

Tackling the Difficult Biliary Stone: Who, When, and How

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Objectives

- Diagnosis of CBD stones
- Standard endoscopic therapy
- Difficult stone management

Choledocholithiasis

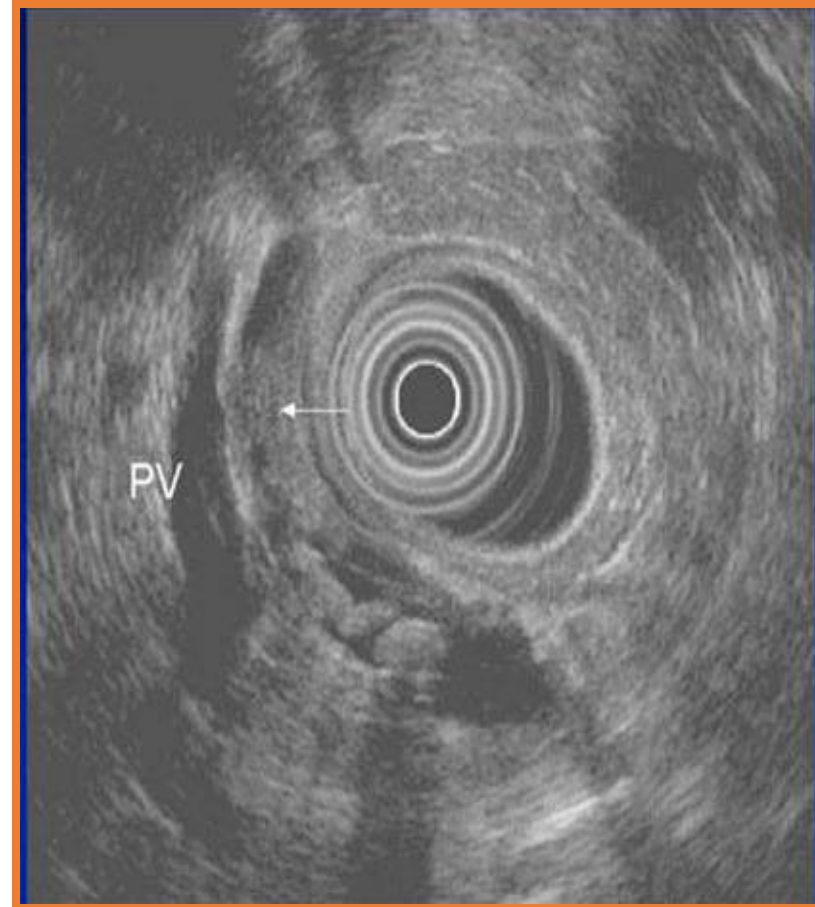
- Common complication of gallbladder stones (15% - 20%)
- In post-cholecystectomy patients, retained or recurrent CBD stones occur in 1% - 5%
- Cholesterol (85%) and pigmented (15%)
- CT and abdominal ultrasound not reliable

EUS for Choledocholithiasis

- Highly accurate in detecting CBD stones (sensitivity >95%)
- Less invasive than ERCP
- Average procedure time: 5 to 10 minutes
- Can be performed with ERCP under one setting



Diagnosis by EUS



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Diagnosis by MRCP



SYSTEMATIC REVIEW

EUS vs MRCP for detection of choledocholithiasis

Dharmendra Verma, MD, Asha Kapadia, PhD, Glenn M. Eisen, MD, MPH, Douglas G. Adler, MD

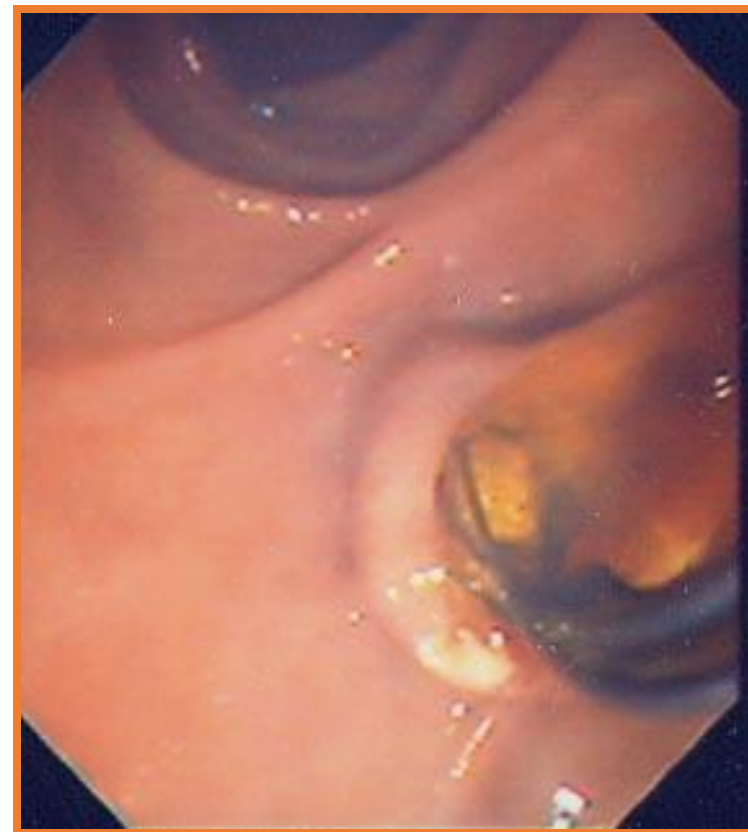
Houston, Texas, USA

- Systemic review of 5 randomized, prospective trials comparing EUS and MRCP in diagnosing CBD stones
- 301 patients underwent both EUS and MRCP
- 108 with confirmed CBD stones
- EUS: Sensitivity 93% Specificity 96%
- MRCP: Sensitivity 85% Specificity 93%

