN**
5/20/2021

65 y/o man, HOP cyst, asymptomatic
CT: 42 mm, unilocular, no main duct dilation
EUS: 46 mm, unilocular cyst, no communication with main duct, CEA: 5, amylase 50, cytology – no mucin
NGS: No KRAS/GNAS
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Serous Cystadenoma

50 y/o woman, body cyst, no h/o pancreatitis
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EUS: 32 mm, focal dilation of main PD in tail (< 5mm), wall thickness, debris, CEA 845, Amylase 6K, Cytology - mucin
NGS: no mutations
EUS-nCLE: dark background with bright particles
Surg path - Pseudocyst

37 y/o man, tail cyst, no h/o pancreatitis
MRI: 60 mm cyst, no communication with main duct
EUS: 60 mm; wall thickness; CEA 10, Amylase 65K; Cytology: No mucin
NGS: No DNA detected
EUS-microforceps bx: epithelial bands
Surg path: MCN

Advanced Diagnostics for PCLs

<table>
<thead>
<tr>
<th></th>
<th>High Accuracy</th>
<th>Moderate Accuracy</th>
<th>Lack of Markers</th>
<th>Differentiation of IPMNs</th>
<th>Complication (Acute Pancreatitis)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cyst fluid molecular analysis</td>
<td>IPMN, SPN</td>
<td>MCN, SCA</td>
<td>Cystic-NET</td>
<td>Center dependent expertise</td>
<td>&lt; 1%</td>
</tr>
<tr>
<td>EUS-nCLE</td>
<td>IPMN, Cystic-NET/SPN, SCA</td>
<td>MCN</td>
<td>Cannot differentiate between NET/SPN</td>
<td>Need multicenter studies</td>
<td>2-3%</td>
</tr>
<tr>
<td>EUS-microforceps bx</td>
<td>IPMN, SCA</td>
<td>MCN</td>
<td>Dependent on tissue yield</td>
<td>No data</td>
<td>4-10% (including intracystic bleeding)</td>
</tr>
</tbody>
</table>

IPMN – Intraductal Papillary Mucinous Neoplasm
MCN - Mucinous cystic neoplasm
SCA - Serous cystadenoma
Cystic-NET - Cystic neuroendocrine tumor
SPN - Solid pseudopapillary neoplasm (SPN)
**Future Directions**

- Increasing Prevalence
- High Cost of Surveillance
- Low Probability of Malignancy

**PCL**

- Accurate Determination of Risk?
  - Size, Growth, Intracystic features
  - Multidisciplinary consensus

- Need multicenter validation of tests to accurately risk stratify IPMNs
- Complementary role of advanced diagnostic tests

- Low Risk
  - Imaging, Cyst fluid CEA, Cytology, & Glucose

- High Risk
  - Advanced Diagnostics for Risk Stratification
  - High-risk cysts
    - IPMNs and MCNs
    - SPNs
    - NETs

**Conclusion**

- Increasing prevalence of pancreatic cystic lesions
- Cost effective surveillance strategies for low-risk cysts
- Surgical overtreatment of IPMNs and associated morbidity
  - Accurate detection of advanced neoplasia in IPMNs for more meaningful pancreatic resections
- Understand complementary role of diagnostic tests
American College of Gastroenterology

Thank You

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INDEX single center study 2015-2018

The Ohio State University

Artificial intelligence & EUS-nCLE 2019-2020

American College of Gastroenterology

CLIMB multicenter study 2018-

The National Pancreas Foundation

CLIMB study multicenter study 2018-

Mauna Kea

CLIMB study multicenter study 2020-

---

The Ohio State University Division of Gastroenterology, Hepatology, and Nutrition: Section of Advanced Endoscopy and Section of Pancreatic Disorders

Adv Endo: U of Colorado

Endo Rx of Chronic Pancreatitis

Dr. Samuel Han

Adv Endo: J Hopkins

Third space endo & bariatrics

Dr. Thomas Runge

Nutrition & Metabolism of Chronic Pancreatitis

Dr. Phil Hart

(Director Pancreatic Disorders)

(U01, U01 DK LRP)

Acute Pancreatitis and Advanced Endoscopy

(Director Advanced Endoscopy)

Dr. George Papachristou

(U01, U01)

Obesity & Pancreas Cancer

Dr. Zoheida Cruz-Monserrate

(R01, R21 NPF, Orien, Pelotonia)

Cyst diagnosis (adv diagnostics) & ablation

Dr. Som Krishna

(ACG, NPF, EDRN)

Pancreas Cancer & Pancreatitis Immunology

Dr. Tom Mace (KL2)

Autologous Islet Transplantation in Chronic Pancreatitis

Dr. Luis Lara (R01, POST)

Adv Endo: J Hopkins

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(U01, U01)

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(R01, R21 NPF, Orien, Pelotonia)

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Third space endo & bariatrics

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Endo Rx of Chronic Pancreatitis

Dr. Samuel Han

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American College of Gastroenterology
Questions?

Speaker:
Somashekar G. Krishna, MD, MPH, FACG

Moderator:
Mohit Girotra, MD

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