



# 9<sup>TH</sup> ANNUAL ***DIGESTIVE DISEASES: NEW ADVANCES***

**September 16–17, 2022**

**W Hotel  
Philadelphia, PA**

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This activity is supported by educational grants from AbbVie,  
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# Advances in Pancreaticobiliary Endoscopy: Creating Alternate Solutions

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# Disclosure

- **Georgios Papachristou, MD, PhD**
  - **Consultant:**
    - Olympus
  - **Speaker:**
    - Nestle

The background of the slide features a light blue header with a pattern of hexagonal icons. These icons include a heart, a city skyline, a pill, a first aid kit, a stethoscope, a virus, and a bar chart. 

# Objectives

- Provide an overview of emerging pancreaticobiliary endoscopy techniques and the evidence supporting their use
- Provide guidance regarding indications and contraindications for pancreaticobiliary endoscopy in 2022
- Review the increasing complexity of adverse events in therapeutic endoscopy

A decorative header featuring a light blue background with various medical icons in white and light blue. The icons include a heart with a pulse line, a city skyline, a water drop, two pills, a first aid kit, a stethoscope, a virus/cell, and a bar chart. A faint ECG line is visible on the right side.

# Agenda

- Biliary Drainage
- Cholecystitis and Cholelithiasis
- Advanced Pancreaticobiliary Stone Management
- Fluid Collection Drainage
- Altered Anatomy
- Gastroenteric Bypass



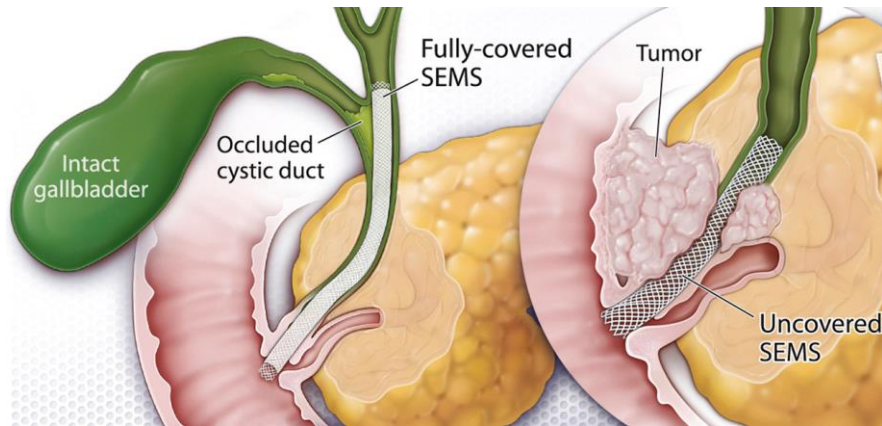
# EUS-Guided Biliary Drainage

## EUS-Guided Biliary Drainage Versus ERCP for the Primary Palliation of Malignant Biliary Obstruction: A Multicenter Randomized Clinical Trial

Woo Hyun Paik, MD, PhD<sup>1,2</sup>, Tae Hoon Lee, MD, PhD<sup>3</sup>, Do Hyun Park, MD, PhD<sup>4</sup>, Jun-Ho Choi, MD<sup>5</sup>, Seon-Ok Kim, MSc<sup>6</sup>, Sunguk Jang, MD<sup>7</sup>, Dong Uk Kim, MD, PhD<sup>8</sup>, Ju Hyun Shim, MD, PhD<sup>4</sup>, Tae Jun Song, MD, PhD<sup>4</sup>, Sang Soo Lee, MD, PhD<sup>4</sup>, Dong-Wan Seo, MD, PhD<sup>4</sup>, Sung Koo Lee, MD, PhD<sup>4</sup> and Myung-Hwan Kim, MD, PhD<sup>4</sup>

- Multicenter RCT (n=125) comparing EUS-guided biliary drainage vs. ERCP for patients with unresectable malignant distal biliary obstruction
- EUS-BD arm: Technical success rate of 94% vs. 90% (ERCP)
- EUS-BD arm: Significantly lower adverse event rate (6%) vs. ERCP (20%)
- EUS-BD: High rate of stent patency (85% vs. 49%) with lower rate of reintervention (16% vs. 43%)