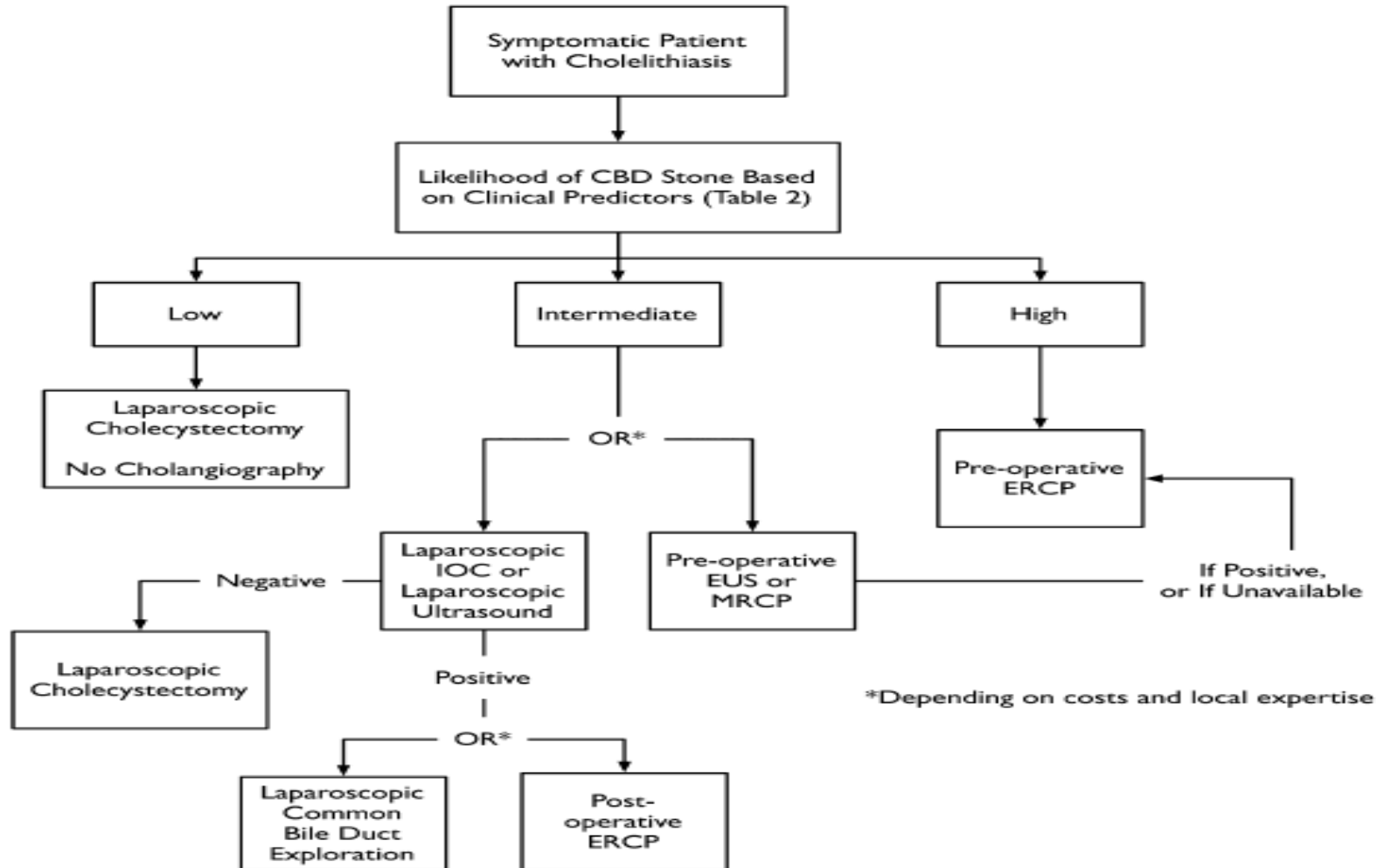
Verma D, et al. Gastrointest Endosc

Diagnosis by ERCP

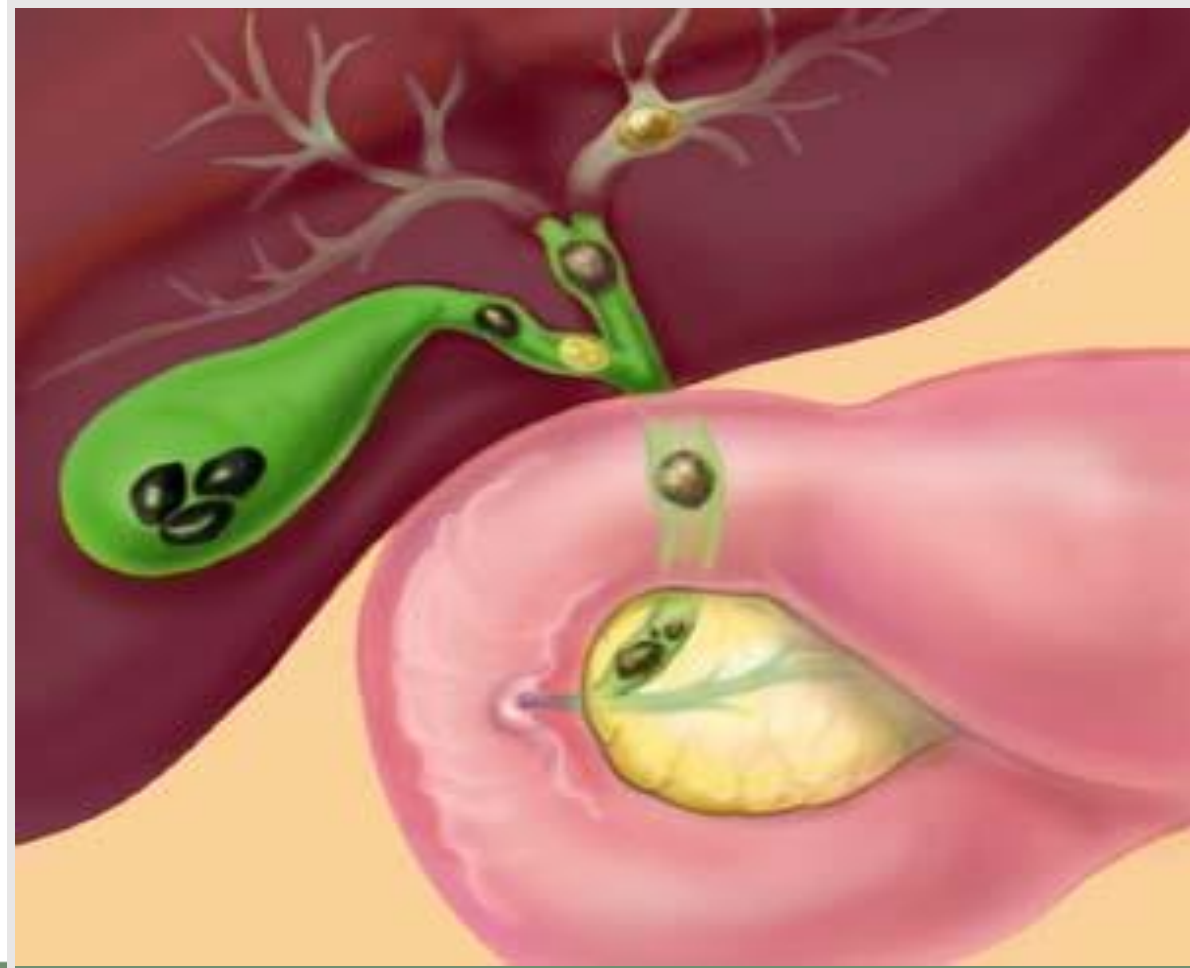
- Most accurate modality in diagnosing CBD stones
- Therapy can be performed
- Complications: perforation, pancreatitis, bleeding



