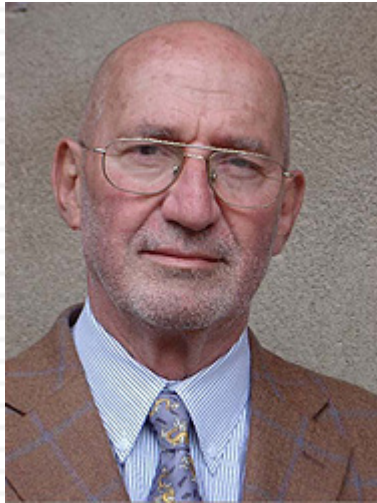


Cholecystectomy

Sarah Forsyth

History of Cholecystectomy



- First open cholecystectomy
- **1882** by Carl Langenbuch in Germany
- First lap cholecystectomy
 - ▣ **1987**, Philip Mouret (Gynaecologist) in Lyon, France
 - ▣ **1990**, Francois Dubois (French surgeon) published a case series

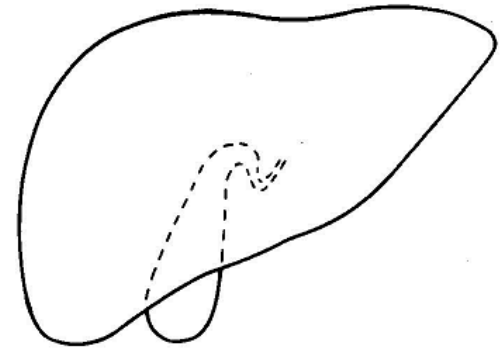




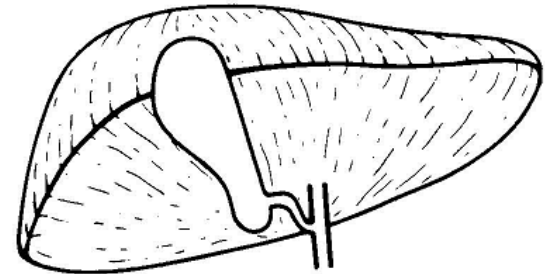
Anatomy

Gall bladder

- Pear shaped viscous, stores & concentrates bile secreted by the liver
- 50ml capacity
- 3 parts:
 - ▣ Fundus
 - ▣ Body
 - ▣ Neck
 - Hartmann's pouch
- Lies in the GB fossa on visceral surface of R lobe of liver, adjacent to quadrate lobe



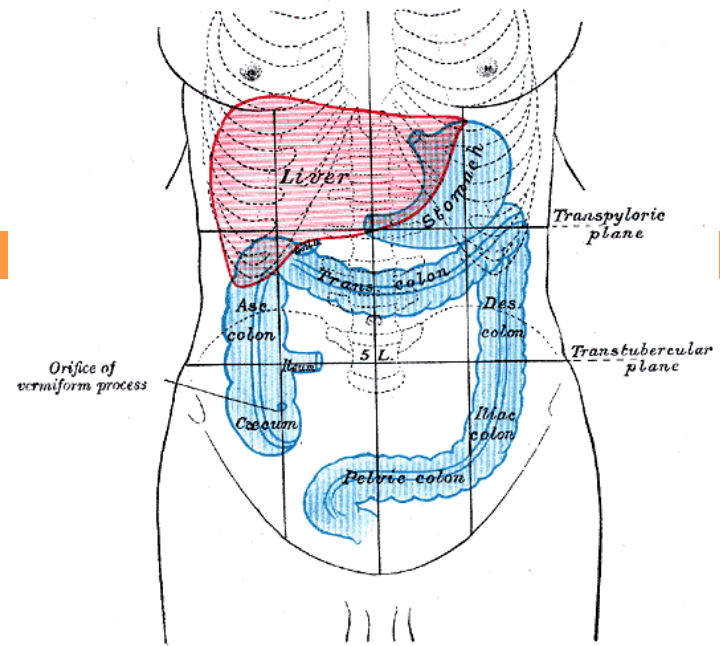
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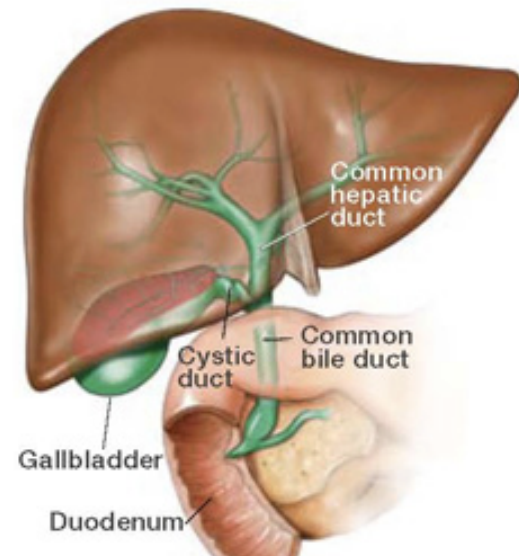
b

Gall bladder

- Relations:
 - ▣ Liver, ant abdo wall, duodenum, TV colon
- Surface anatomy
 - ▣ Fundus projects below lower border of liver, touches ant abdo wall
 - Tip 9th CC
 - Lateral border R rectus sheath
 - Transpyloric plane crosses the R costal margin



The Biliary Tree

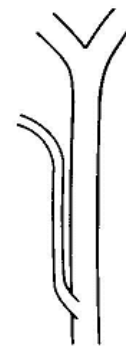


Histology

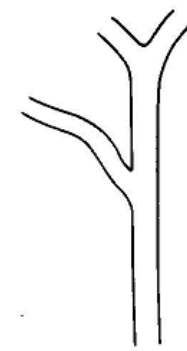
- Wall composed of fibromuscular tissue
- Non striated muscle cells composed in circular, longitudinal & oblique fashion
- Mucosa: single layer of simple columnar epithelium
 - Secrete mucous, no goblet cells
- Spiral valves of Heister: neck and cystic duct, spiral folds of mucosa

Cystic duct

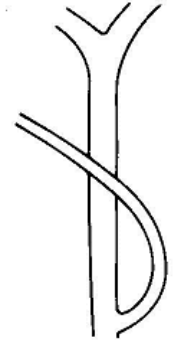
- Passes down & back to join the CHD to form the CBD
- Length **2-3cm** (Last's), 2-8cm (Jamieson's)
- Diameter **2-3mm**
- 3 major modes of entry into CHD
- Variations:
 - ▣ Cystic duct joins RHD