# EUS-Guided Biliary Drainage vs. ERCP



# EUS-Guided Biliary Drainage

## Stent placement by EUS or ERCP for primary biliary decompression in pancreatic cancer: a randomized trial (with videos)

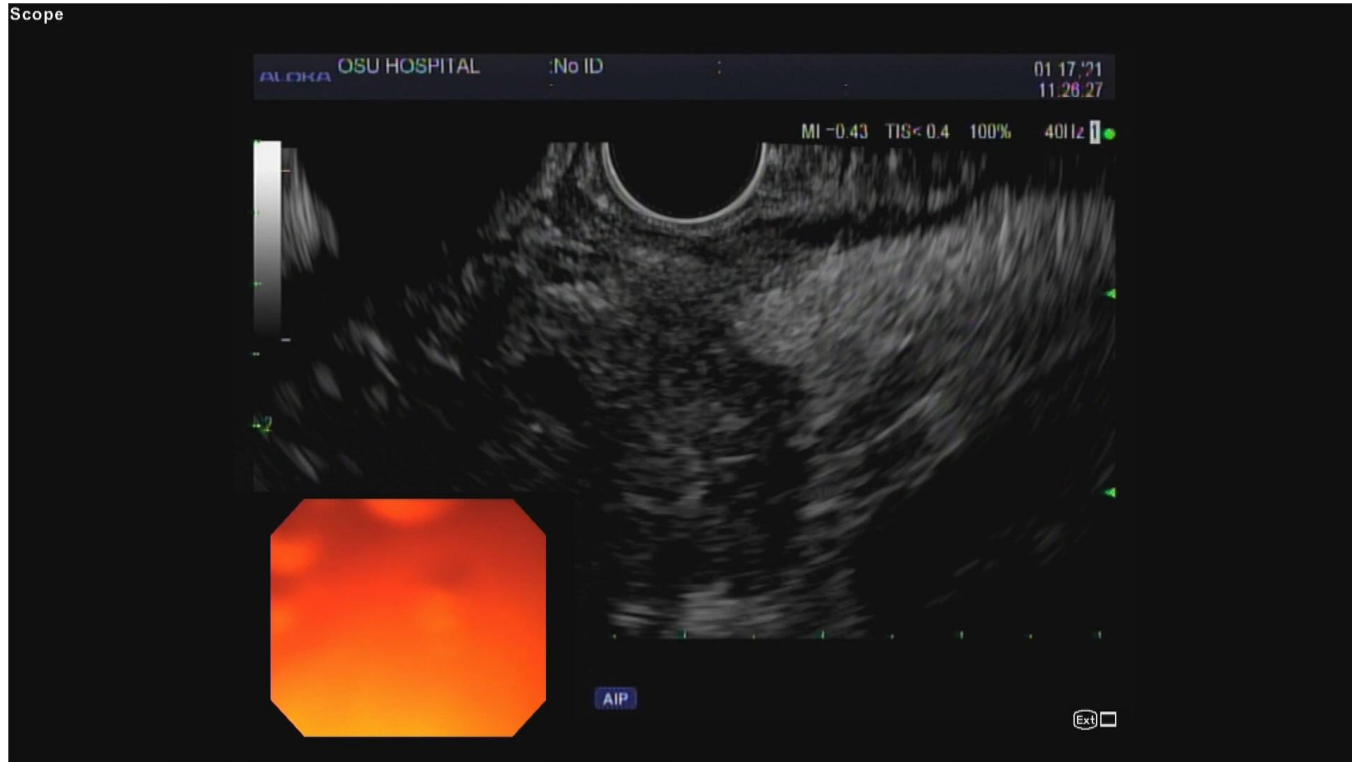


Ji Young Bang, MD, MPH, Udayakumar Navaneethan, MD, Muhammad Hasan, MD, Robert Hawes, MD, Shyam Varadarajulu, MD

- Single-center RCT (n=67) comparing EUS-BD vs. ERCP for distal biliary obstruction from pancreatic cancer with primary outcome being adverse event rate
- 21% adverse event rate (EUS-BD) vs. 15% adverse event rate (ERCP)
- Most adverse events of mild severity (abdominal pain)
- EUS-BD did not affect subsequent Whipple surgeries