The role of endoscopy in the evaluation of suspected choledocholithiasis



ERCP for Stone Removal



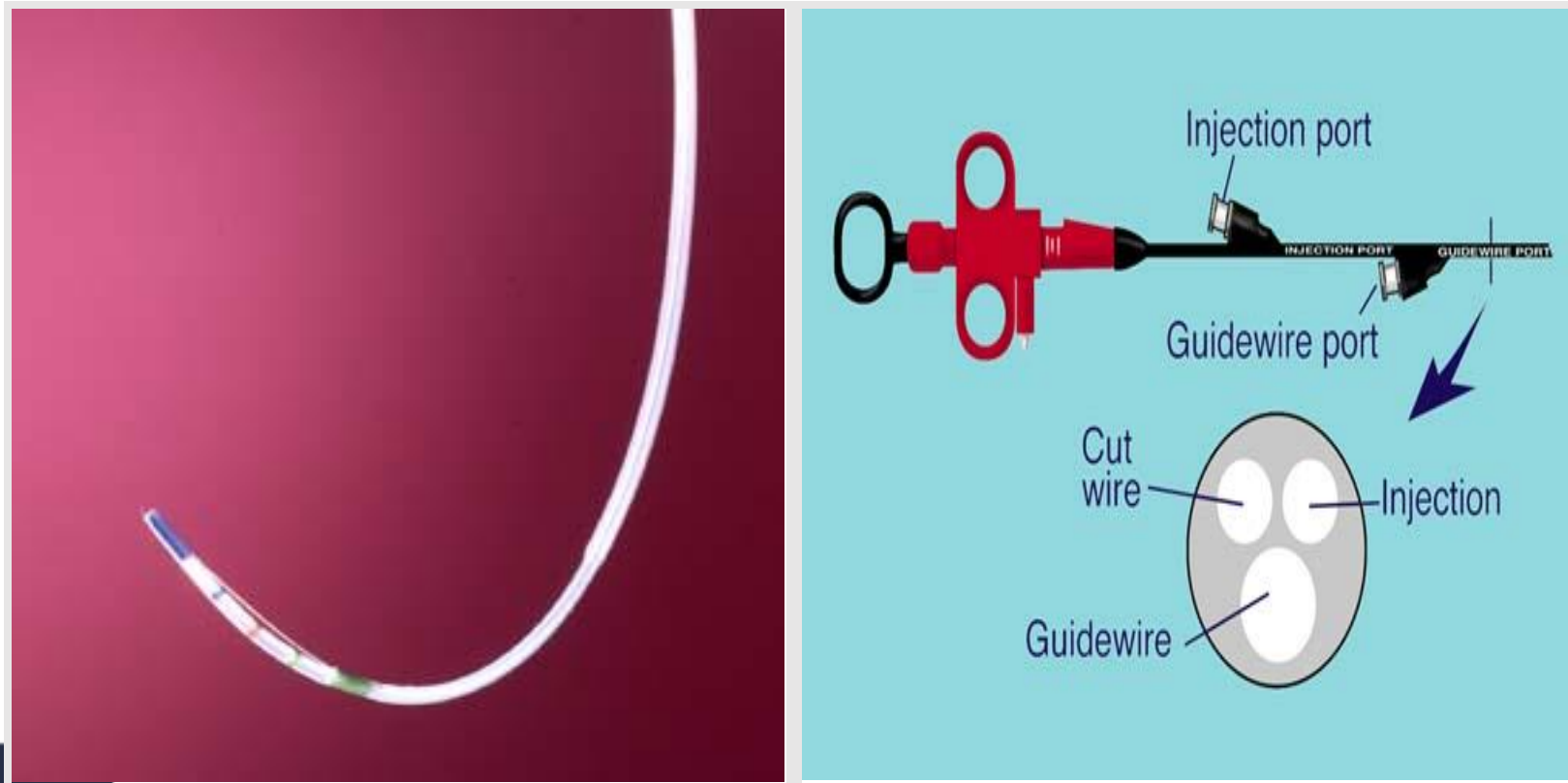
Procedural Considerations