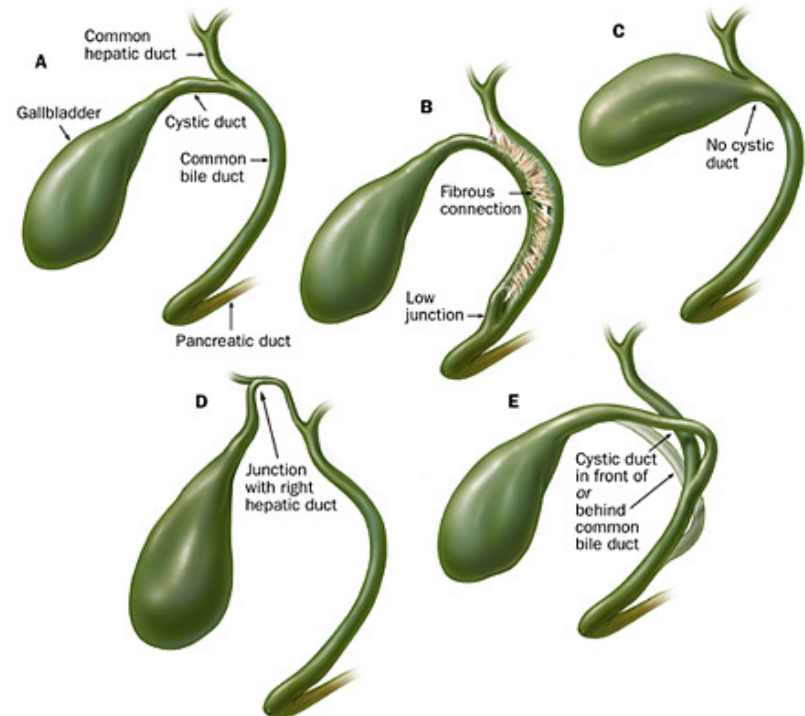
Parallel
~ 20%



Angular
~ 70%

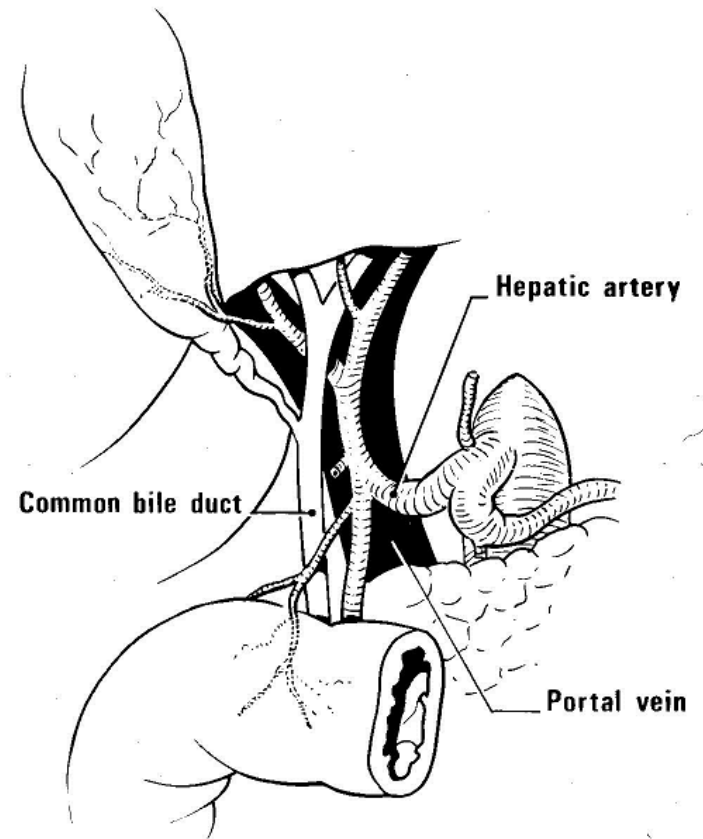


Spiral
10%



Cystic artery

- Main blood supply to GB
 - In addition to small vessels from hepatic bed
- Branch of **RHA**
 - R side of RHD
 - Passes behind cystic duct to reach neck of GB
 - Branches into ant & post cystic art
- **Variations:**
 - Branch of CHA/LHA/GDA
 - 25% of people arises on L side of duct system, crosses in front of duct to reach GB



Calot's triangle

- Triangle formed by:
 - ▣ Liver
 - ▣ Cystic duct
 - ▣ CHD
- Cystic artery usually found within the triangle

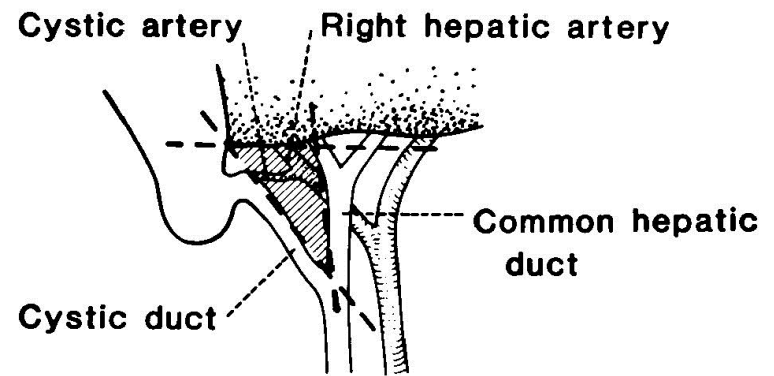


Fig. 5.3 Calot's triangle (shaded) is shown by the interrupted lines.

Describing the operation

‘What is the aim of a laparoscopic cholecystectomy?’



