# Lap. Common Bile Duct Exploration (LCBDE). Feasibility and Prospective to Substitute ERCP-Lap. Chole. in Management of CBD Stones

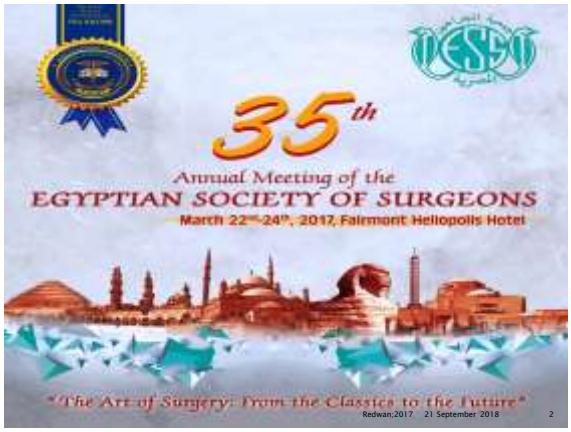
*By*

*Prof. : Alaa A. Redwan M.D, Ph.D.*

*Professor of G.I.T. Surgery and Laparo Endoscopy*

*Sohag University, Sohag*








## Choledocholithiasis
### Magnitude of the problem

- Approximately **10%** of patients who undergo laparoscopic cholecystectomy harbor common bile duct stones
- It is estimated that **5% to 12%** of patients with choledocholithiasis may be completely asymptomatic and have normal liver function tests.

*Scott Melvin et al; minimally invasive surgery. 2014*



## ERCP/Lap. Chole.

two-step procedure consisting of preoperative ERCP followed by lap. chole. Alternatively, lap. Chole. with intraoperative ERCP or ERCP at a later date may be performed

*Maris Jones et al; surg. Endosc. 2013*



## LCBDE

The successful laparoscopic management of CBD stones depends on several factors including surgical expertise, adequate equipment, the biliary anatomy, and the number and size of CBD stones. With advancing technology it has become safe, efficient, and cost effective.

Abolfazl, et al; Gastroenterology Research and Practice, 2009



## LCBDE

- **Instrumentation/Material**
- LCBDE is a technically demanding operation requiring:
- ■ High volume insufflator
- ■ High energy light source
- ■ Fluoroscopic intraoperative cholangiographic equipment
- ■ Dormia basket or balloon extraction baskets
- ■ Flexible endoscope 3.5mm (fine, fragile and expansive)
- ■ Contact or laser lithotripsy device (optional)
- ■ Laparoscopic knife
- ■ Laparoscopic needle holder
- ■ Transcystic drain or T-tube

Fluoroscopic intraoperative cholangiographic equipment

and/or

Flexible endoscope 3.5mm (fine, fragile and expansive)



# LCBDE Trans-cystic approach



Conditions for successful and safe trans cystic laparoscopic CBD exploration include:

- CBD diameter <6 mm
- Stone location distal to the cystic duct/CBD junction
- Cystic duct diameter >4 mm
- Fewer than 6 to 8 stones within the CBD
- Stones smaller than 10 mm

For laparoscopic transcystic exploration, the gallbladder is left in situ and the dome of the gallbladder is grasped and retracted cephalad to facilitate visualization and manipulation.

Topal, Aerts& Penninckx; Surg Endosc 2007



- Advantage:
  - Less invasive
  - Minimal morbidity, no T-tube, no drain, and a rapid return to normal activity in most cases
- Disadvantage:
  - Limited by cystic duct diameter
  - Depends on the stone that need to be removed



# LCBDE Trans-choledocal approach



LCD is indicated for patients with:

- Failed laparoscopic transcystic exploration or preoperative endoscopic stone extraction
- Narrow/tortuous cystic duct
- Dilated CBD (6 to 10 mm)
- Large stones (>10 mm)
- Multiple stones
- Stone location proximal to the cystic duct/CBD junction

As is the case for laparoscopic transcystic exploration, the gallbladder is left in situ and the dome of the gallbladder can be grasped and retracted cephalad to facilitate visualization and manipulation. A 30 degree laparoscope should be used to assist with visualization of the supraduodenal CBD.