# EUS-Guided Choledochoduodenostomy



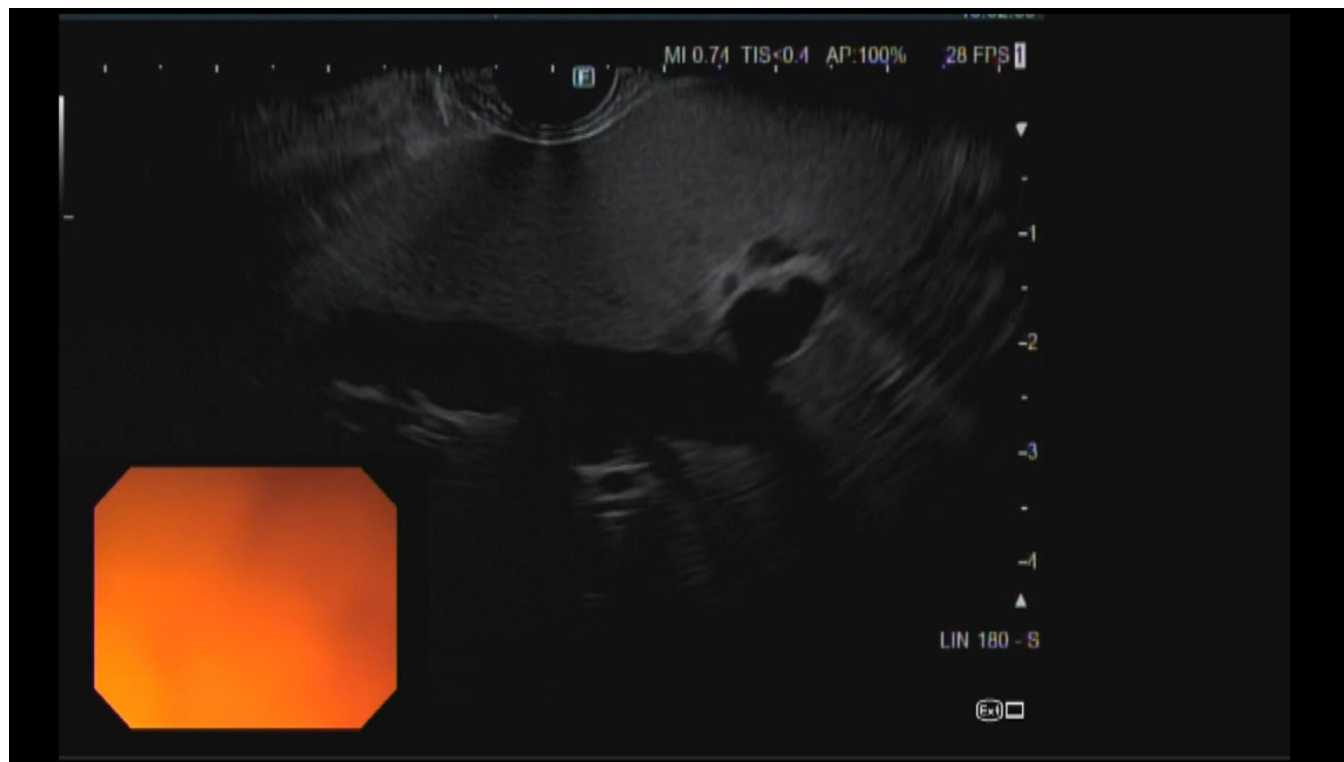
# EUS-Guided Left Hepaticogastrostomy



# EUS-Guided Left Hepaticogastrostomy

Comparison of the efficacy and safety of endoscopic ultrasound-guided choledochoduodenostomy and hepaticogastrostomy for malignant distal biliary obstruction: Multicenter, randomized, clinical trial

- Multicenter randomized study (n=47) comparing EUS-guided Choledocho-duodenostomy vs. Left hepaticogastrostomy in pts who failed standard ERCP for malignant distal biliary obstruction
- Technical Success: EUS-Choledochoduodenostomy (83%) vs. Left hepaticogastrostomy (88%)
- Clinical Success: EUS-Choledochoduodenostomy (95%) vs. Left hepaticogastrostomy (100%)
- Cross-over allowed if unsuccessful with overall technical success rates being 100% (left hepaticogastrostomy) and 96% (Choledochoduodenostomy) – suggesting that if one technique is unsuccessful, switching to another may be



