Gallbladder Drainage in a non-surgical Candidate: A life saving option to bring at the bed of the patient

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Overview

- Define the problem
- Discuss current options for Non-surgical candidates
- Evidence currently for EUS guided Gallbladder drainage
- Clinical Indications
- Technique – options
- Follow up

Cholecystitis

- Calculous Cholecystitis
  - 90% of cases
  - 1% to 2% of individuals with gallstones become symptomatic annually

- Acalculous Cholecystitis occurs in 5-10% of cases
  - Critically ill patients in ICU
  - Prolonged TPN & inotropes
  - Stroke, heart attack, sepsis, severe burns & extensive trauma.

  - Gallbladder stasis secondary to lack of gallbladder stimulation leads to the concentration of the bile salts with a build-up of pressure within the organ.

  - This leads to ischemia, pressure necrosis and eventual perforation.

Treatment

- Laparoscopic Cholecystectomy is the gold standard for treatment
- 600 000 LC’s annually for calculous cholecystitis
- Poor surgical candidates:
  - High-risk comorbidities
  - Marked intra-abdominal inflammation
  - Haemodynamic instability
- Approaches to these patients include percutaneous and endoscopic techniques

Percutaneous Transhepatic Biliary drainage (PT-GBD)

- Percutaneous transhepatic gallbladder drainage (PT-GBD)

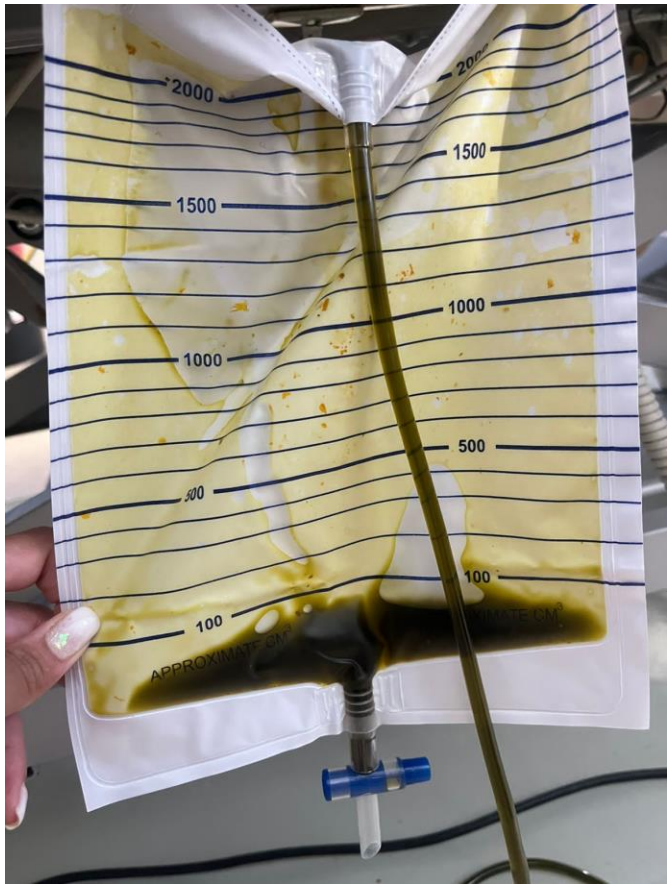
- Technical success rates are good – 95- 100%

- Complication rate -12%
  - puncture- induced haemorrhage
  - pneumothorax
  - bile peritonitis
  - drain site pain or infection

- Contraindications - perihepatic ascites, intervening loops of bowel, coagulopathy

AGA Clinical update on Role of EUS-Guided Gallbladder drainage in Acute Cholecystitis – May 2023

PT-GBD



Endoscopic Transpapillary Gallbladder Drainage ET-GBD

- Technically challenging
- Requires a C arm and Fluoroscopy
- Patient needs to be moved out of the ICU.
- Technical success rate 84% :
  - Difficulty in getting the wire into the cystic duct
  - Difficulty in navigating past the obstruction
- Temporary placement of a plastic stent requires repeated intervention

Itoi T, Sofuni A, Itokawa F, et al. Endoscopic transpapillary gallbladder drainage in patients with acute cholecystiti in whom percutaneous transhepatic approach is contraindicated or anatomically impossible (with video). Gastrointest Endosc 2008;68:455-60.