- Clinical status
- Anatomy
- Stone
 - Size/number
 - Location
- Instruments

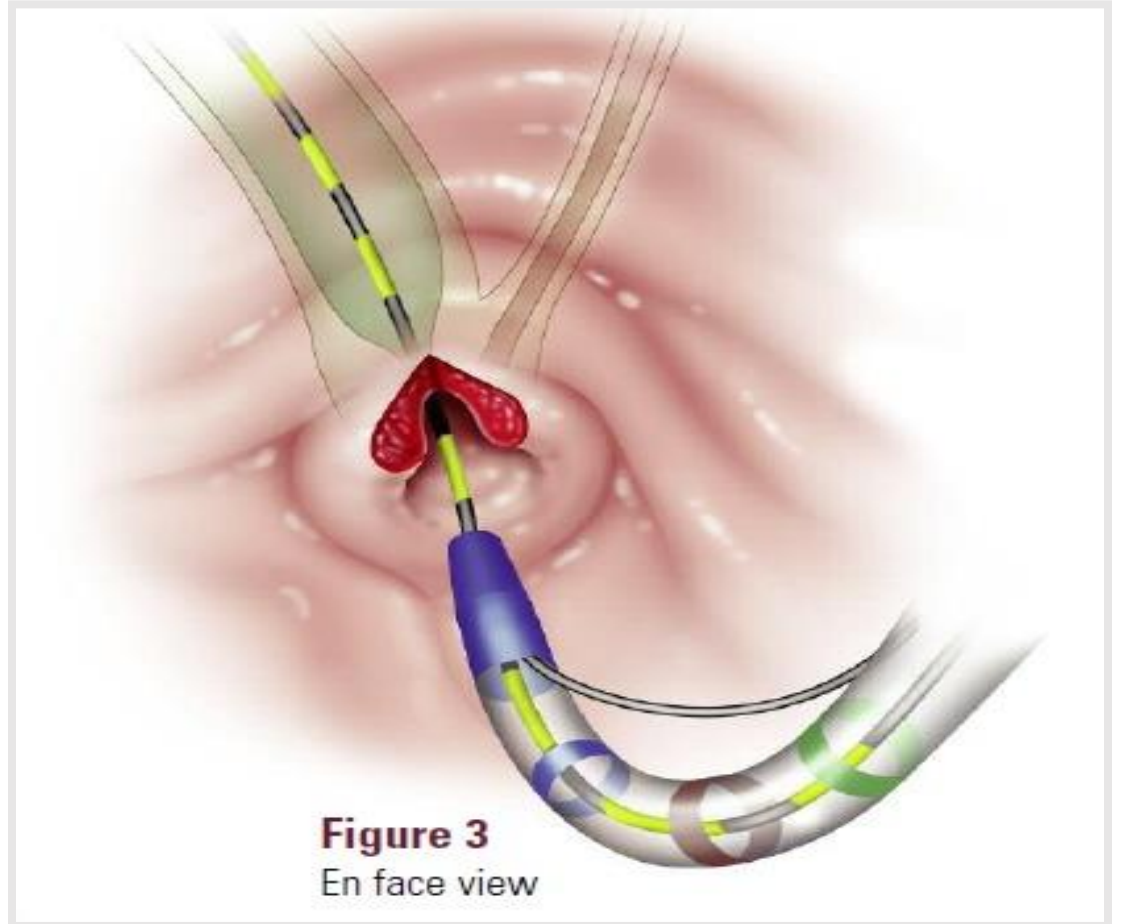
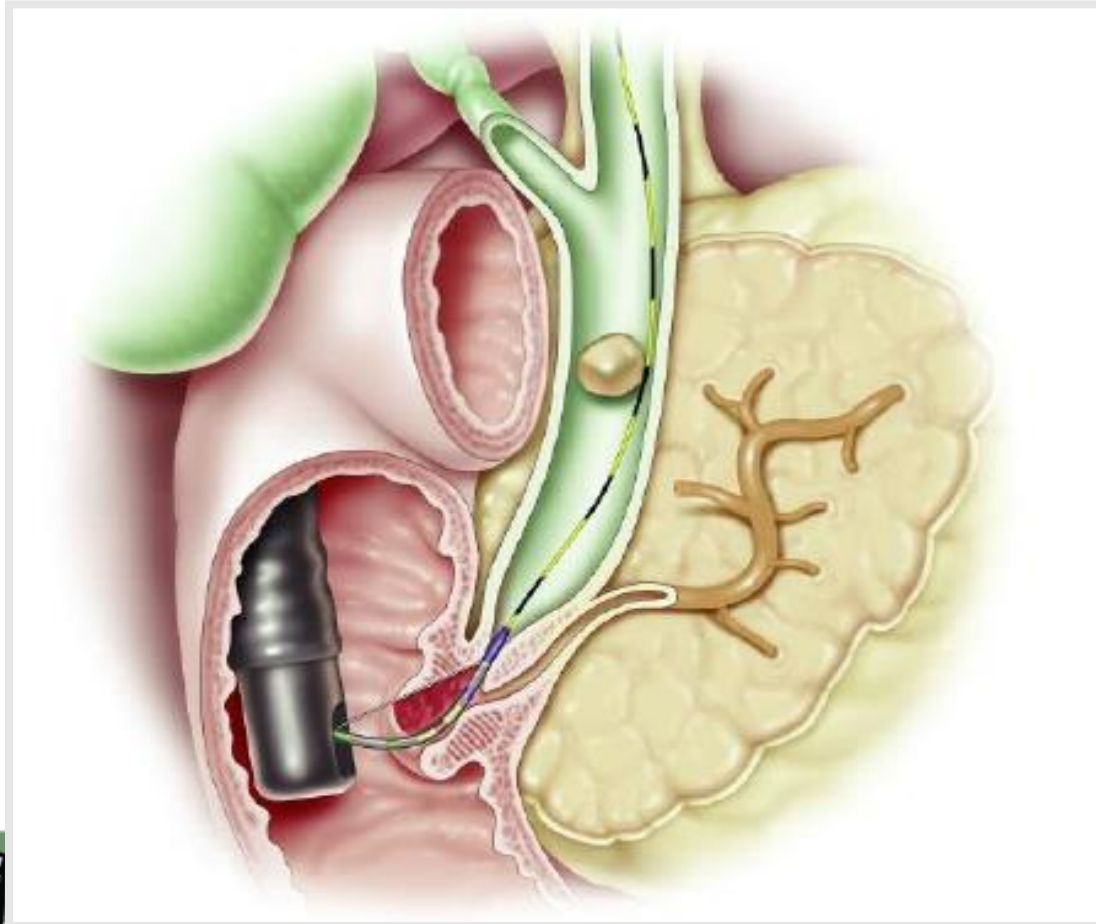
Steps of Procedure

