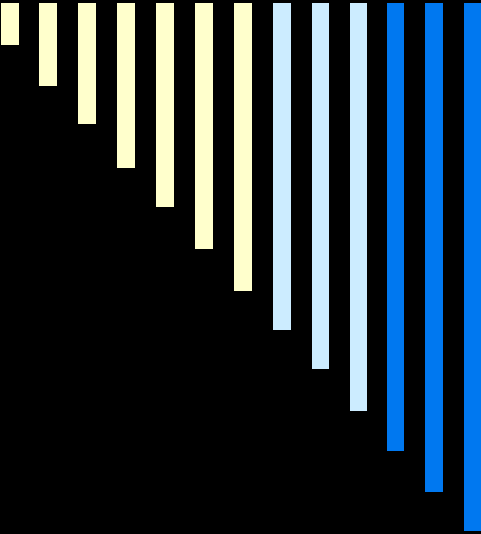


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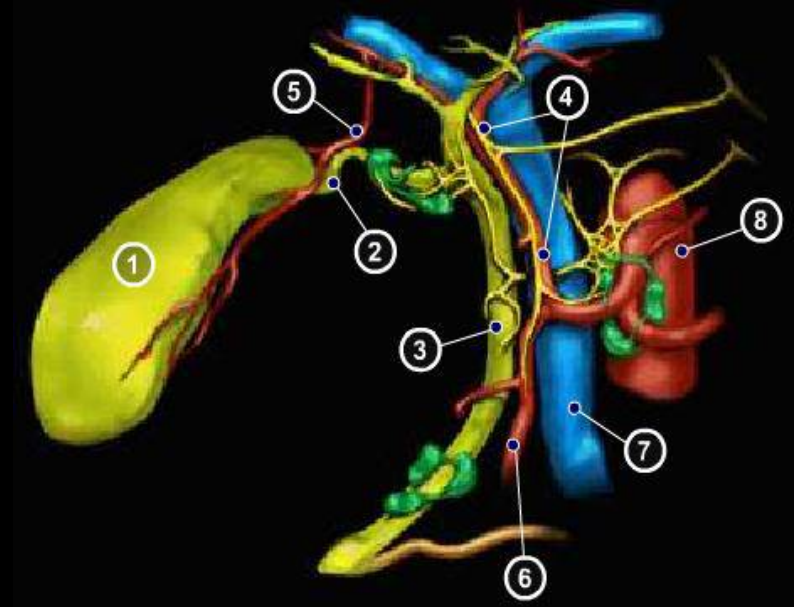
# Laparoscopic Choledocotomy

**R. K. Mishra**



# Biliary Anatomy

1. Gallbladder
2. Cystic duct
3. Common bile duct
4. Proper hepatic artery
5. Cystic artery
6. Gastroduodenal artery
7. Portal vein
8. Abdominal aorta



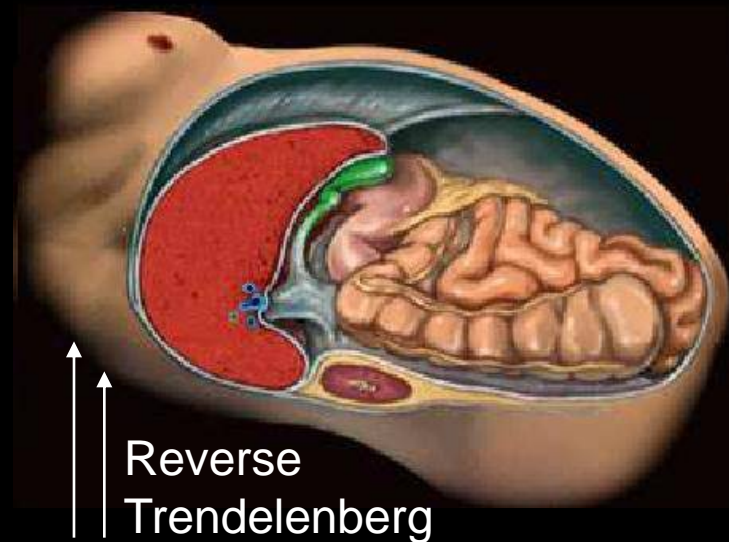
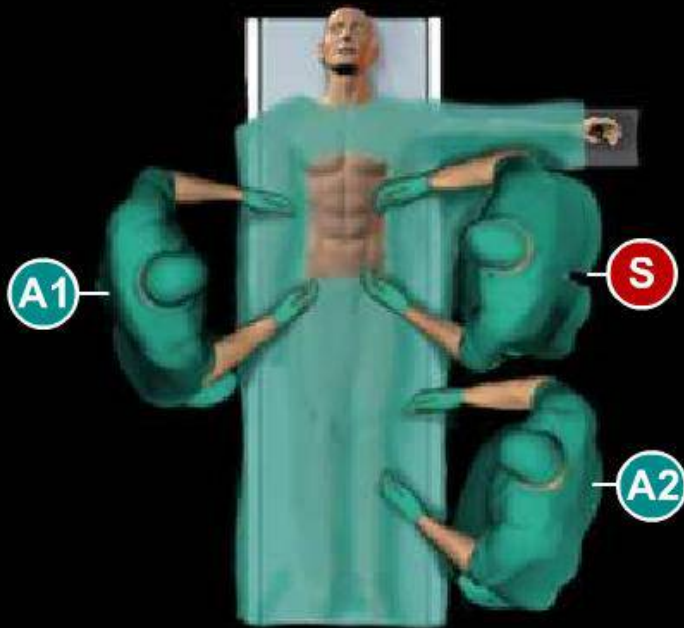
# Transcystic vs Transcholedocal approach