# Cholecystitis and Cholelithiasis

- In high surgical risk-patients, EUS-guided gallbladder drainage offers a treatment option for both drainage of the gallbladder and treatment of gallstones



# EUS-Guided Gallbladder Drainage

Endosonography-guided gallbladder drainage versus percutaneous cholecystostomy in very high-risk surgical patients with acute cholecystitis: an international randomised multicentre controlled superiority trial (DRAC 1)

Anthony Y B Teoh <sup>1</sup>, Masayuki Kitano <sup>2</sup>, Takao Itoi<sup>3</sup>, Manuel Pérez-Miranda,<sup>4</sup> Takeshi Ogura,<sup>5</sup> Shannon Melissa Chan,<sup>1</sup> Carlos Serna-Higuera,<sup>4</sup> Shunsuke Omoto,<sup>6</sup> Raul Torres-Yuste,<sup>4</sup> Takayoshi Tsuchiya,<sup>3</sup> Ka Tak Wong,<sup>7</sup> Chi-Ho Leung <sup>1</sup>, Philip Wai Yan Chiu <sup>1</sup>, Enders Kwok Wai Ng,<sup>1</sup> James Yun Wong Lau<sup>1</sup>

- Multicenter RCT (n=80) comparing EUS-guided gallbladder drainage with percutaneous cholecystostomy in pts deemed not surgical candidates
- No difference in clinical success rates (93% EUS vs. 93% perc chole)
- EUS-drainage had a significantly lower 1-year adverse event rate (26% vs. 78%)
- EUS-drainage had a significantly lower rate of recurrent cholecystitis (2.6% vs. 20%)

# EUS-Guided Gallbladder Drainage

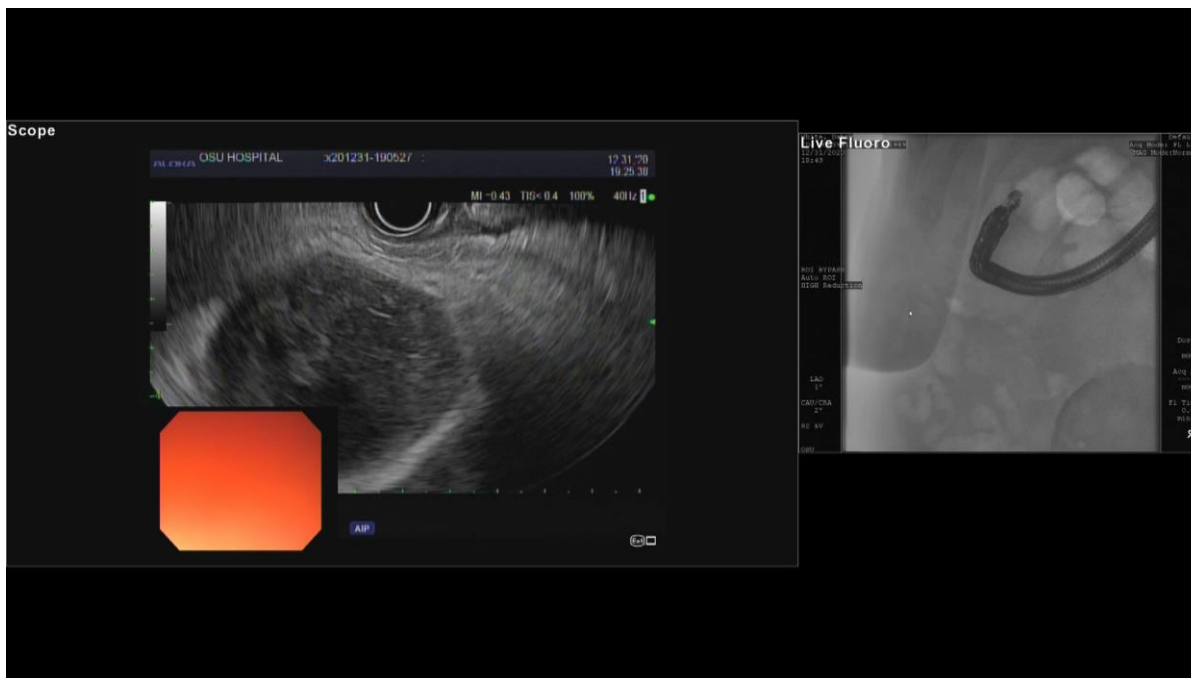
## EUS-guided gallbladder drainage versus laparoscopic cholecystectomy for acute cholecystitis: a propensity score analysis with 1-year follow-up data