EUS- Guided Gallbladder Drainage

- 2007 Barron and Topazian attempted the first drainage
- 2012 Itoi et al used the first LAMS
- Systematic review & meta-analysis by Mcarty et al. EUS-GBD with LAMS:
  - Technical success – 94.7%
  - Clinical success – 92.1%,
  - Adverse events - 11.7%

McCarty, T.R.; Hathorn, K.E. et al.Endoscopic gallbladder drainage for symptomatic gallbladder disease: A cumulative systematic review meta-analysis. *Surg. Endosc.* **2021**, *35*, 4964–4985.

Table 1. Summary of Procedure Description, Patient Selection, and Special Consideration for PT-GBD, ET-GBD, and EUS-GBD

Gallbladder drainage modality	Description	Patient selection	Advantages	Disadvantages
PT-GBD	Ultrasound- (or computed tomography–) guided percutaneous drain placement into the gallbladder	Conventional treatment in patient with acute cholecystitis and with significant medical comorbidities that would make laparoscopic cholecystectomy excessively risky	Widely available	Higher reintervention rate (drain exchanges) Higher risk of recurrent cholecystitis Dyscosmesis
ET-GBD	ERCP with selective cannulation of the cystic duct and transpapillary stent placement	Consider in the following: Patients requiring ERCP for other indications Future cholecystectomy candidates Patient with large-volume ascites Coagulopathy	Can simultaneously address choledocholithiasis and cholangitis Safer in patients with ascites	Lower technical success Lowest clinical success Risk of pancreatitis May need stent changes or replacement if migration occurs
EUS-GBD	EUS-guided placement of a stent from the duodenum or the stomach into the gallbladder	Consider in the following: Patients with in-dwelling, uncovered, metal biliary stent Malignant obstruction of the cystic duct takeoff Large burden of cholelithiasis	Least likely to need reintervention	May require fistula closure if patient undergoes cholecystectomy May become occluded with food Contraindicated in patients with gallbladder perforation

ERCP, endoscopic retrograde cholangiopancreatography; ET-GBD, endoscopic transpapillary gallbladder drainage; EUS-GBD, endoscopic ultrasound guided gallbladder drainage; PT-GBD, percutaneous gallbladder drainage.

CLINICAL INDICATIONS

(I) Lifesaving procedure in the acute setting – particularly in ICU

(II) Elective nonsurgical candidates with & without stone extraction

(II) Bridging therapy to cholecystectomy

(III) Conversion from PT-GBD to EUS- GBD

(IV) alternative to failed EUS-guided biliary drainage.

Itoi T, Tsuchiya T, Sofuni A, et al. Development of EUS-guided gallbladder drainage and current indications. Endosc Ultrasound 2018;7:76-8.

ESGE Guidelines

- EUS-guided gallbladder drainage (GBD) should be favoured over PT-GBD

- Due to lower rates of adverse events
- Less need for re-interventions in EUS-GBD

- Strong recommendation, high quality of evidence

Skalk van Der Merwe, Roy JL Wanrooij et al. Therapeutic endoscopic ultrasound: European Society of Gastrointestinal Endoscopy (ESGE) Guideline. Endoscopy Feb 2022

NICE National Institute for Health and Care Excellence

NICE guidance

Endoscopic ultrasound-guided gallbladder drainage for acute cholecystitis when surgery is not an option

Interventional procedures guidance
Published: 22 June 2023

The Evidence

12 Resources

4 systematic reviews

1 RCT

3 non randomized comparative studies

1 Registry

1 case series

2 case reports

Study	No. of patient	Puncture device	Puncture site	Dilation device	Stent	Technical success, %	Clinical success, %	Complications [n]
Manta *et al.* [2017] (58)	16	19 G FNA	TG/TD	10 Fr CT	12–16 mm lumen-apposing CSEMS (NAGI)	100	94	Intraprocedural bleeding[a] [1]; delayed bleeding [1]
Dollhopf *et al.* [2017] (35)	75	19 G FNA/ CT (Hot AXIOS)	36 TG, 38 TD, 1 TJ	CT (Hot AXIOS)	6–15 mm lumen-apposing CSEMS (AXIOS)	99	96	Intraprocedural bleeding[a] [1]; recurrent cholecystitis [3]; stent migration [2]; Bouveret syndrome [1]; sepsis [3]
Chantarojanasiri *et al.* [2017] (15)	6	19 G FNA	TG/TD	7 Fr bougie, 6 Fr CT, tapered tip balloon	7 Fr double pigtail PS	100	100	Peritonitis[a] [1]
Ahmed *et al.* [2018) (59)	13	19 G FNA	4 TG, 9 TD	4 mm balloon	6–8 cm CSEMS (BONA), 7 Fr double pigtail PS inside	100	92	Pneumoperitoneum[a] [1]