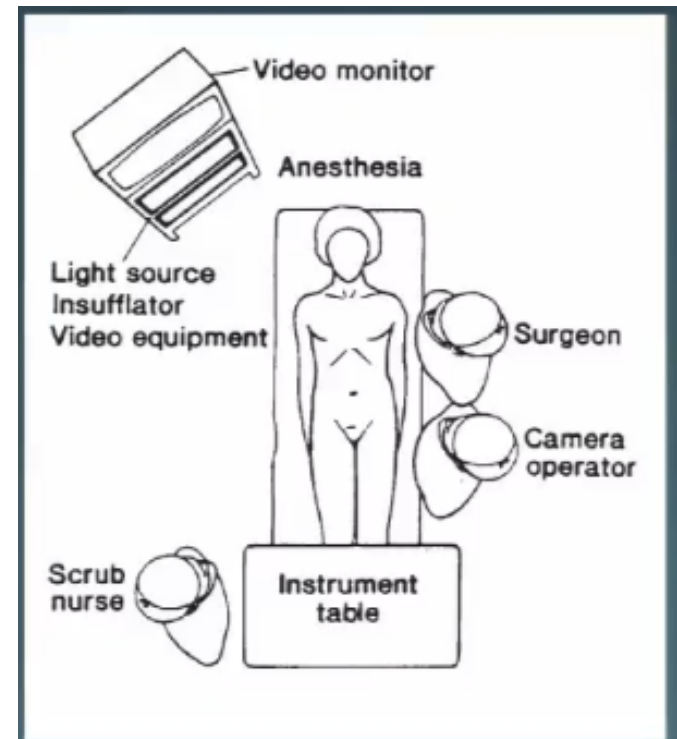
To not cause a bile duct injury!

Check your set up

- IOC booked
- Il table
- Laparoscopic stack with 30 degree scope
- Port sizes/types
- Hook diathermy/sucker/clip applicator/concord or RO/graspers (ratchet)/endocatch/drain
- Sutures

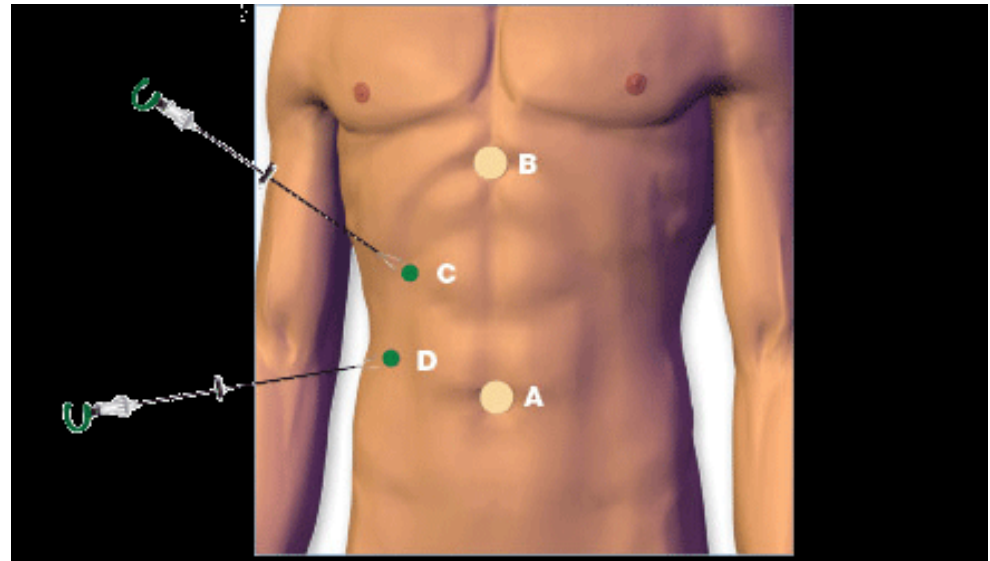
Patient positioning

- Time out/IV Abx/DVT prophylaxis/CC/diathermy plate & set to 30 coag/0 cut
- Supine
- L arm in, R arm out
- Prep from nipple line
- Drape
 - ▣ Superior & lateral drape position
 - ▣ Suitable for conversion to open
- Laparoscopic set up
 - ▣ Screen on patients right side



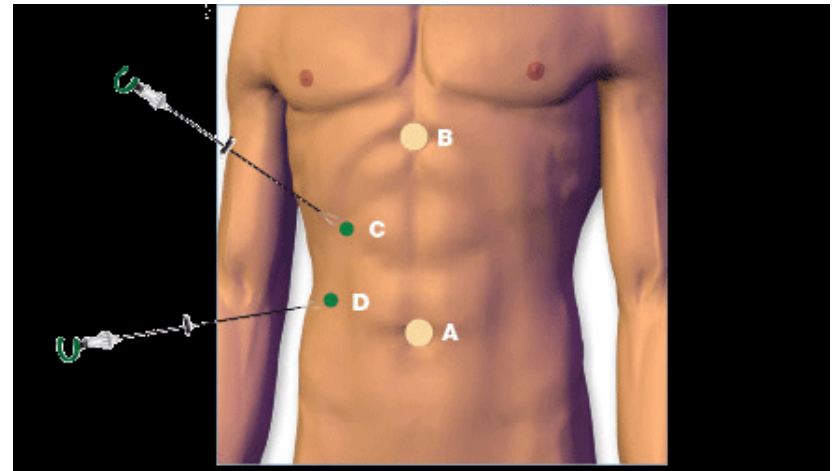
Access

- 15 blade
- Subumbilical incision
- Identify cicatrix
- Incision in linea alba
- 0 vicryl stay suture
- 10mm Hasson port
- Pneumoperitoneum
 - ▣ Pressure 12mmHg
- Position patient reverse trendelenburg/R side up