TA = Transcystic Approach  
Ch = Choledochotomy  
\* to insertion of cystic duct  
NR = Not Recommended

		TA	Ch
Diameter of the cystic duct	< 3 mm	NR	Yes
	≥ 3 mm	Yes	Yes
Cystic valves		NR	Yes
Entrance of cystic duct into CBD	Lateral (right margin of CBD )	Yes	Yes
	Medial or posterior	NR	Yes
Stone impacted in ampulla		Yes	Yes
Severe inflammation in CBD		Yes	NR
Laparoscopic suturing	Poor	Yes	NR
	Good	Yes	Yes
CBD diameter	< 7 mm	Yes	NR
	≥ 7 mm	Yes	Yes
Large stones		NR	Yes
Number of stones	< 4 mm	Yes	Yes
	≥ 4 mm	NR	Yes
Stone location in CBD	Proximal *	NR	Yes
	Distal *	Yes	Yes



# Operating room set-up

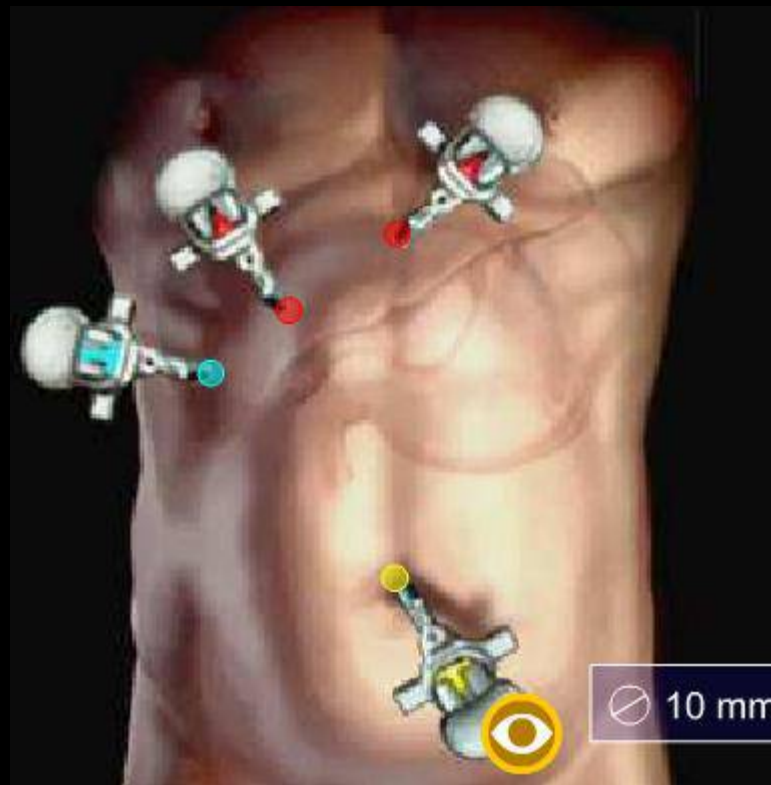


# Operating room set-up

1. Radiological equipment (portable X-ray unit or portable C-arm fluoroscope, laparoscopic ultrasound)
2. Laparoscopic unit
3. Anesthetic unit
4. Laparoscopic unit for choledochoscopy
5. Instrument table
6. Electrocautery
7. Operating table



# Port Position



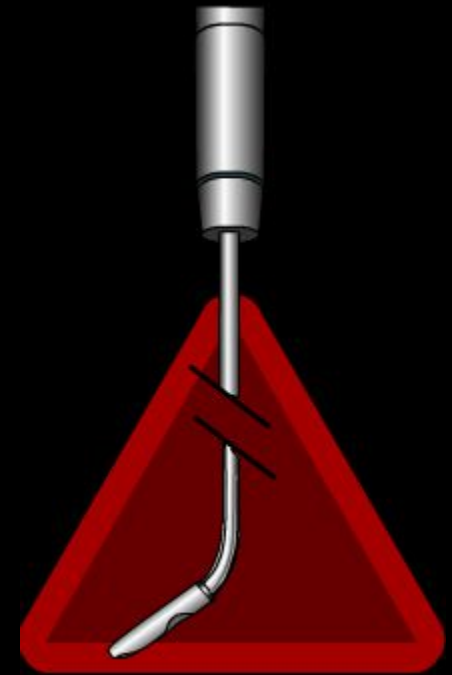
# Choledoscope

The choledochoscope used in the choledochotomy approach has a small outer caliber ( $\leq 3.2$  mm). The dimensions of the operating channel must be  $\geq 1.1$  mm (in order to be able to introduce a Dormia basket while maintaining the irrigation flow). The choledochoscope should have a maneuverable tip, but with a certain degree of rigidity.