NICE Guidelines

Good evidence to show this procedure is effective when surgery is not an option

Disadvantage is the recurrence of symptoms

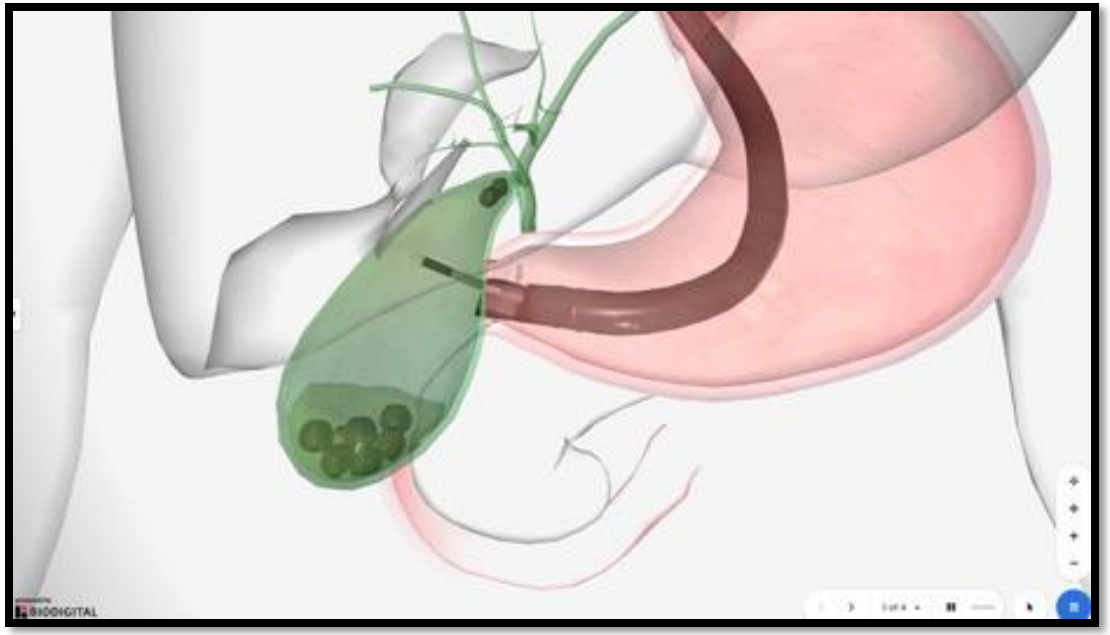
Selection of access site

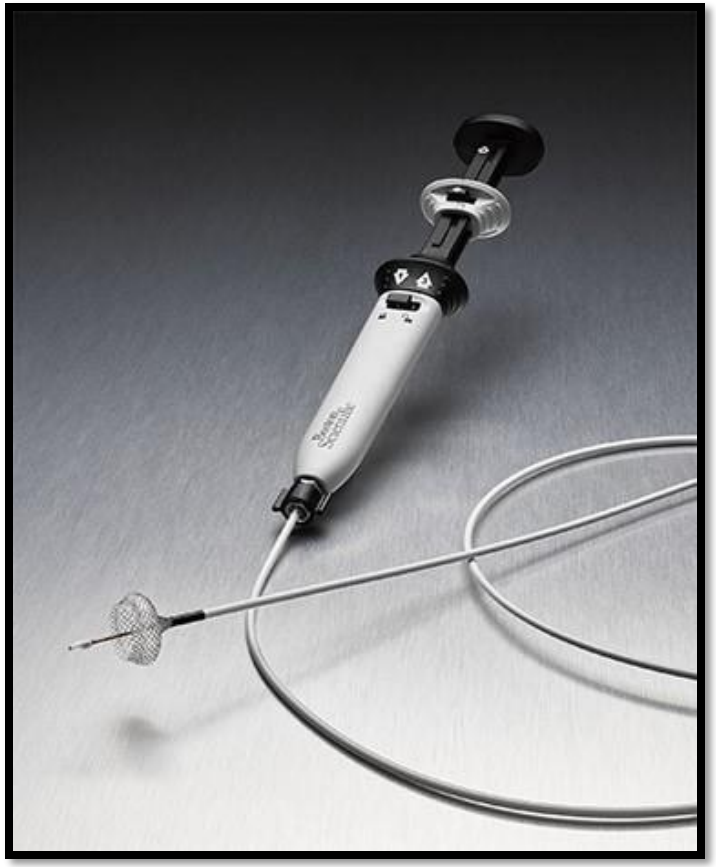
- Duodenal bulb and gastric antrum

- Duodenal Bulb - puncture site the neck of the GB
  - Safer site due to its retroperitoneal location it is less mobile
  - More stable tract formation as compared to the stomach where peristalsis can lead to a higher degree of tissue overgrowth
- - Lower risk of stent migration or dislodgement in the long term
  - Lower risk of food reflux into the gallbladder
- Transgastric access aims for the gallbladder body:
  - Larger entry point
  - Easier target during stent deployment.
  - Favoured in patients with tumour infiltration of the duodenum
  - Duodenal self-expanding metal stents
  - Surgical closure at LC is easier via the transgastric route

Perez-Miranda M. Technical considerations in EUS- guided gallbladder drainage. Endosc Ultrasound 2018;7:79-82