Scott Melvin et al; minimally invasive surgery. 2014

- Advantage:
  - Useful in cases when transcystic method is not feasible, such as large stones, intrahepatic stones, or a miniscule or tortuous cystic duct
- Disadvantage:
  - Technically demanding
    - Require suturing and knot-tying skills not necessary in the transcystic method
  - Limited by CBD diameter
  - Increased risk of post-operative bile leakage and late stenosis



- Methods for stone retrieval:
  1) Graspers either regular or reticulated
  2) Irrigation/ suction techniques
  3) Through the scope techniques (Choledochoscopy basket and/ or balloon )
  4) Direct access techniques either basket and /or Balloon (or Fogarty catheter)
- Confirm ductal clearance by either cholangiogram, or choledochoscopic inspection, or to decide for open conversion in case of retained stones



# Results



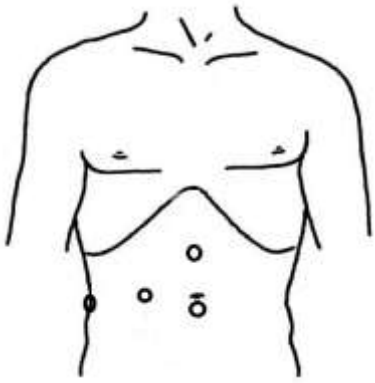
A prospective and retrospective work to study and evaluate laparoscopic common bile duct exploration (LCBDE), detailed techniques used for choledocholithotomy and assessment of CBD clearance to discuss its feasibility, assess all difficulties encountered in management of CBD stones, and its prospective to substitute combined ERCP-Lap. Chole.





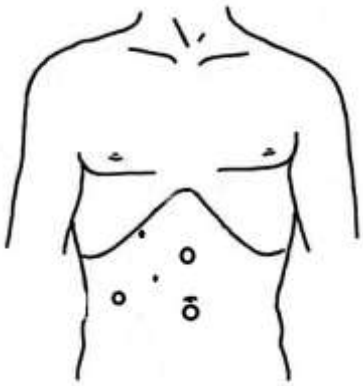

50 cases of chronic calcular cholecystitis, with CBD stone(s) were enrolled, and treated by laparoscopic cholecystectomy plus choledocholithotomy with the help of choledochoscope in 30 patients, and cholangiogram in 15 patients

Trocar arrangement





Trocar arrangement



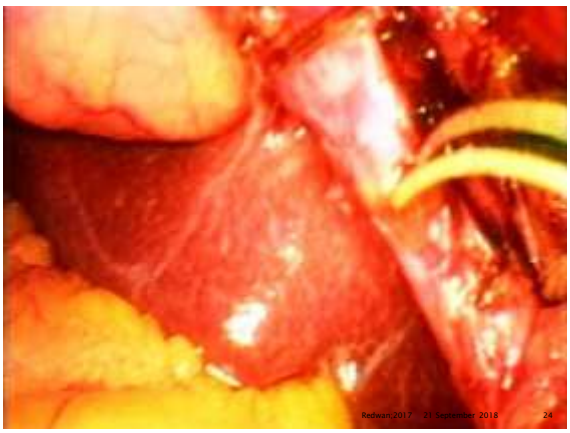






| The item | Number | Percent |
|---|---|---|
| Transe-cystic approache | 5 | 10% |
| Transe-choledochotomy approache | 45 | 90% |
| Choledochoscopic technique | 30 | 60% |
| Cholangiogram | 15 | 30% |
| Converted to open technique (failed attempt) | 1 | 2% |
| Total | 50 | 100% |