Anthony Yuen Bun Teoh, FRCSEd (Gen), Chi Ho Leung, MSc, Prudence Tai Huen Tam, MRCS, Kitty Kit Ying Au Yeung, MRCS, Richard Chung Ying Mok, MRCS, Daniel Leonard Chan, FRACS, Shannon Melissa Chan, FRCSEd (Gen), Hon Chi Yip, FRCSEd (Gen), Philip Wai Yan Chiu, FRCSEd (Gen), Enders Kwok Wai Ng, FRCSEd (Gen)

- Propensity score analysis of 60 patients with acute cholecystitis treated with either laparoscopic cholecystectomy or EUS-guided drainage
- Similar technical success rates (100% in both treatment arms) and clinical success rates (93% EUS vs. 100% Lap Chole) and length of stay (6.8 days EUS vs. 5.5 days Lap Chole)
- Similar outcomes between two treatments suggests EUS-guided gallbladder drainage is an appropriate alternative treatment to patients who are not surgically fit to undergo cholecystectomy

# EUS-Guided Gallbladder Drainage Video

## EUS-guided Gallbladder Drainage followed by Gallstone Lithotripsy



# Cystic Duct Stent Placement via ERCP

- Placement of a plastic stent into the gallbladder via the cystic duct is an alternative option for treatment of cholecystitis
- Particularly for patients with ascites or inaccessible gallbladder anatomy
- 50% success rates via traditional ERCP
- 75% success rates using cholangioscopy for direct visualization of the cystic duct



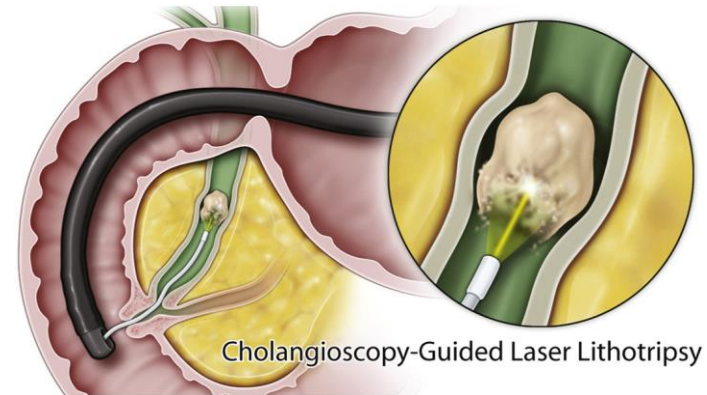
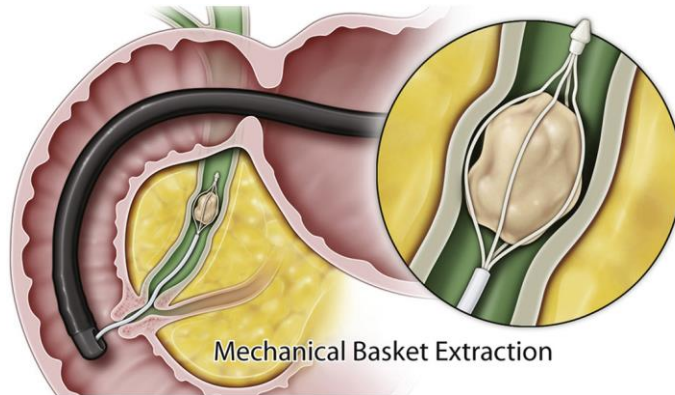


# Advanced Pancreaticobiliary Stone Management

- Cholangiopancreatography enables targeted stone lithotripsy under direct visualization
- Lithotripsy via electrohydraulic lithotripsy or laser lithotripsy
- Direct stone extraction using a basket