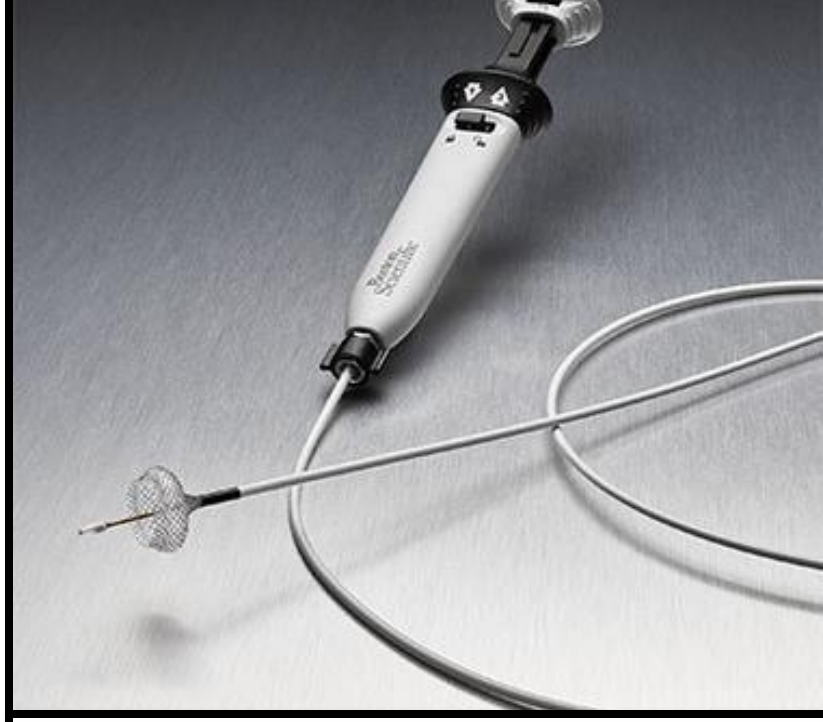
Duodenum bulb access

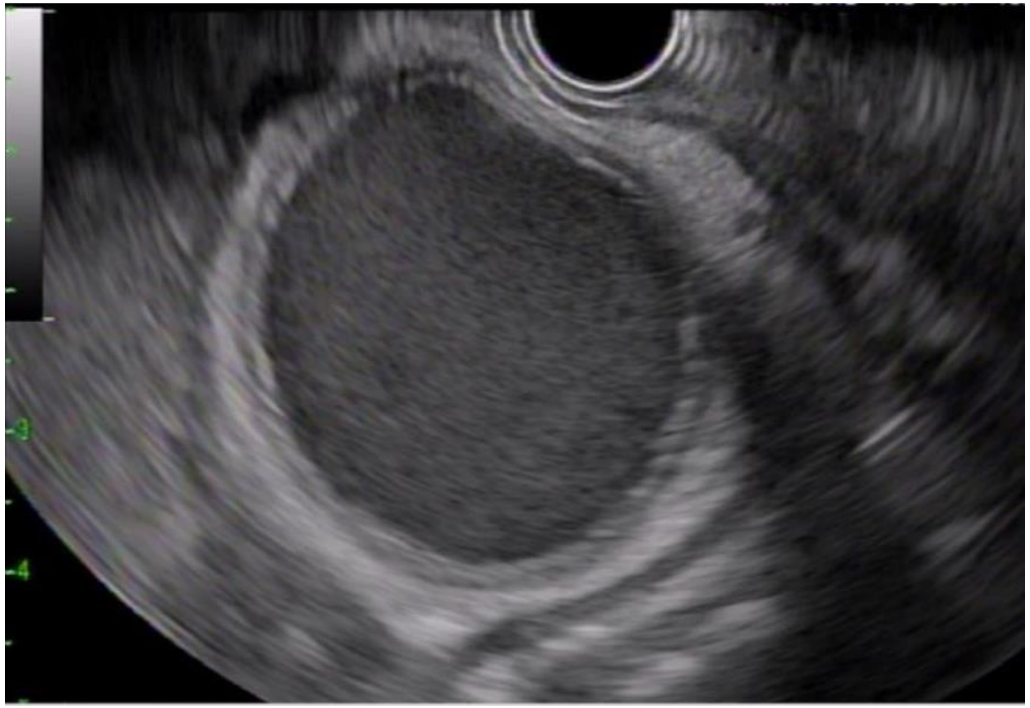


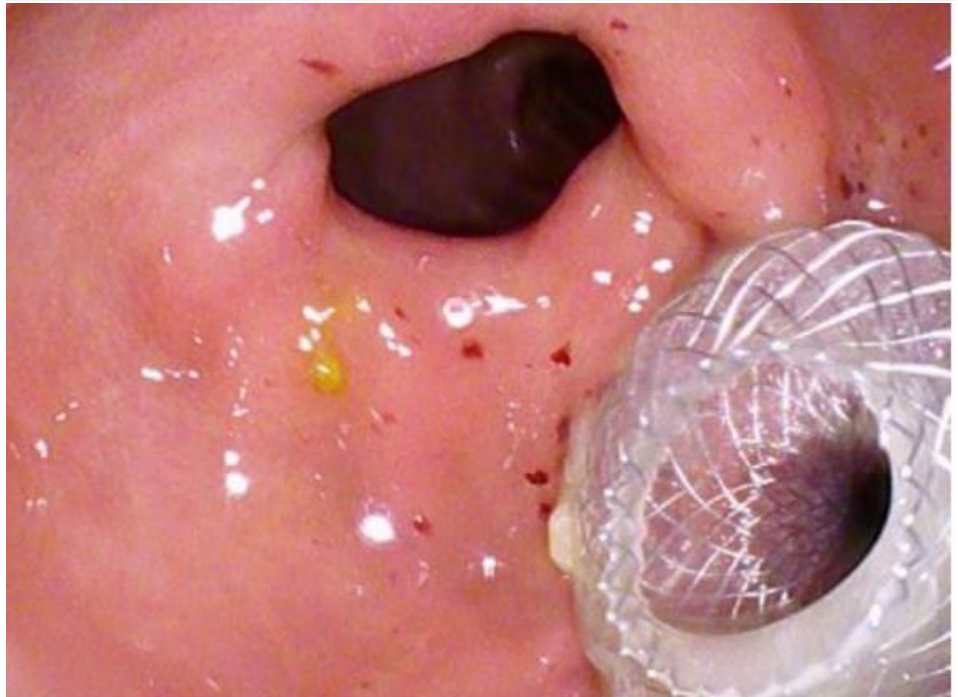


Technique

- Single-step electrocautery-enhanced delivery system (Hot AXIOSTM, Boston Scientific, Marlboro, MA USA)
- Free hand technique
- Guidewire technique after puncture with a 19 g needle
- Most people would use a 10mm Hot Axios on the GB