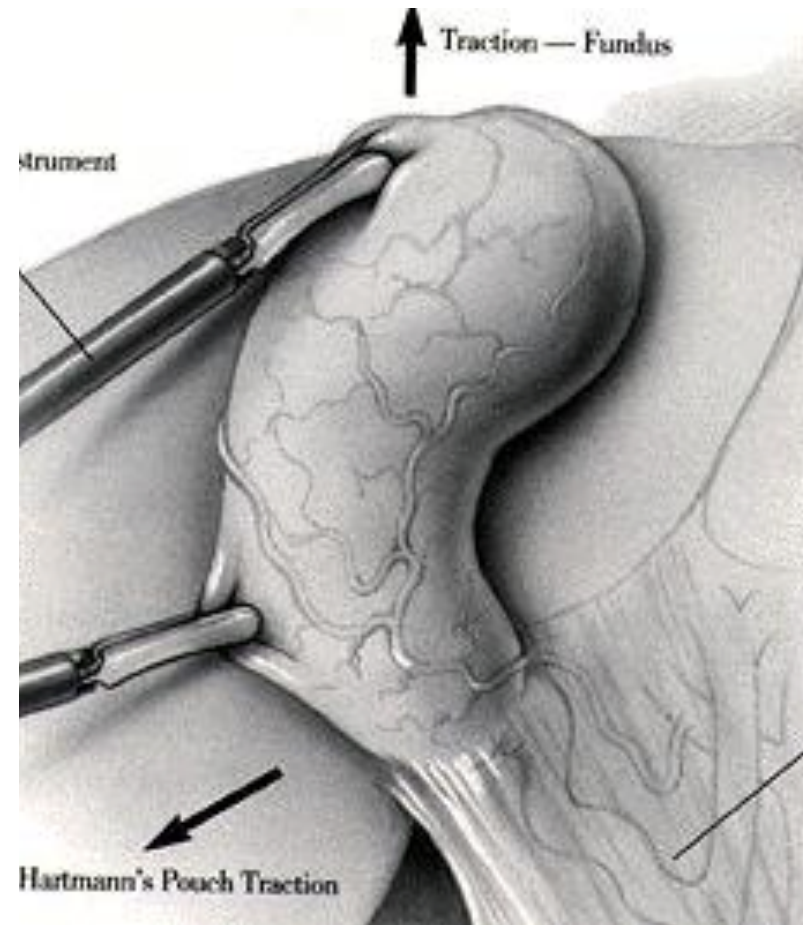


Access

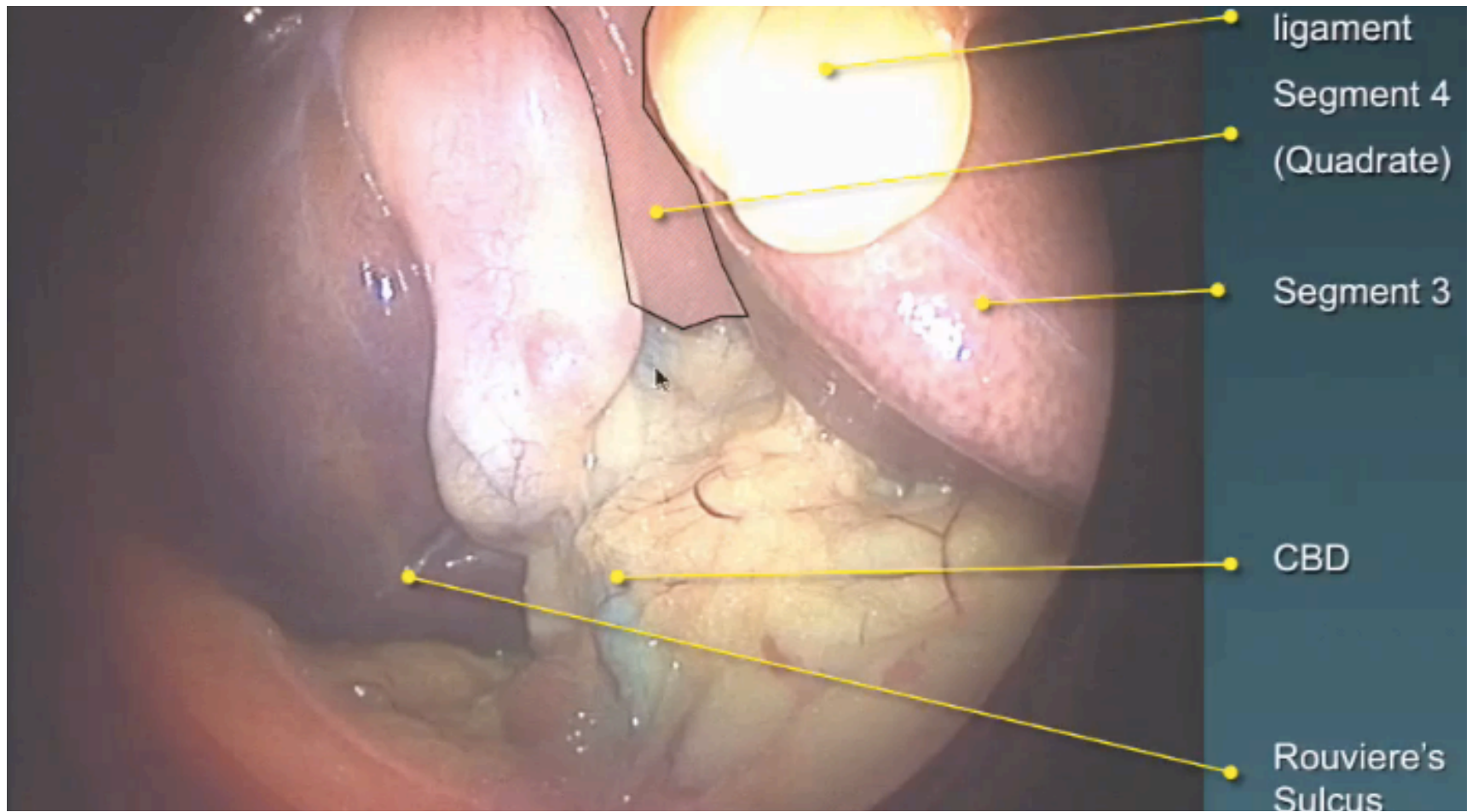
- Ports introduced under direct vision
- LA marcain 0.5% w adrenaline
- 1 x 10mm epigastric port
- 2 x 5mm R flank/RUQ