# Laparoscopic Ultrasound

Ultrasound has been used successfully in open surgery for many years. Since the introduction of laparoscopic ultrasound probes, this technology has also been used for evaluation of abdominal pathology during minimally invasive procedures. With the loss of touch and stereoscopic vision during laparoscopy, such technologies become an important source of additional information. Ultrasound can be used for evaluation of the biliary anatomy and to evaluate the presence of stones. Several probes with or without flexible tips and with different degrees of motion are available on the market.



Ultrasound



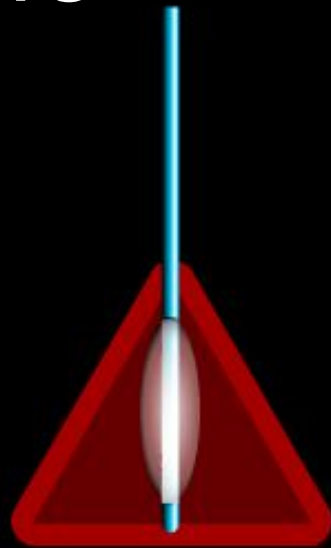


# Dormia Basket

- Dormia Basket is used to extract Stone
- It should be of less than 1 mm diameter in thickness



# Dilators



Balloon dilatation  
catheter



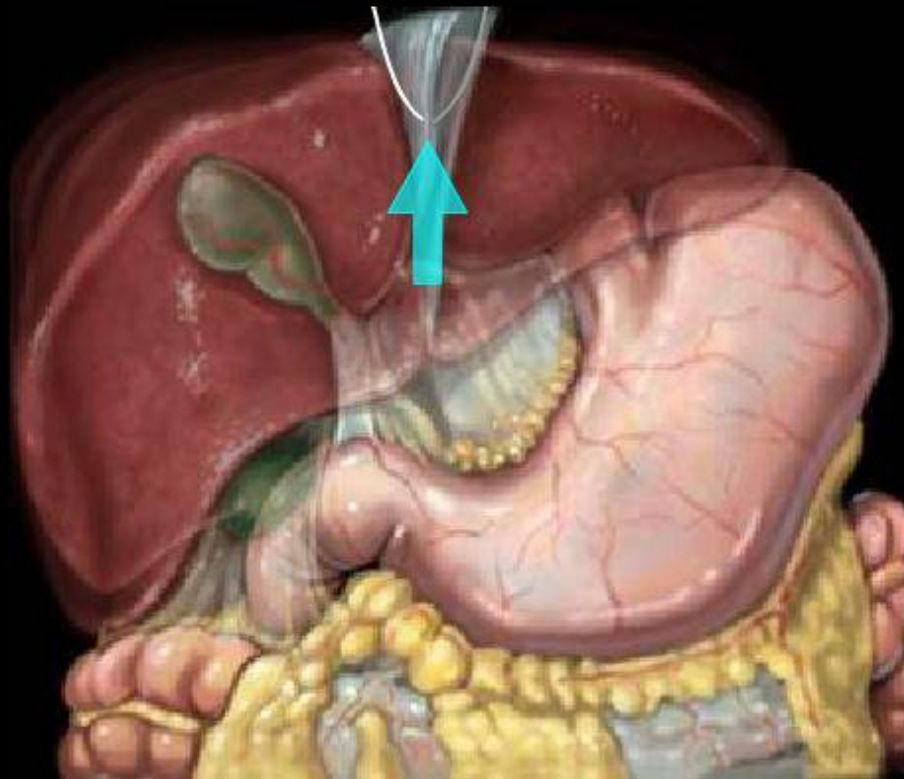
Fogarty catheter

Semi-rigid dilators are used:

- bougies or flexible atraumatic dilators;
- sequential bougie catheters;
- balloon dilatation catheters – these can also be used to extract stones.