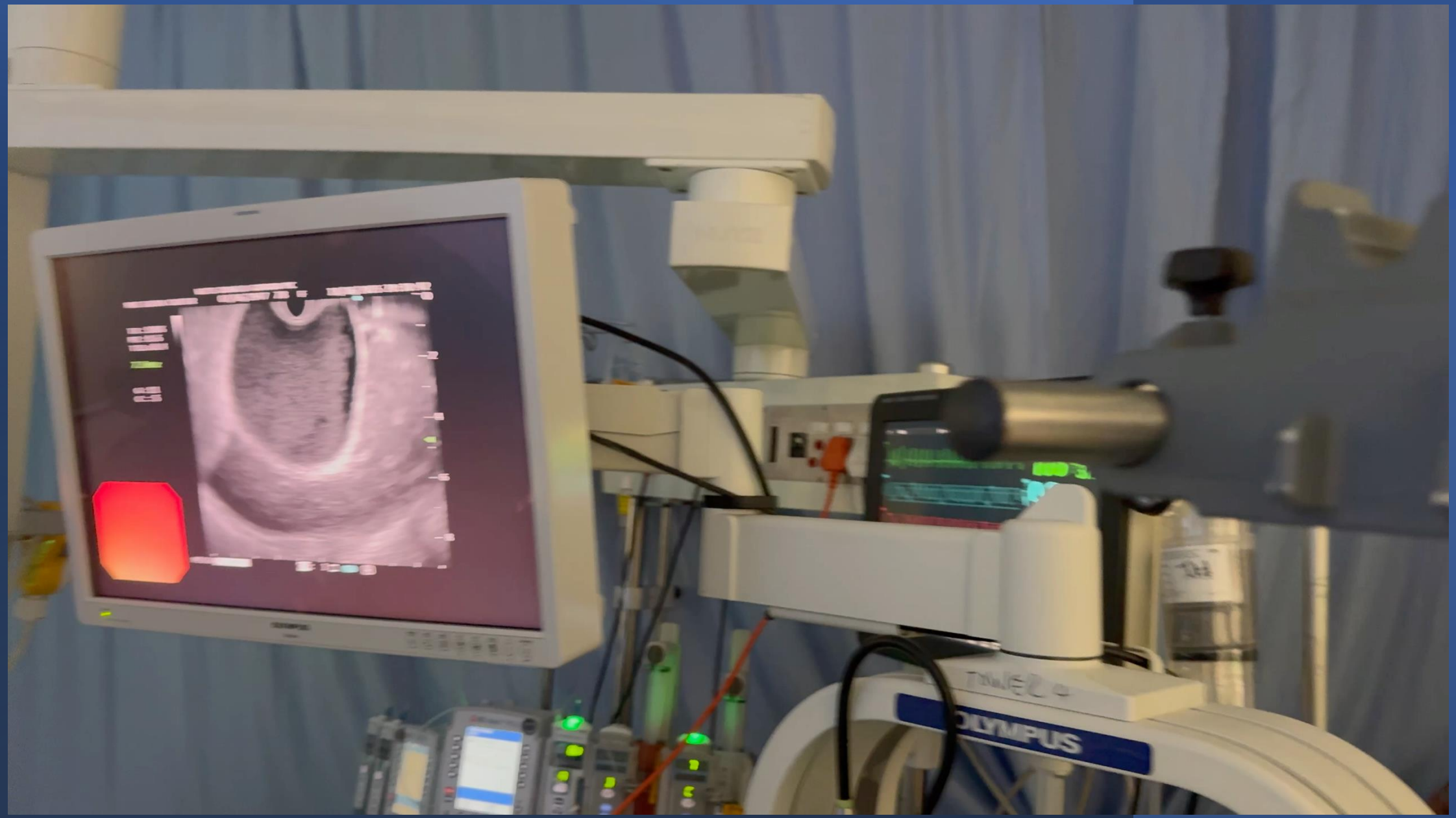


Follow up:

- Limited life Expectancy – leave in situ
- 7% will achieve stent migration or relapse of the cholecystitis
- As a bridge to Surgery should be removed prior to LC
- If they remain poor surgical candidates, the metal stent can be replaced with a double pigtail.

Adverse Events

- Bile leak
- Peritonitis
- Pneumoperitoneum
- Bleeding
- Recurrent cholecystitis
- Stent Migration
- Stent blockage
- Bouveret syndrome


OLYMPUS


MRS SUZAN CARTER
WITS DONALD GORDON MC
03/06/1947 78 F
18/06/2025 20:10:58
TX :100%
MI :0.6
TIS:<0.4
7.5MHz
G :11
C : 5
MEDIA
OLYMPUS
PHILIPS

Case Study

- 78 yr old male with end stage renal failure on dialysis
- Diabetic hypertensive with ischemic heart disease & hyperlipidemia
- Presents with new MI and severe RUQ pain was admitted to ICU

- 3 hours of admission:

  hypotensive

  Temp spikes to 38 deg

  Tachycardic with a pulse of 120b/min

- Bloods on admission:

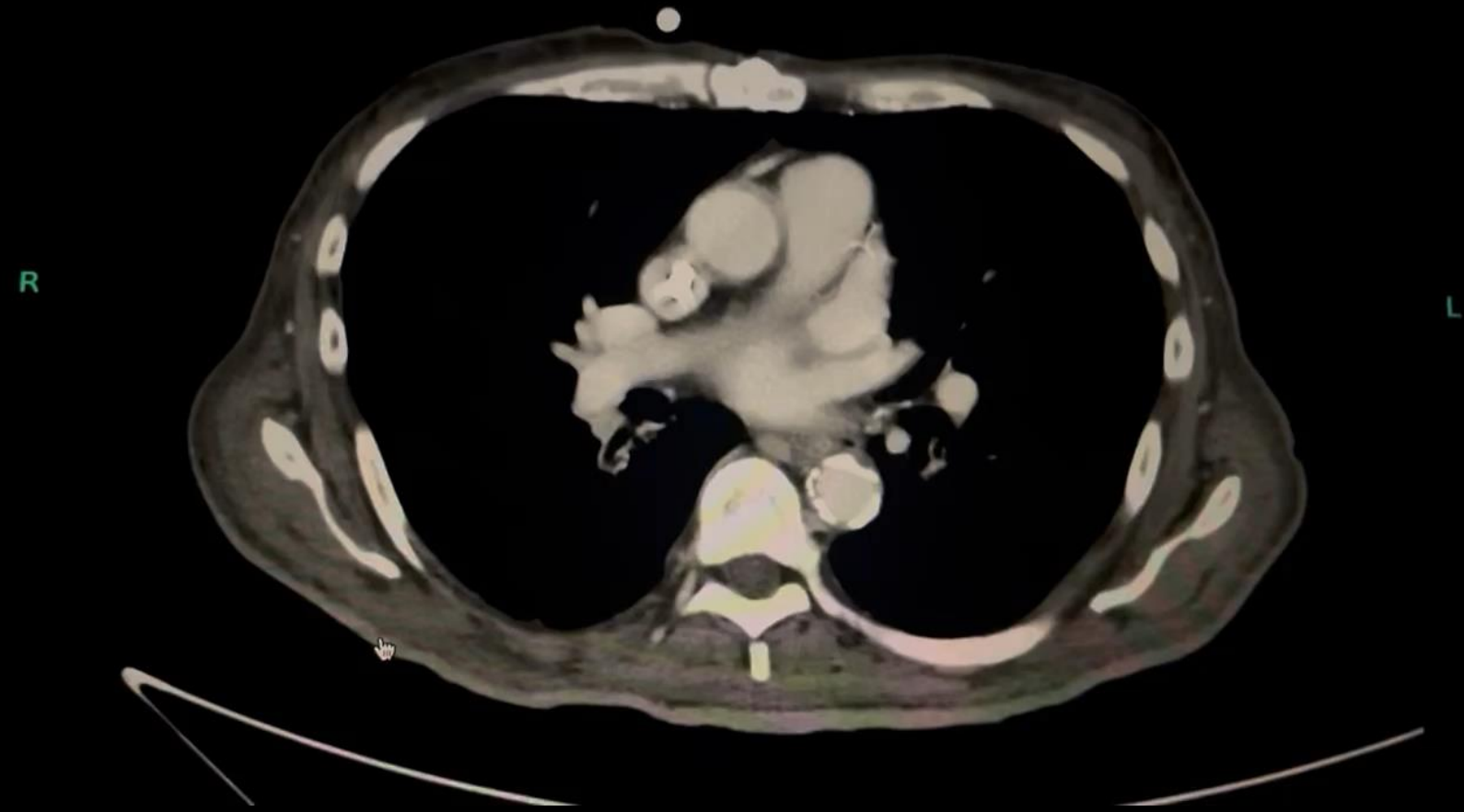
  FBC – 11.1/ WCC – 21.73/PLTS – 324

  UREA 9.3 & Cr 290

  LFT: 12/9/76/32/ 29/96/

- Confirmed MI but also CT abdomen revealed distended GB with early signs of rupture