1. Cannulation
2. Sphincterotomy
3. Stone retrieval

Triple Lumen Sphincterotome

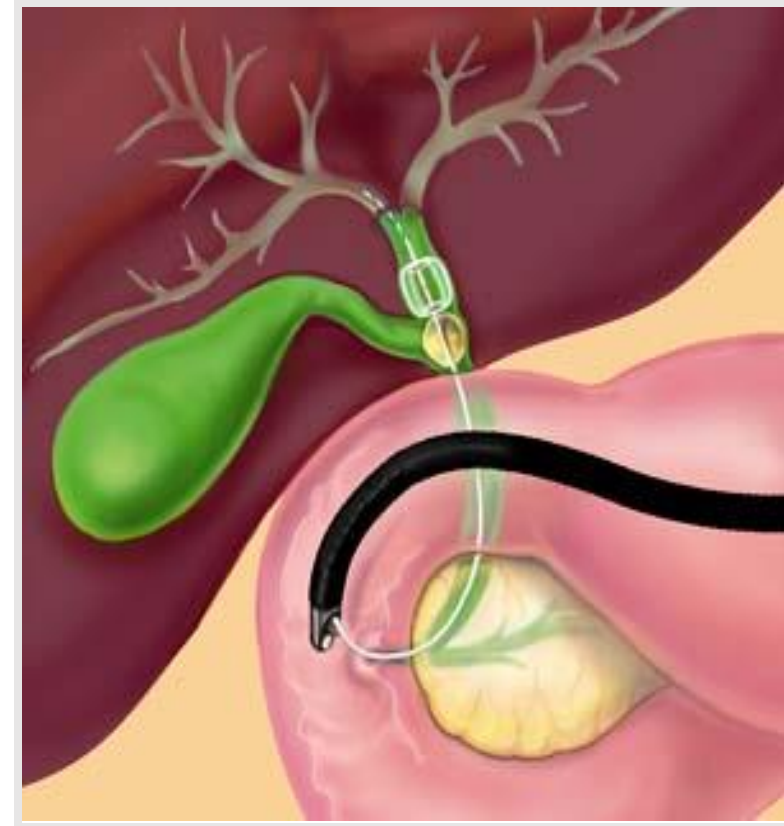


Sphincterotomy



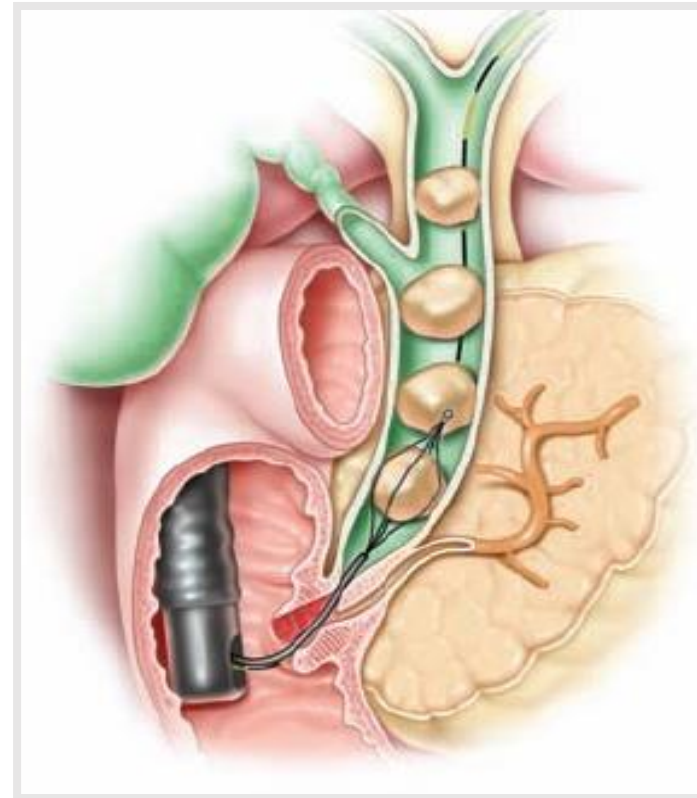
Retrieval Balloons

- Available in different sizes
- Above or below injections
- Most distal stones should be removed first

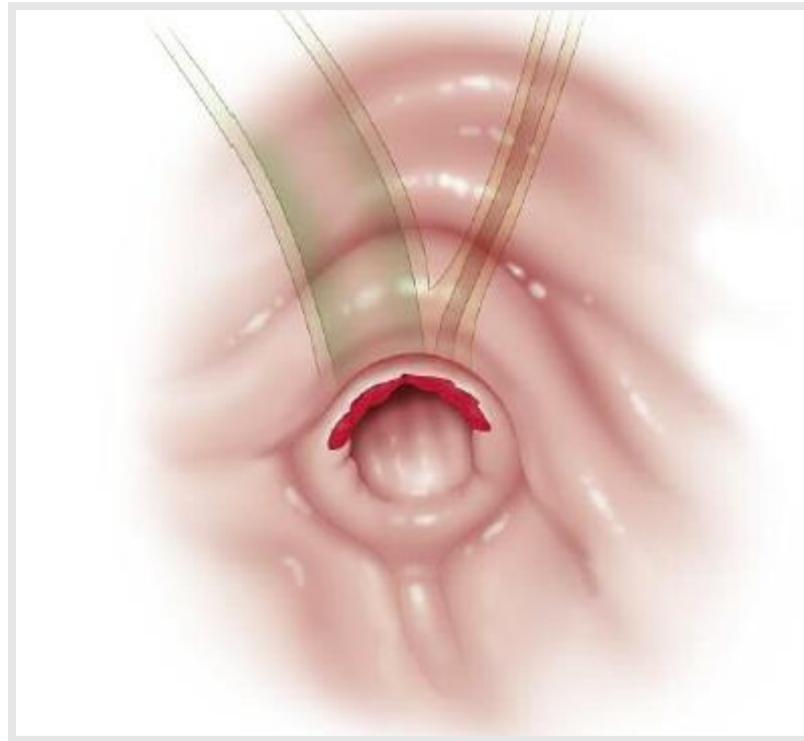
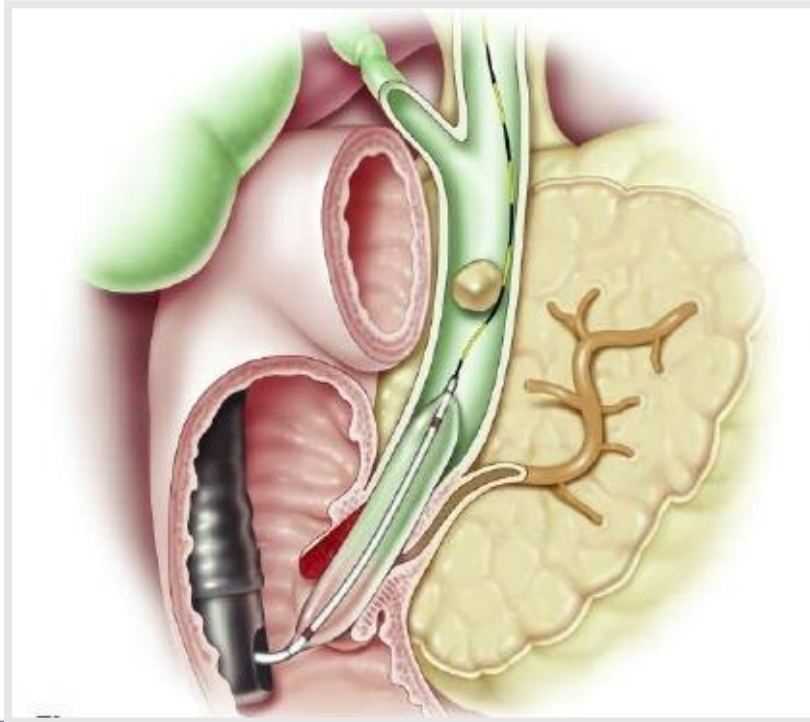