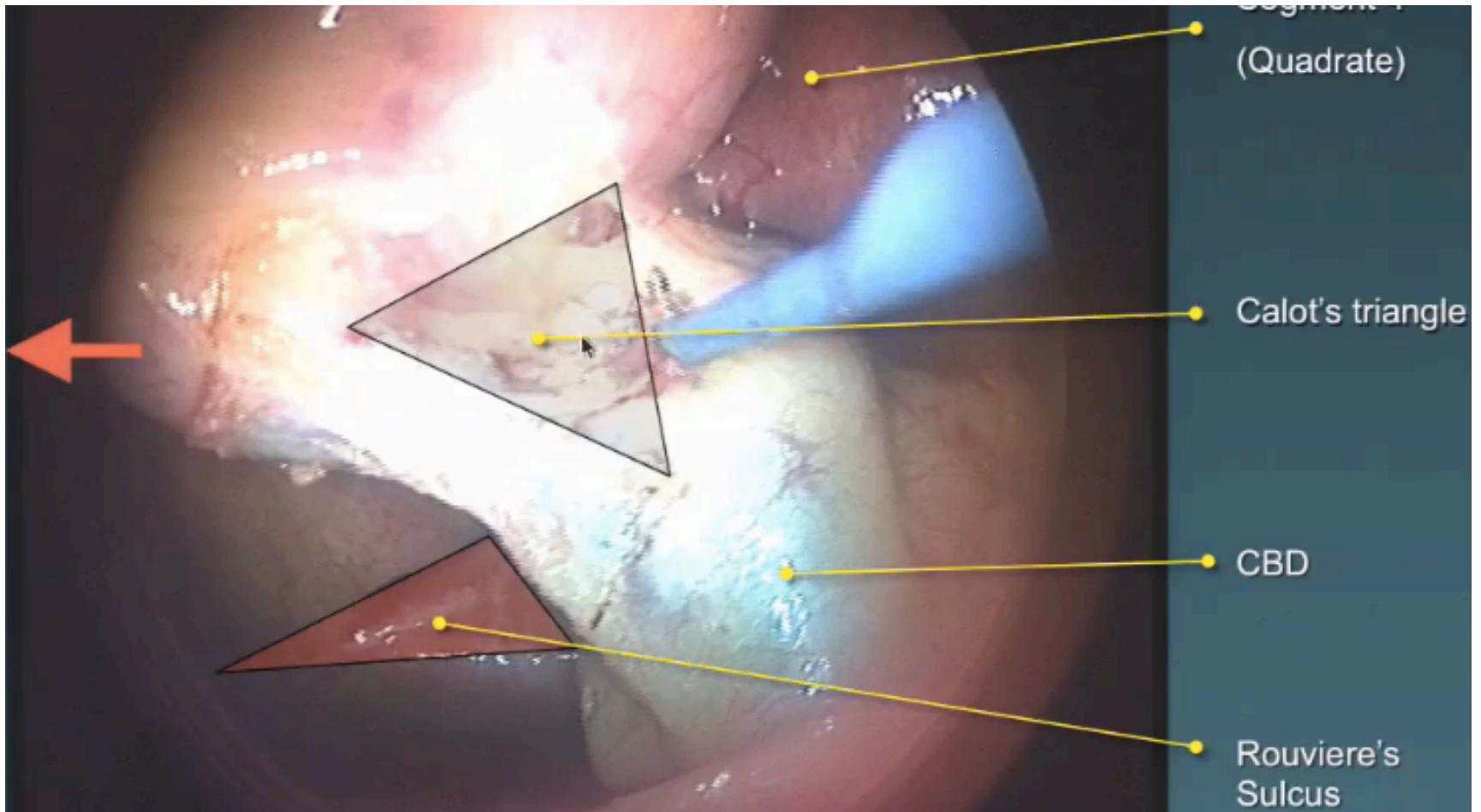
- Assistant and surgeon on left side of patient
- Assistant grasps fundus with toothed forceps (ratchet) & retracts cranially
- Hartmann's pouch grasped and retracted laterally