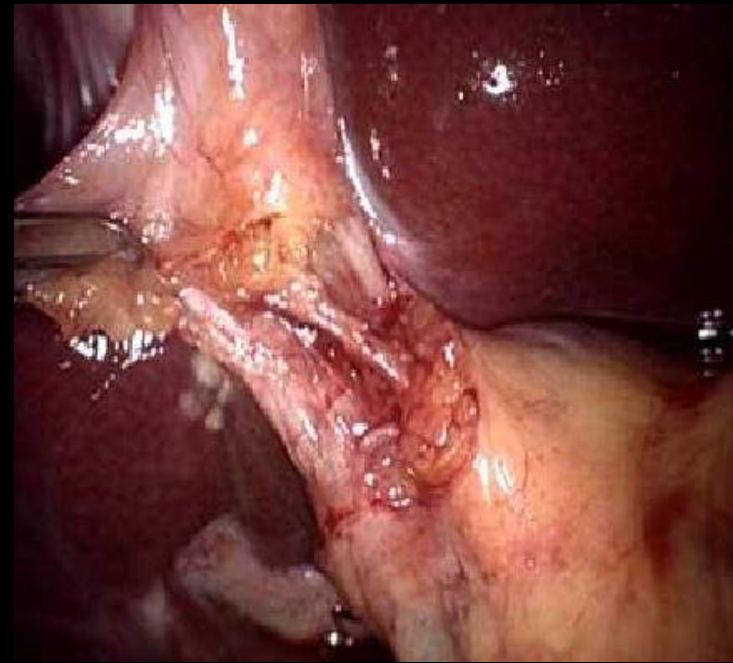
# Exposure



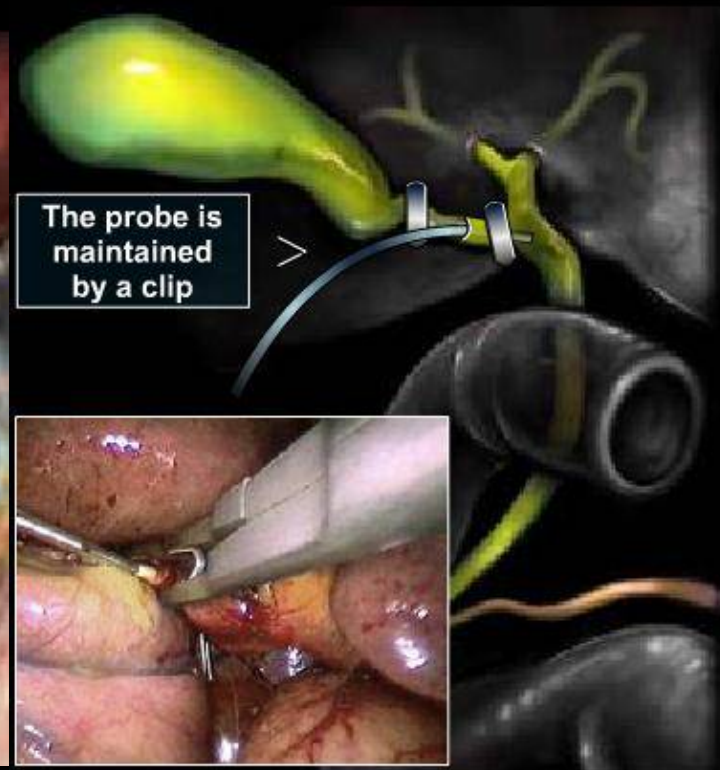
The liver is lifted by suspension of the ligamentum teres with the aid of a transcutaneous suture.



# Dissection of Callots Triangle



# Clipping of Cystic Duct

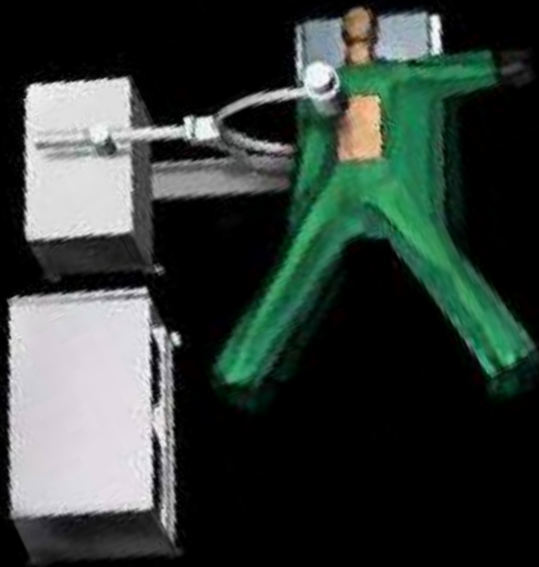


# Secure Cystic artery





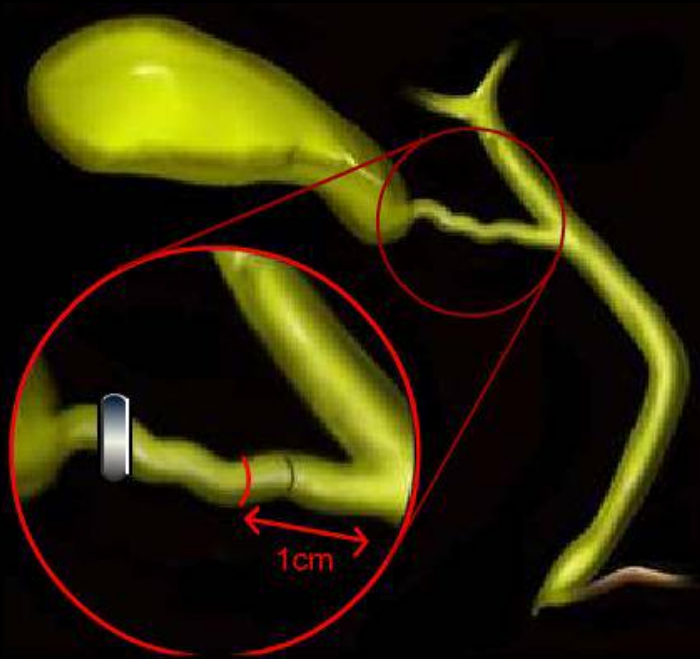
# Intraoperative Cholangiogram



The operating table is placed into a flat position (i.e. taken out of reverse Trendelenburg and left tilt) with a slight right tilt to displace the CBD anteriorly.