Extraction Baskets

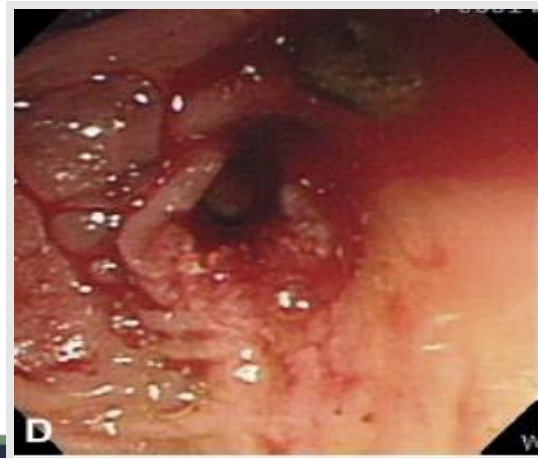
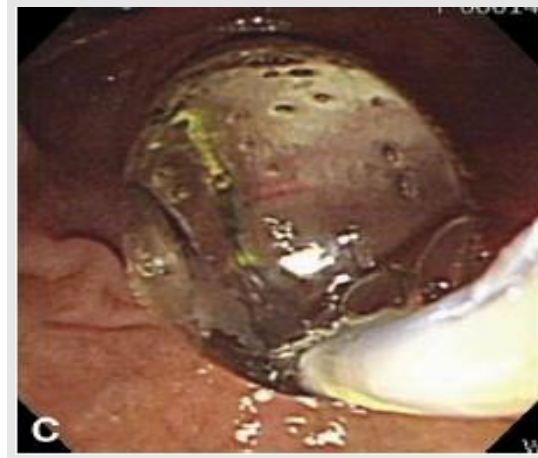
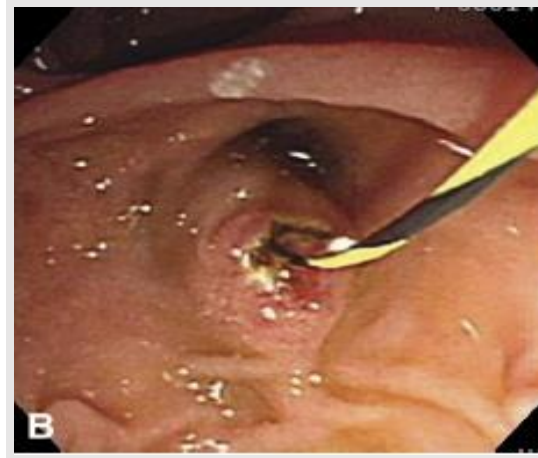
- Available in different sizes
- Should be fully opened proximal to the stone
- Most distal stones should be removed first

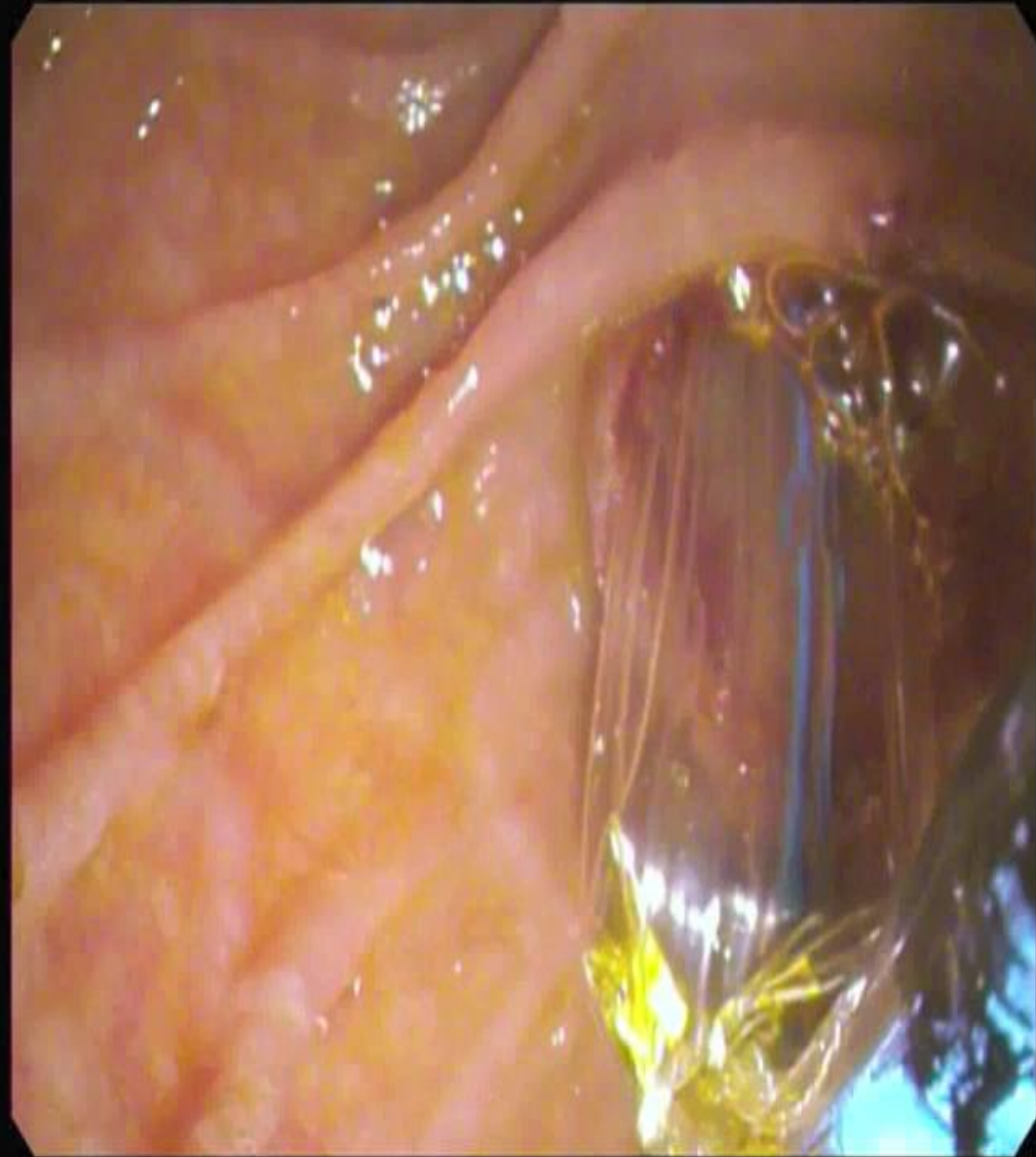


Balloon Sphincteroplasty



Balloon Sphincteroplasty





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Endoscopic Sphincterotomy Combined With Large Balloon Dilation Can Reduce the Procedure Time and Fluoroscopy Time for Removal of Large Bile Duct Stones