# Challenging (Large) Choledocholithiasis

- Randomized study found 93% success rate with cholangioscopy-guided laser lithotripsy compared to 67% success rate with standard ERCP techniques
- Multicenter study found a 95% success rate of stone clearance using cholangioscopy in difficult stone cases

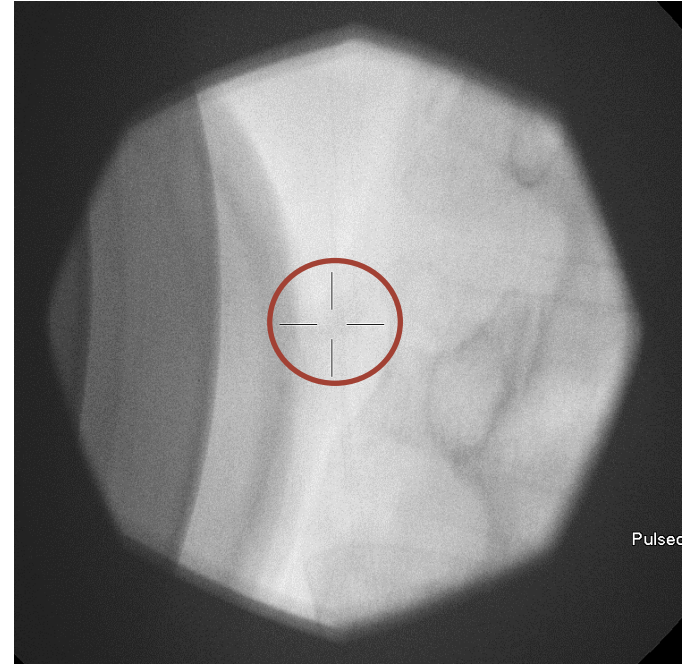
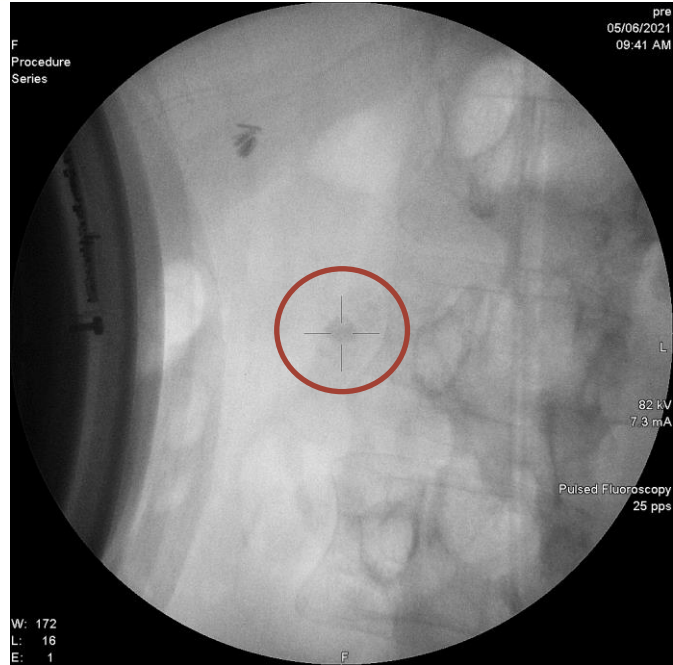




# Pancreatic Duct Stones

- When conventional ERCP fails, the two main therapeutic options include
  - A) **ESWL** (extracorporeal shockwave lithotripsy)
    - 70% success rate (limited availability in the US, difficult in radiolucent stones) and best for stones in the head/neck area
  - B) **Pancreatotomy-guided Lithotripsy** (EHL and Laser Lithotripsy)
    - 90% success rate