CT SCAN

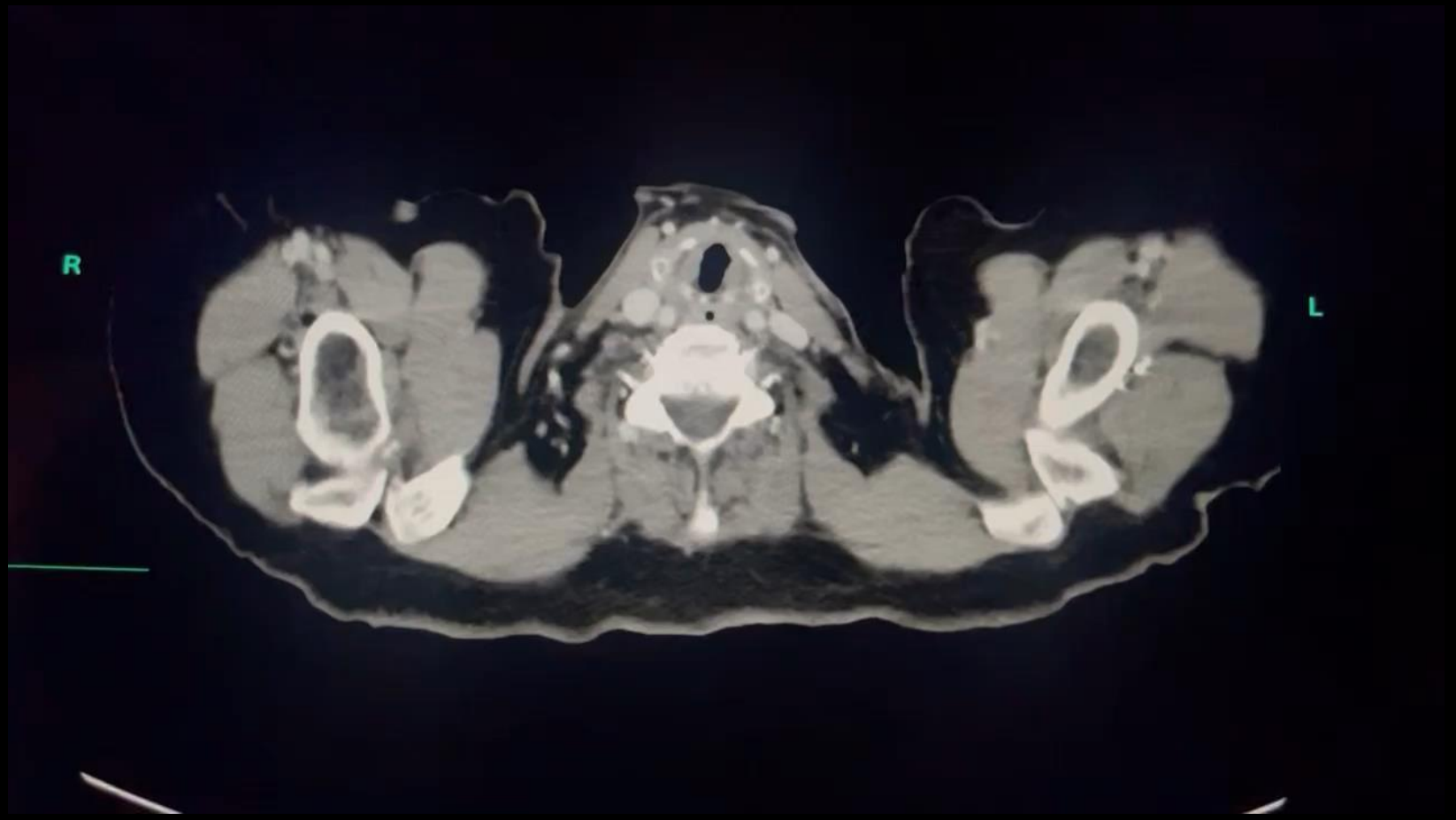


Procedure at the bedside in ICU

Case 2

- 87 yr old female previous Gallstone pancreatitis July 2023.
- Multiple comorbidities :
    - cardiac with aortic valve replacement
    - Hypertensive
    - Severe dementia
    - Previous thromboembolic disease
- Treating Physician suspected a retained stone in the CBD and ERCP and sphincterotomy was performed
- Represented in August 2023 with severe acute cholecystitis

CT abdomen



Case 2

Emerging Indications:

- Malignant Biliary obstruction below the cystic duct insertion when conventional methods fail
- Non surgical candidates with Biliary pancreatitis
- Case reports of Mirrizzi Syndrome

Conclusion:

- Evidence for EUS GBD in non-surgical candidates
- Life saving Intervention
- Adverse events are between 12-15%
- Superior to percutaneous drainage when EUS skills are available
- Offers an option for stone removal