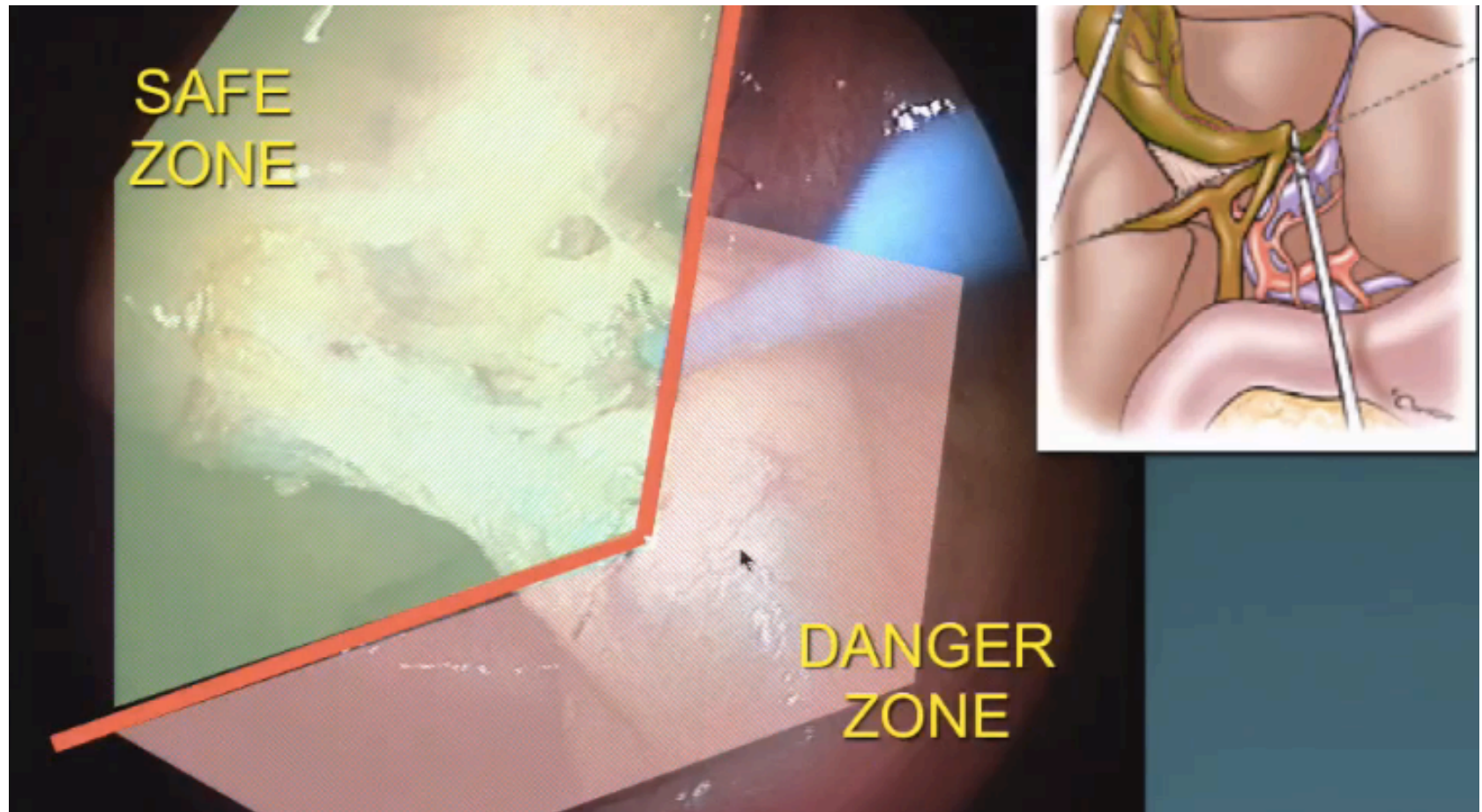
Identify critical structures



Identify critical structures

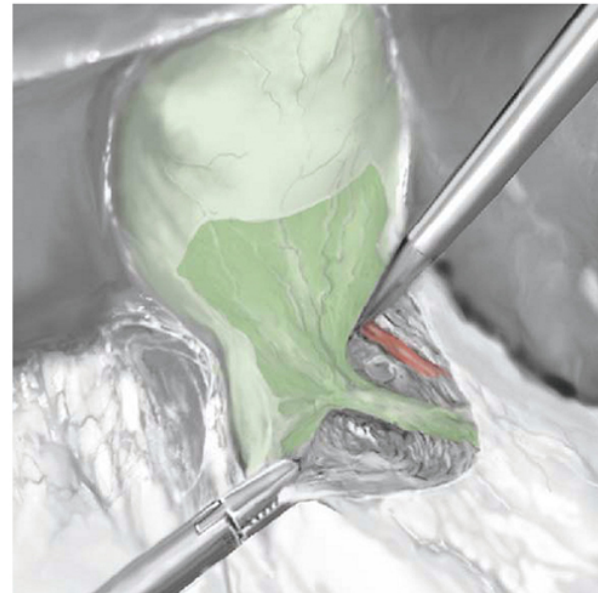
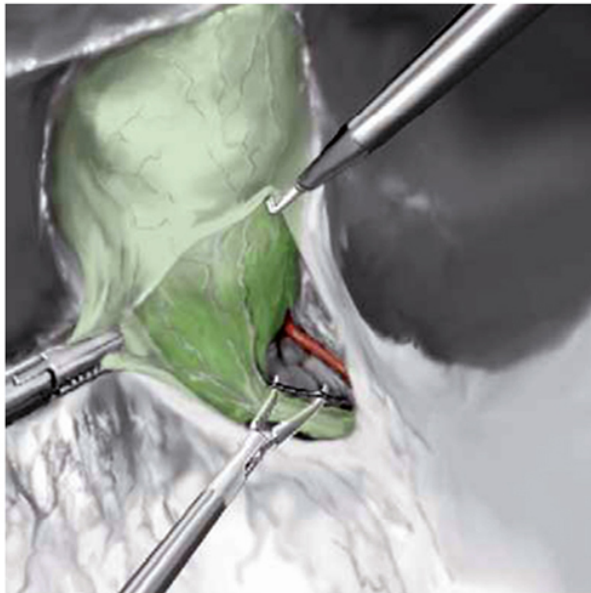


Identify critical structures



Dissection

- Peritoneum over medial/lateral edges of GB divided
- Peritoneum over hepatocystic triangle divided



Establish critical view of safety

- Clear hepatocystic triangle of fat and fibrous tissue
 - ▣ Diathermy/sucker/blunt dissection
 - ▣ Create window between duct & artery/artery and liver
- Dissect the GB off the cystic plate
- Cystic artery
 - ▣ Clip x 3 and divide with scissors
- Cystic duct
 - ▣ Clip proximally
 - ▣ Incision in duct with scissors to perform IOC

IOC – 5 things

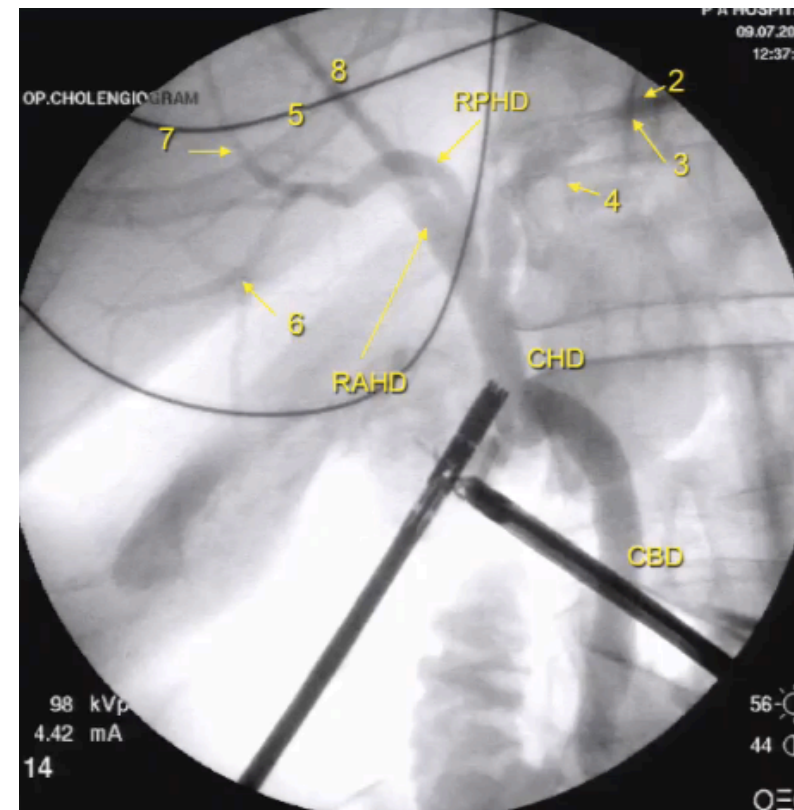
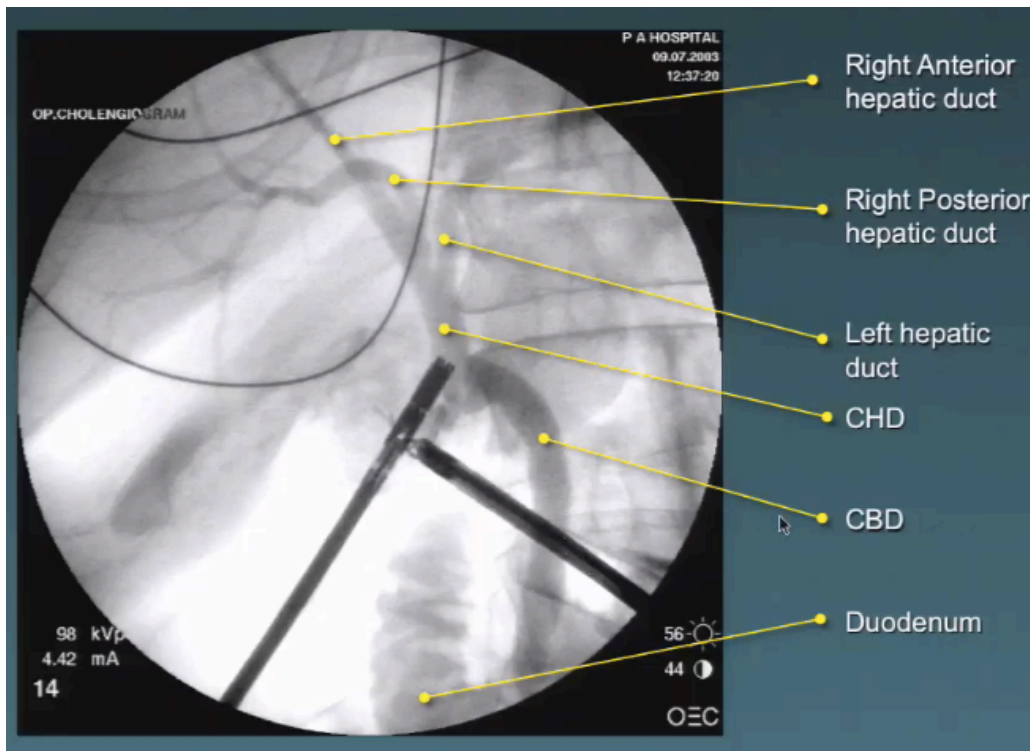