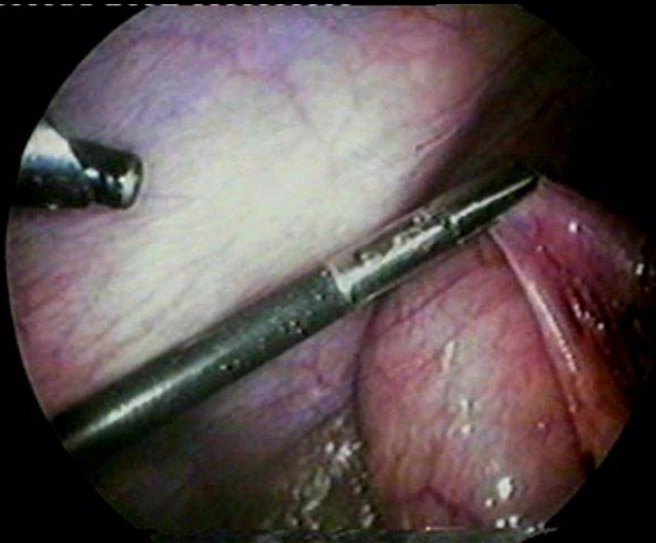


# Intraoperative Cholangiogram

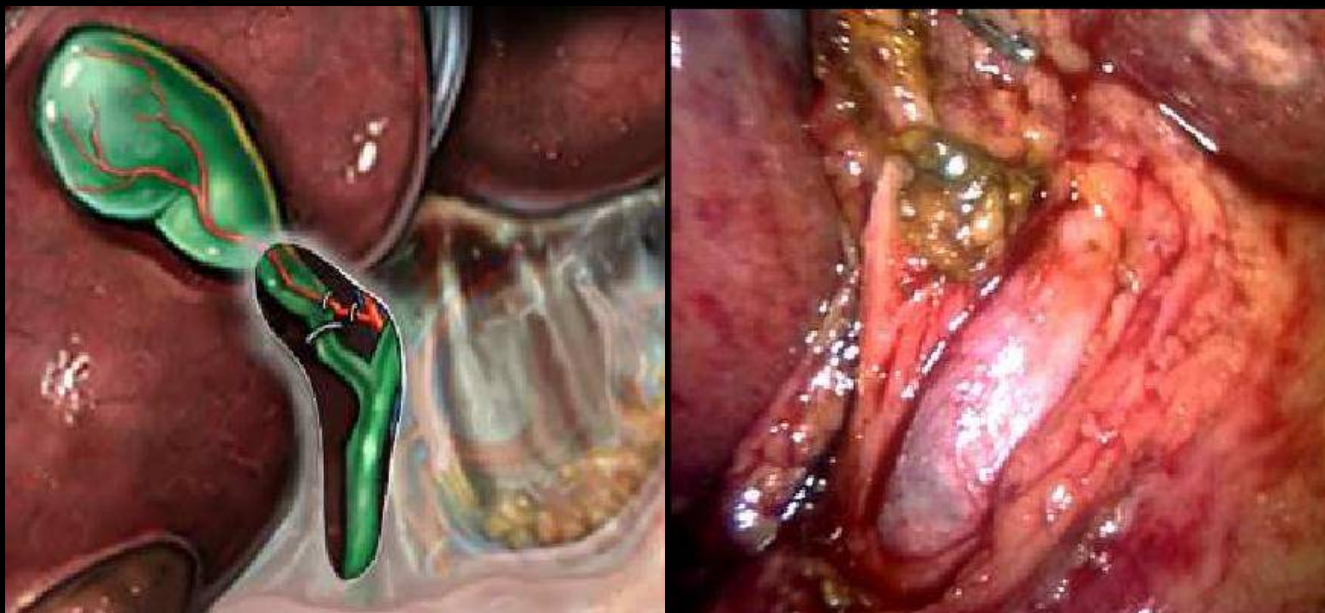




# Choledocoscopy



# Opening of Anterior Peritoneum of CBD

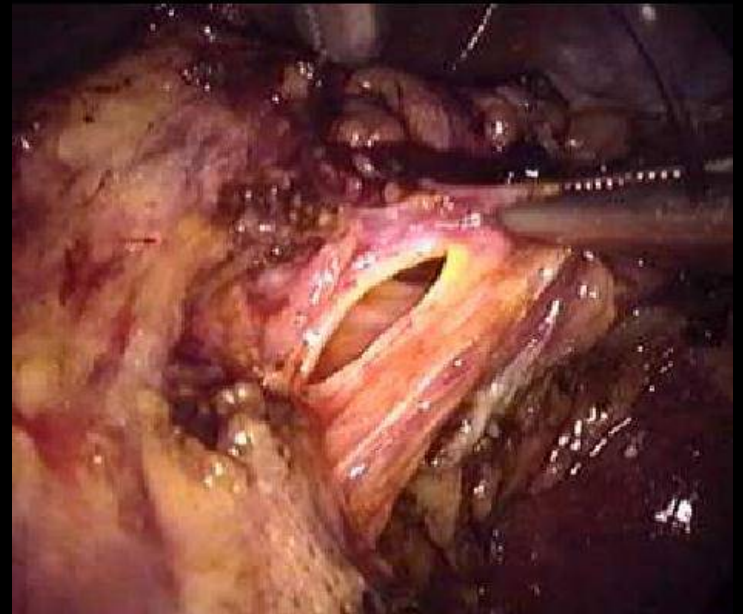


After opening the anterior peritoneal layer along the free edge of the lesser omentum, hemostasis is achieved and the anterior surface of the CBD is exposed over a length of 10 to 20 mm.