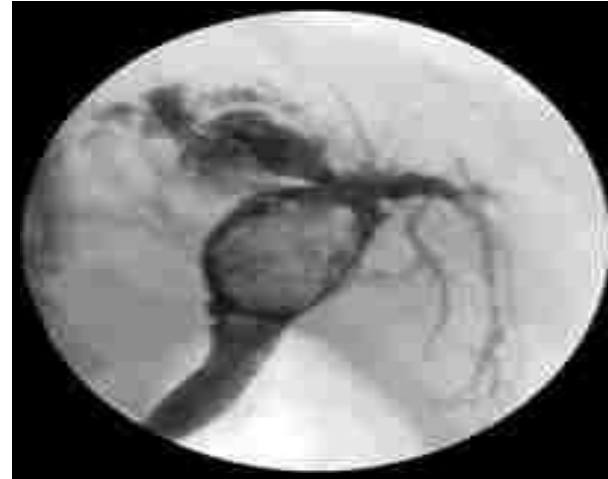
Takao Itoi, MD, PhD¹, Fumihide Itokawa, MD¹, Atsushi Sofuni, MD¹, Toshio Kurihara, MD¹, Takayoshi Tsuchiya, MD¹, Kentaro Ishii, MD¹, Shujiro Tsuji, MD¹, Nobuhito Ikeuchi, MD¹ and Fuminori Moriyasu, MD¹

- 101 patients with large CBD stones
 - 53 ESLBD
 - 48 EST
- Success rates (100% vs. 97%)
- Complications (4% vs. 6%)
- Mechanical lithotripsy requirement (6% vs. 25%)
- Total time procedure (32min vs. 40min)

Itoi Takao, et al. Am J Gastroenterol

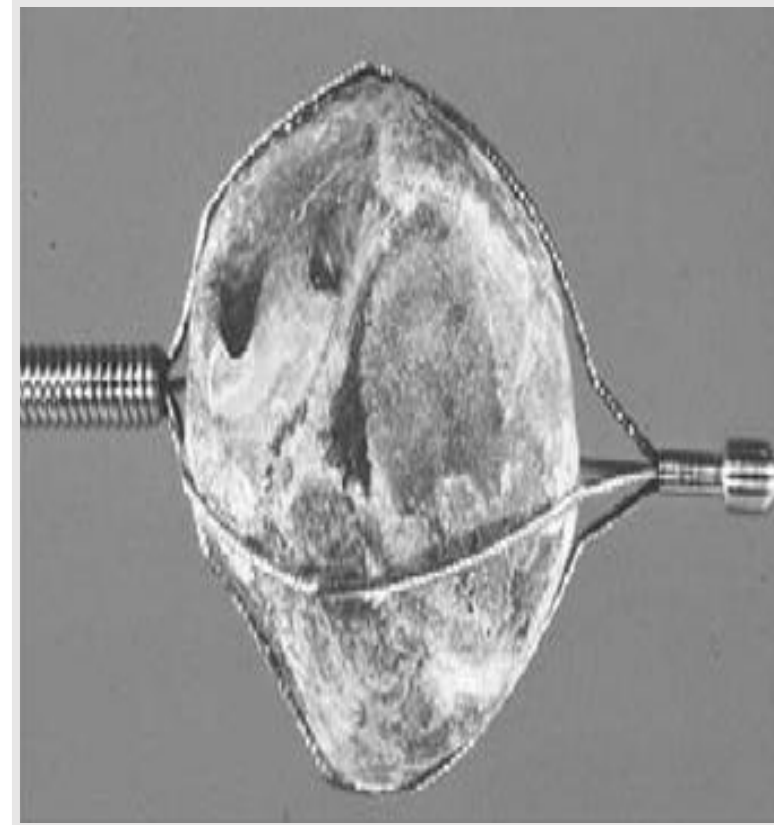
Lithotripsy

- Mechanical
- Electrohydraulic (EHL)
- Laser



Mechanical Lithotripsy

- Consists of a wire basket, metal sheath, and a handle which provides mechanical retraction of the basket into the sheath
- First line approach to difficult stone removal by ASGE



Mechanical Lithotripsy



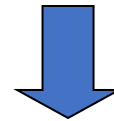
Electrohydraulic Lithotripsy (EHL)