1. Filling defects
2. Free flow into duodenum
3. Tapering of CBD into duodenum
4. R & L hepatic ducts/intrahepatic biliary tree
5. Size of cystic duct/CBD

IOC

- Concord needle or Reddick Olsen (4Fr ureteric catheter)
- 20ml syringe with NS to catheter and insert into duct (L port)
- Clamp over catheter & ensure free flow of NS without leak
- Level and raise table for II
- Place clip to secure ratchet grasper on GB
- Attach 20ml syringe of contrast (omnipaque) to catheter ensuring no bubbles
- Mayo to cover II
- Shot to establish position, then save images at 3 frames/second
- Slow injection of contrast to observe filling of CBD

IOC



Finish dissection

- Place 3 clips distally on cystic duct and divide between clips
 - ▣ If any concern about cystic duct stump, apply endoloop
- Dissect rest of GB off liver bed with hook diathermy
- Move laparoscope to epigastric port, insert endocatch bag, place GB in bag and secure suture externally

Post dissection

- Inspect GB fossa for bleeding/bile leak
 - ▣ Haemostasis with diathermy if required
- Level patient, irrigation and lavage
- Desufflate
- Remove bag/GB through umbilical port incision
- 10mm jackson pratt drain if necessary
- Closure:
 - ▣ 0 vicryl fascia
 - ▣ 3-0 monocryl subcuticular to skin
 - ▣ Dress with steri strips/opsite dressing

Strasberg critical view of safety (CVS)

AN ANALYSIS OF THE PROBLEM OF BILIARY INJURY DURING LAPAROSCOPIC CHOLECYSTECTOMY

Steven M. Strasberg, M.D., F.R.C.S.(C), F.A.C.S., Martin Hertl, M.D., *and*
Nathaniel J. Soper, M.D., F.A.C.S.

Rationale and Use of the Critical View of Safety in Laparoscopic Cholecystectomy

Steven M Strasberg, MD, FACS, L Michael Brunt, MD, FACS

CVS – Three requirements



1. Calot's triangle must be cleared of fat and fibrous tissue
2. The lowest part of the GB must be separated from the cystic plate
3. Two structures, and only two, should be seen entering the GB

CVS

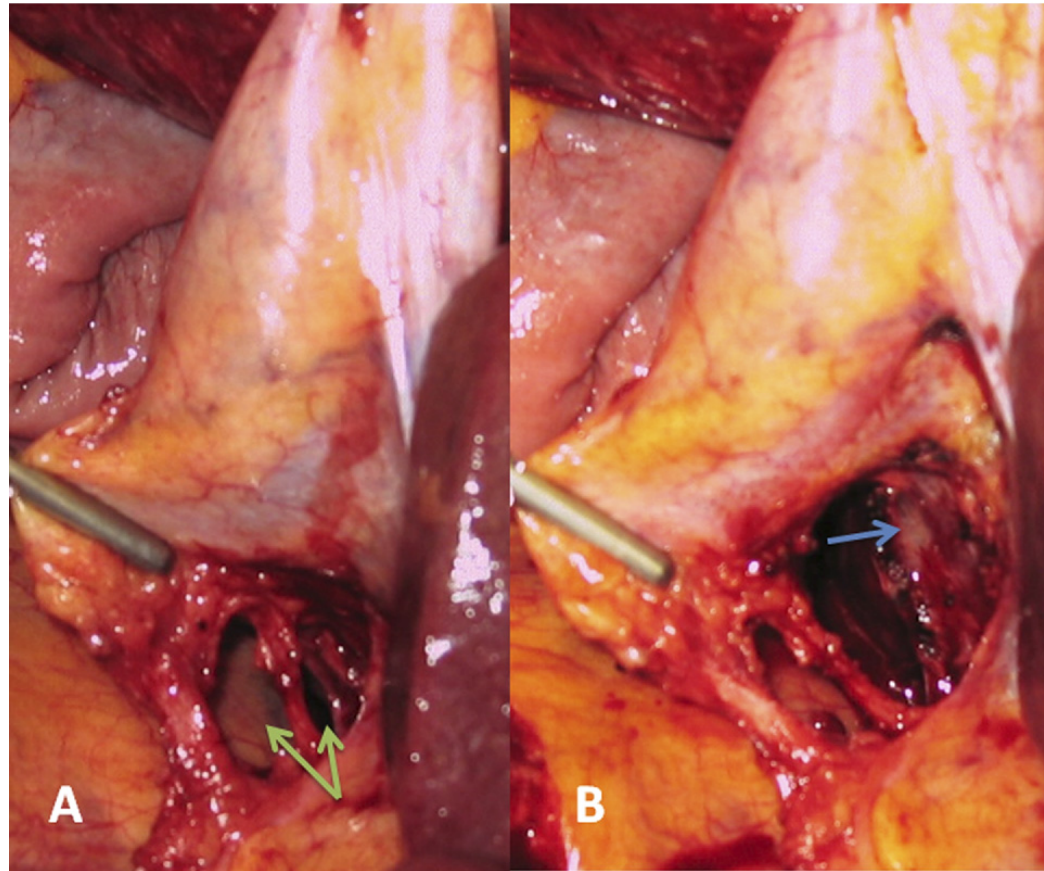


Figure 3. Difference between 2 “windows” and critical view of safety (CVS). (A) Dissection has led to the creation of 2 windows, 1 between the cystic duct and artery and 1 between the artery and the liver (arrows). This dissection does not fulfill the criteria of CVS because the cystic plate cannot be clearly identified. (B) CVS. Arrow points to whitish clearly identified cystic plate.