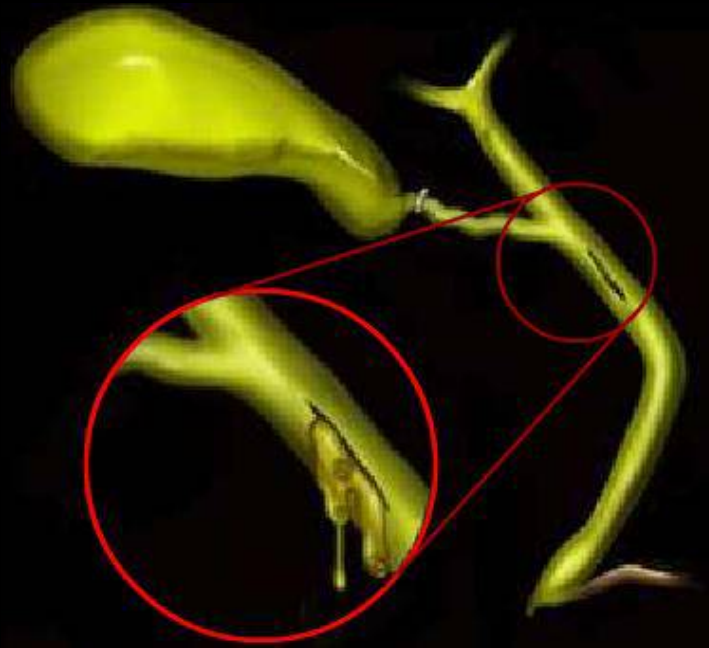


# Choledochotomy

The choledochotomy is made vertically in the supra-duodenal portion of the CBD with a retractable blade or scissors. It can be enlarged if necessary. It should be equivalent in length to the size of the largest stone. It can be used for any CBD measuring over 7 mm in diameter.



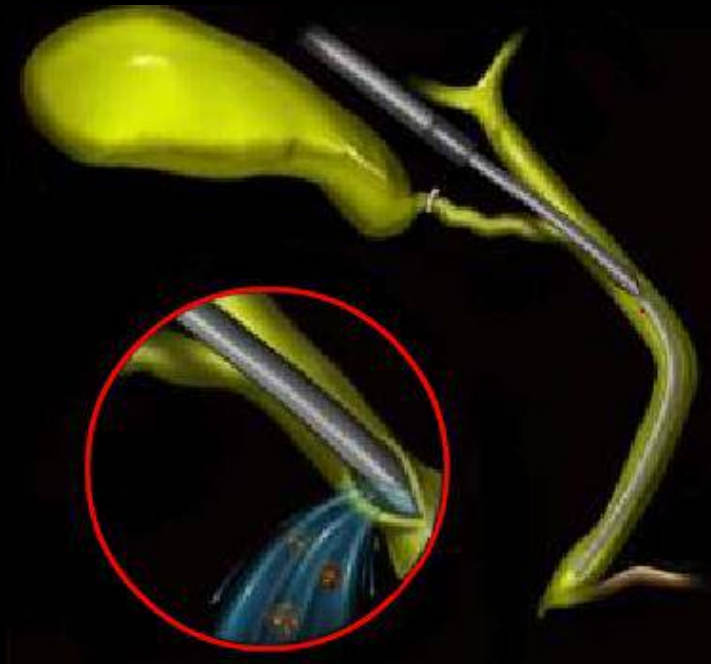
# Extraction of stone



Commonly, stones clear spontaneously when the CBD is opened. Residual stones are extracted using various techniques.



# Extraction of stone by suction

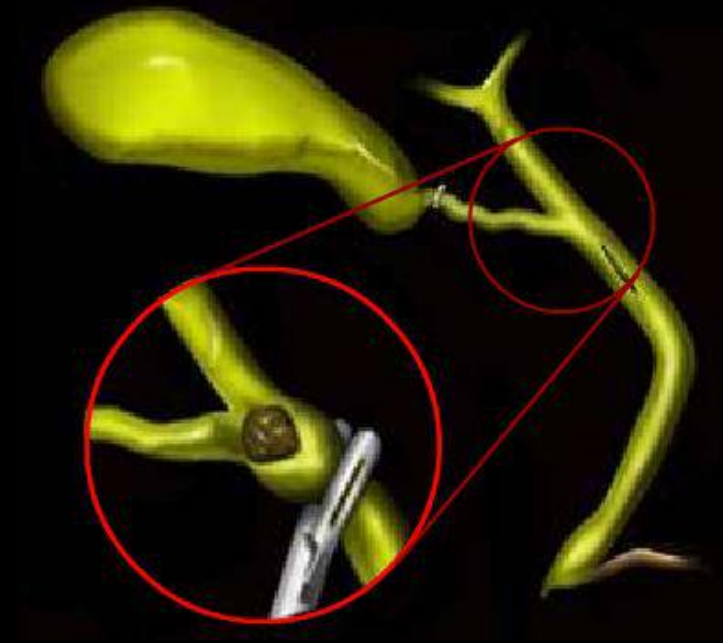


A high-pressure suction-irrigation device makes it possible to flush out a large number of stones via opening of the CBD when the choledochoscope is removed.