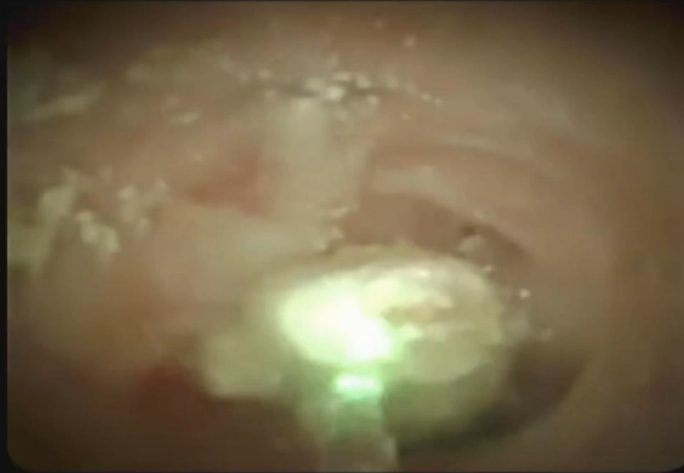
# Extracorporeal Shockwave Lithotripsy





# Pancreatostomy-Guided Laser Lithotripsy

IN 2



# ESWL vs. Pancreatoscopy-Guided Lithotripsy (NCT04115826)

- 8-center randomized study comparing ESWL with Pancreatoscopy-guided Lithotripsy for Large Pancreatic Duct Stones

# Pancreatic (Or Other) Fluid Collection Drainage

- Typically for either walled-off necrosis (acute) or pseudocysts (chronic pancreatitis)
- Presence of a continuous wall is key for endoscopic transmural drainage

## A Step-up Approach or Open Necrosectomy for Necrotizing Pancreatitis

- Step-up approach (either endoscopic or percutaneous) results in lower rates of major adverse events such as multiple-organ failure compared to open necrosectomy
- Long-term results revealed that the step-up approach leads to lower rates of incisional hernias, pancreatic exocrine and endocrine insufficiency without an increased need for reintervention
- Open necrosectomy should rarely be performed for necrotizing pancreatitis

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## Endoscopic or surgical step-up approach for infected necrotising pancreatitis: a multicentre randomised trial

*Sandra van Brunschot, Janneke van Grinsven, Hjalmar C van Santvoort, Olaf J Bakker, Marc G Besselink, Marja A Boermeester, Thomas L Bollen, Koop Bosscha, Stefan A Bouwense, Marco J Bruno, Vincent C Cappendijk, Esther C Consten, Cornelis H Dejong, Casper H van Eijck, Willemien G Erkelens, Harry van Goor, Wilhelmina M U van Grevenstein, Jan-Willem Haveman, Sijbrand H Hofker, Jeroen M Jansen, Johan S Laméris, Krijn P van Lienden, Maarten A Meijssen, Chris J Mulder, Vincent B Nieuwenhuijs, Jan-Werner Poley, Rutger Quispel, Rogier J de Ridder, Tessa E Römkens, Joris J Scheepers, Nicolien J Schepers, Matthijs P Schwartz, Tom Seerden, B W Marcel Spanier, Jan Willem A Straathof, Marin Strijker, Robin Timmer, Niels G Venneman, Frank P Vleggaar, Rogier P Voermans, Ben J Witteman, Hein G Gooszen, Marcel G Dijkgraaf, Paul Fockens, for the Dutch Pancreatitis Study Group\**

- Compared endoscopic drainage vs. minimally invasive surgical step-up approach (start with percutaneous drainage and move up to VARD if needed)
- Endoscopic drainage had a lower rate of pancreatic fistulae and a shorter length of hospitalization (by 16 days) without any difference in mortality





**An Endoscopic Transluminal Approach, Compared With Minimally Invasive Surgery, Reduces Complications and Costs for Patients With Necrotizing Pancreatitis**

**Endoscopic versus laparoscopic drainage of pseudocyst and walled-off necrosis following acute pancreatitis: a randomized trial**

- Single-center US trial comparing endoscopic treatment vs. minimally invasive surgery (VARD or lap-assisted) for infected necrotizing pancreatitis – endoscopic treatment had a lower adverse event rate with improved quality of life and lower overall cost
- Single-center trial from India compared endoscopic cystgastrostomy vs. laparoscopic cystgastrostomy – endoscopic treatment required fewer reinterventions and a shorter time to resuming oral feeding with similar clinical success rates



# Multiple-Gateway Technique

# Additional Techniques

- **Altered Anatomy**
  - Enteroscopy-assisted ERCP
  - Laparoscopy-assisted ERCP
  - EUS-Directed transGastric EUS/ERCP (EDGE)
- **EUS-guided Gastroenterostomy (EUS-GJ)**

# Thank You