CVS

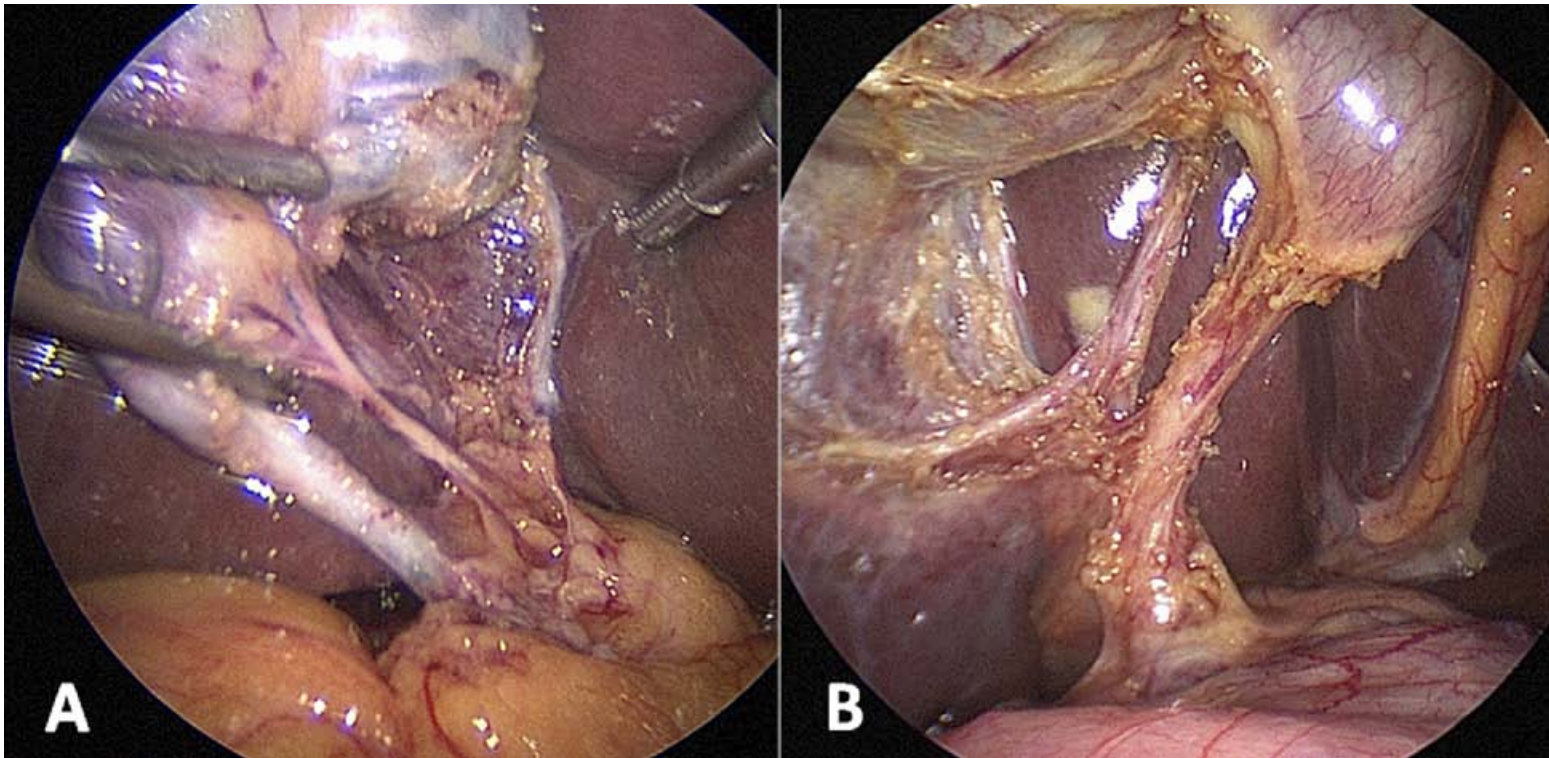


Figure 4. Different appearances of the cystic plate. (A) Critical view of safety (CVS) is seen from in front of the gallbladder as usually shown. The cystic plate is very thin. (B) CVS is seen with the gallbladder reflected to the left so that a posterior view of the triangle of Calot is shown. The cystic plate is thicker and whitish. Both views fulfill criteria for CVS.

IOC

- Routine vs Selective
- Routine:
 - ▣ Anatomy
 - ▣ Stones
 - ▣ Early ID of injury
 - ▣ Routine skill

Routine IOC

Complications of Cholecystectomy: Risks of the Laparoscopic Approach and Protective Effects of Operative Cholangiography

A Population-Based Study

David R. Fletcher, MD, FRACS,* Michael S.T. Hobbs, DPhil, FRACP,† Patrick Tan, MBBS, FRACS,‡
Liora J. Valinsky, BSc(Hons), MPH,† Richard L. Hockey, BSc,† Terri J. Pikora, BHSc,† Matthew W. Knuiman, PhD,†
Harry J. Sheiner, MS, FRCS, FRACS,§ and Anthony Edis, MD, FRCS, FRACS§

B1.

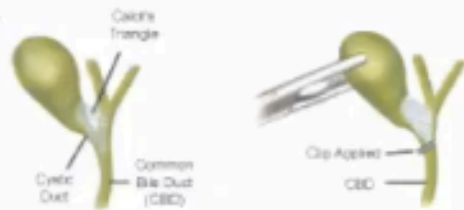


3) Two More Clips Placed On Common Bile Duct.

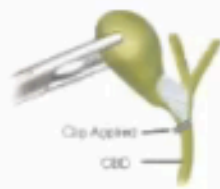
4) Transection Of Common Bile Duct.

5) Resulting Anatomy

A.



1) Cystic Duct With Calot's Triangle Incompletely Dissected



2) Clip Applied To Misidentified Common Bile Duct Instead Of Cystic Duct.



B2.



3) A Hole Is Placed In The Misidentified Common Bile Duct Because Of Incomplete Dissection.

4) The Cholangiogram Catheter Infuses Contrast Material Into Anatomical Structures.

5) Cholangiogram Performed



6) a. Further Dissection Of Calot's Triangle.
b. Removal Of Catheter And Clips.
c. Placement Of T-Tube.

7) Removal Of Gall Bladder With T-Tube Remaining In CBD And Long Limb Of The T Acting As A Drain Through