# Extraction of stone by milking



Stones that are easily accessible or visible through choledochotomy are extracted with atraumatic graspers. Stones can also be pushed out by exerting pressure with the graspers on the surrounding CBD wall.



# Extraction of stone by catheter



The catheter is passed into the CBD and beyond the stone. It is then inflated to occlude the lumen and gently withdrawn bringing any stone up into the choledochotomy. It can be useful to dislodge impacted stones.

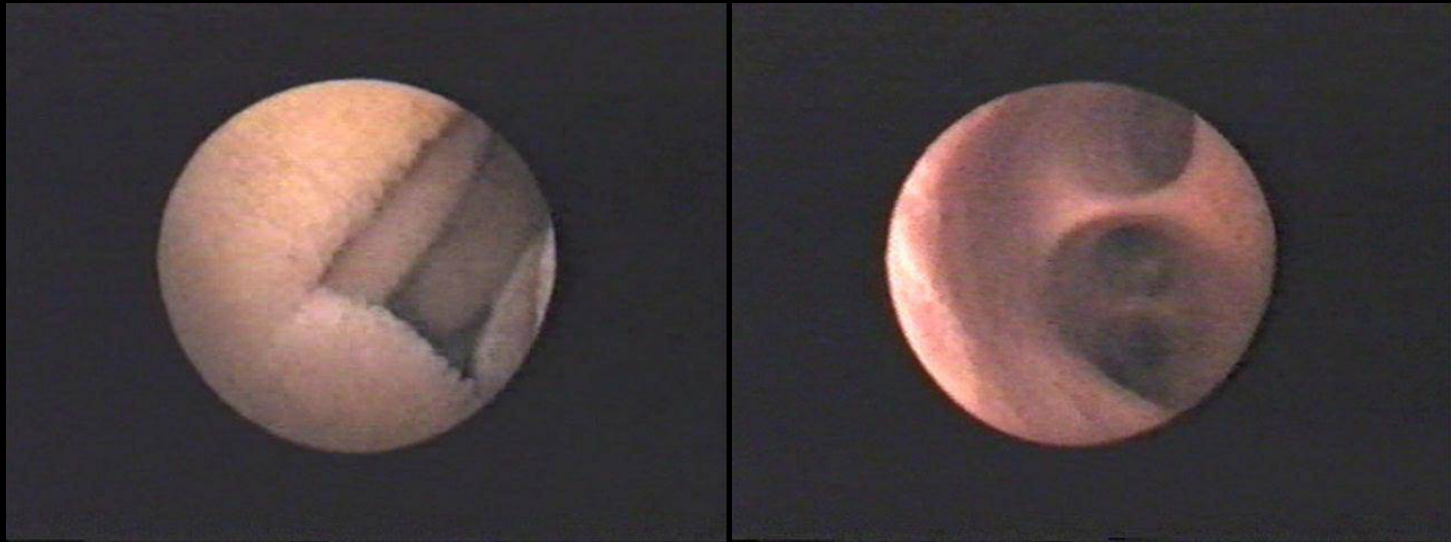


# Choledocolithotomy

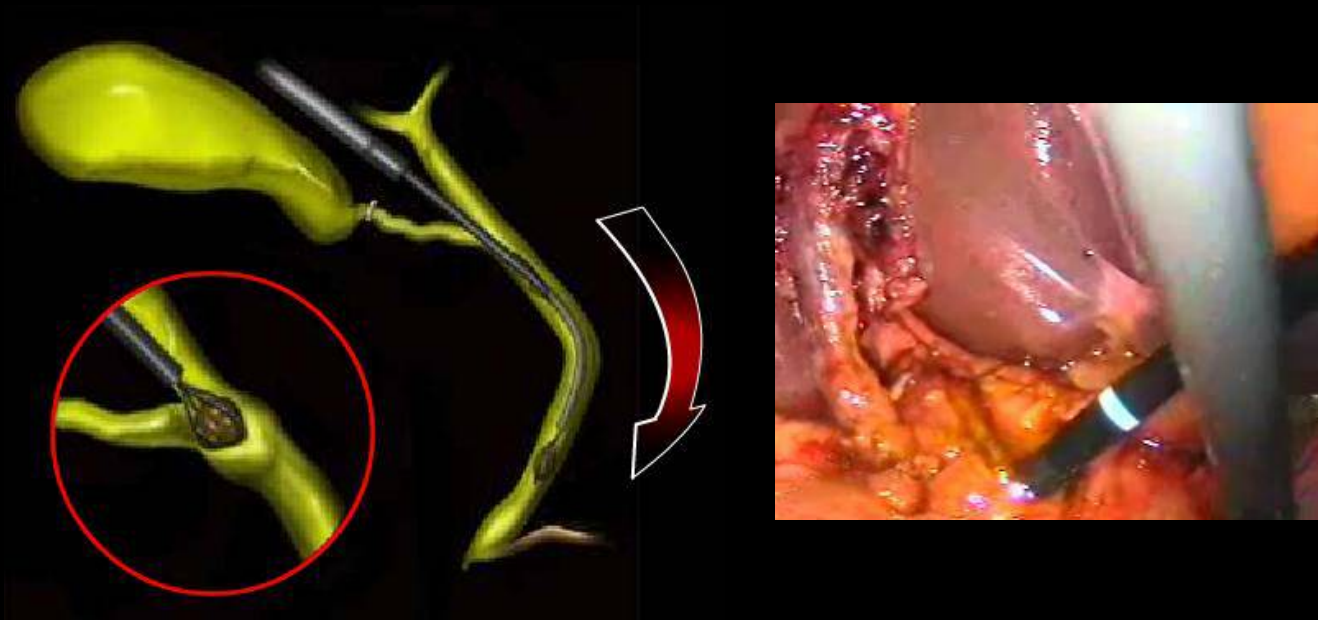