- 1.9 French probe (250cm)
- Continuous saline irrigation is necessary

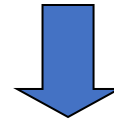


Mechanism

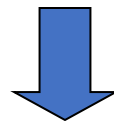
Electric sparks



Expansion of surrounding liquid

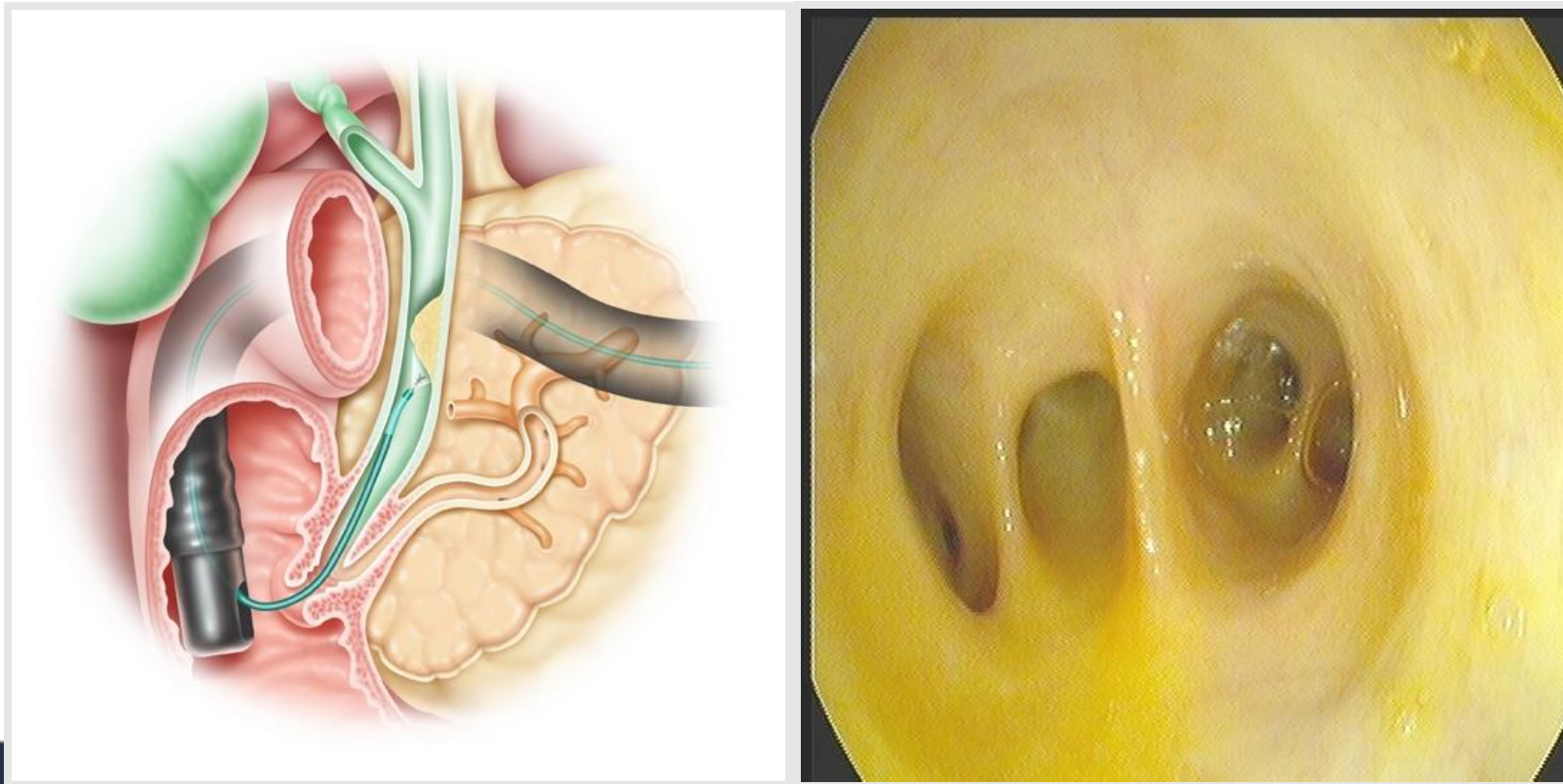


Hydraulic shock wave



Stone fragmentation

Cholangioscopy



Electrohydraulic Lithotripsy





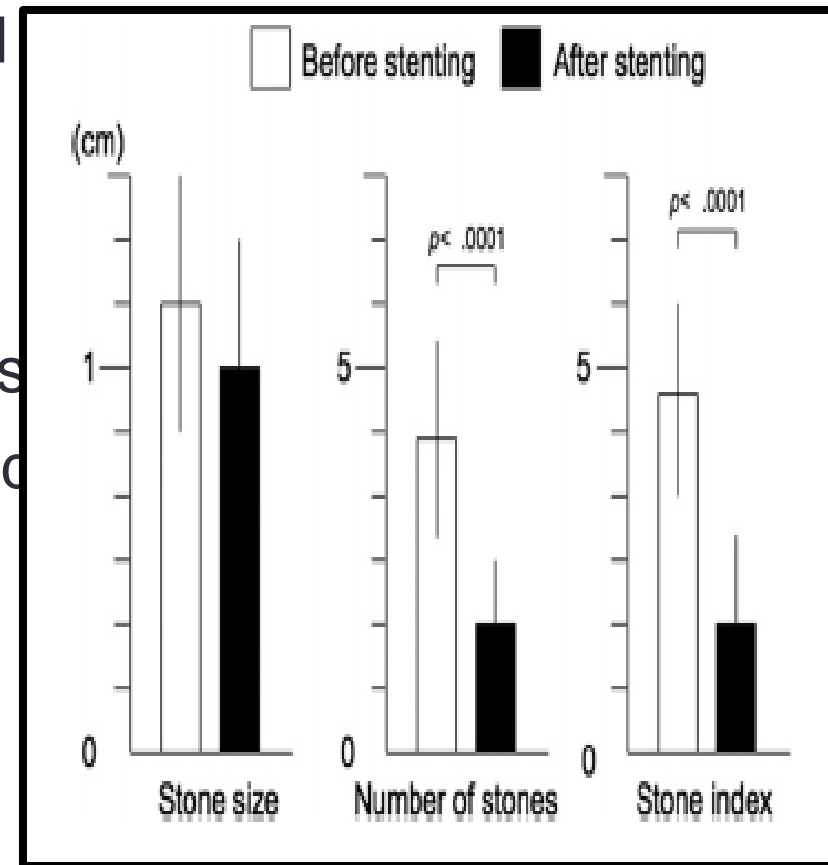
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Biliary stenting in the management of large or multiple common bile duct stones CME

Akira Horiuchi, MD, Yoshiko Nakayama, MD, Masashi Kajiyama, MD, Naoyuki Kato, MD,
Tetsuya Kamijima, MD, David Y. Graham, MD, Naoki Tanaka, MD

Komagane, Matsumoto, Japan; Houston, Texas, USA

- 40 patients with large and multiple stones
- One plastic stent placed without stone extraction
- Repeat ERCP in 2 months
- Stone clearance at second ERCP: 93%



Objectives

- Diagnosis of CBD stones
- Standard endoscopic therapy
- Difficult stone management

Steps for CBD stone removal

1. Assess the bile duct anatomy
2. Adjust the procedure to the clinical situation
3. Make an adequate exit for the stones to be removed
4. Think about using lithotripsy early for difficult stones
5. Not mandatory to complete the procedure in one session if it is not safe to do so

Take Home Points

- In patients with suspected CBD stones, both EUS and MRCP are safe and accurate modalities to select patients for therapeutic ERCP
- Endoscopic sphincterotomy (EST) and stone extraction with a balloon or wire basket is successful in over 90% of cases
- EST plus large balloon dilation (ESLBD) is an effective and safe treatment for patients with large CBD stones

Take Home Points

- Lithotripsy is highly effective in treating difficult biliary stones
- Not mandatory to attain complete stone clearance at initial ERCP

Thank you for your attention