# Confirmation of stone clearance



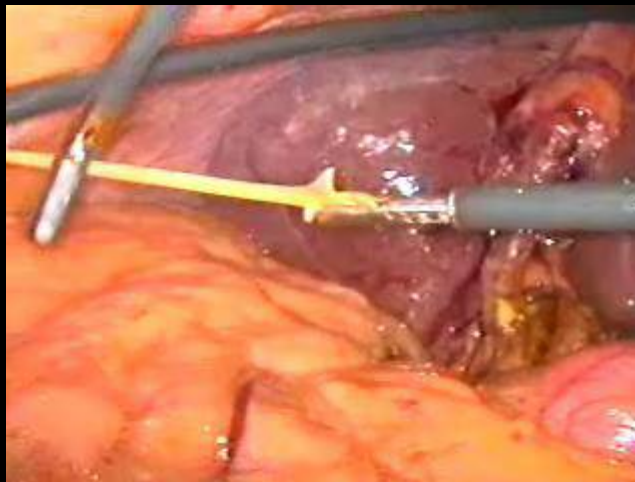
# Extraction of stone by Dormia



The basket is introduced into the choledochotomy. It is then opened and the basket is moved around slowly until the stone can be felt and pushed into the basket prior to closure and extraction.



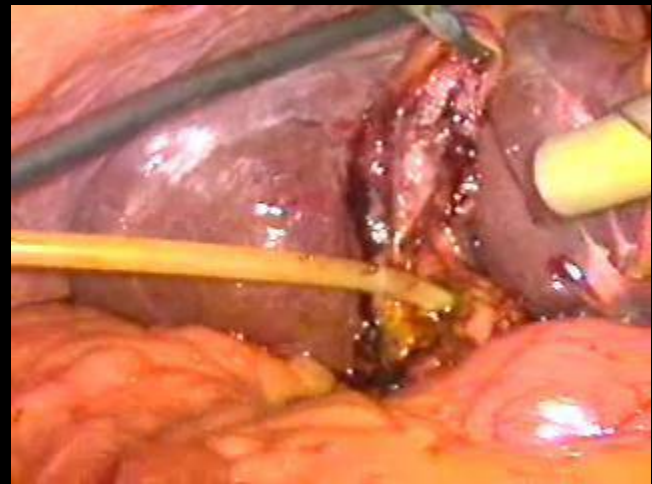
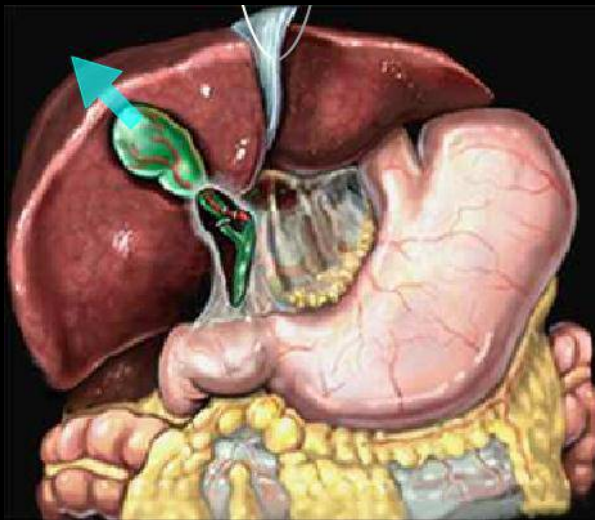
# Insertion of T tube



# Fixation of T tube



# Cholecystectomy



After finishing Choledocotomy a retrograde  
Cholecystectomy is performed





# Thank You



Prof. Sir Alfred Cuschieri Giving Lecture to  
Dr. R. K. Mishra at Ninewells Hospital U.K.