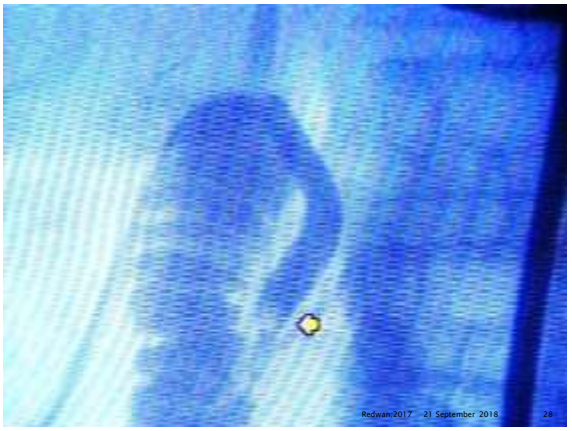


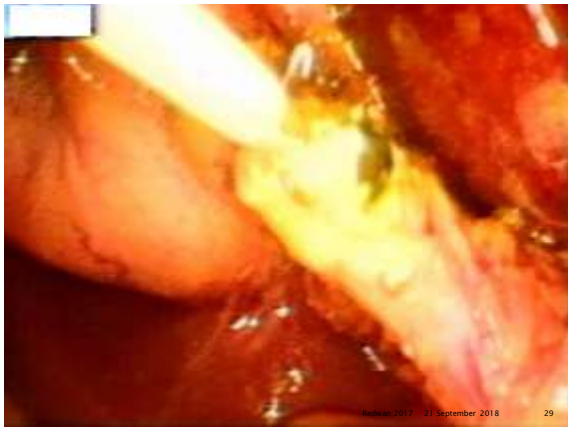



Redwan;2017 21 September 2018 25


Redwan;2017 21 September 2018 26


Redwan;2017 21 September 2018 27


Redwan;2017 21 September 2018 28


Redwan;2017 21 September 2018 29


Redwan;2017 21 September 2018 30

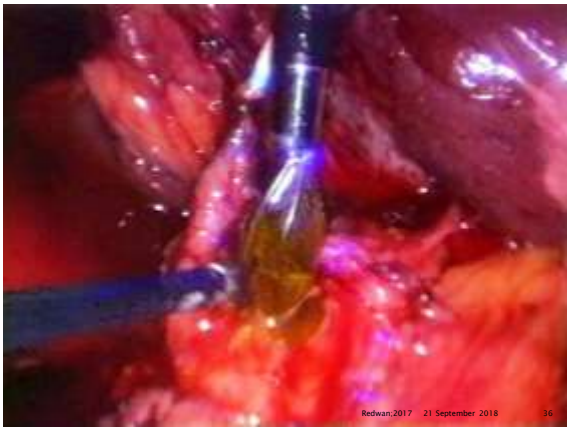

Redwan 2017 21 September 2018 31


Redwan 2017 21 September 2018


Redwan 2017 21 September 2018


Redwan 2017 21 September 2018 34

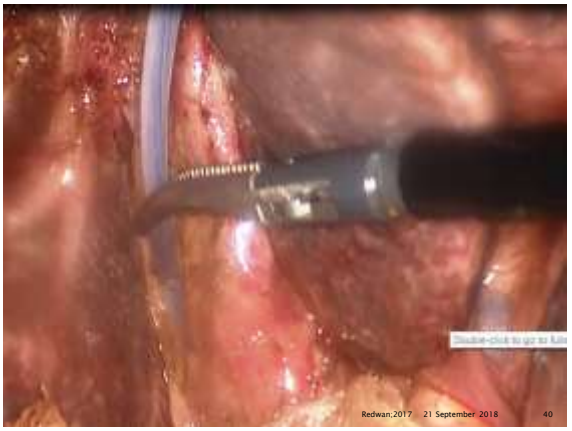

Name:
ID:
Age Sex
04/03/95
16:54:14
Comment
Dr.
Hospital
FB-1838
VCR1:OFF
VP 1:OFF LINE
PENTAX


Redwan 2017 21 September 2018 36


Redwan;2017 21 September 2018 37

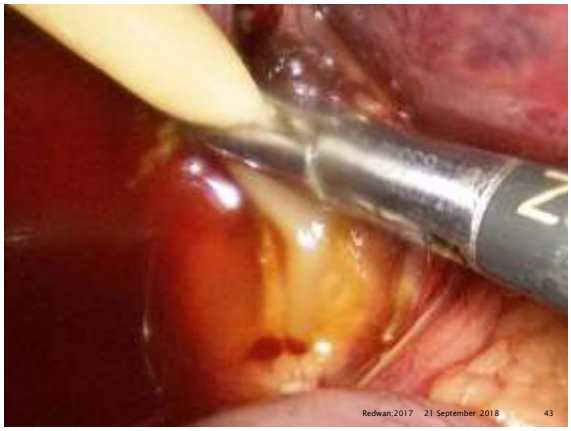

Redwan;2017 21 September 2018 38


Redwan;2017 21 September 2018

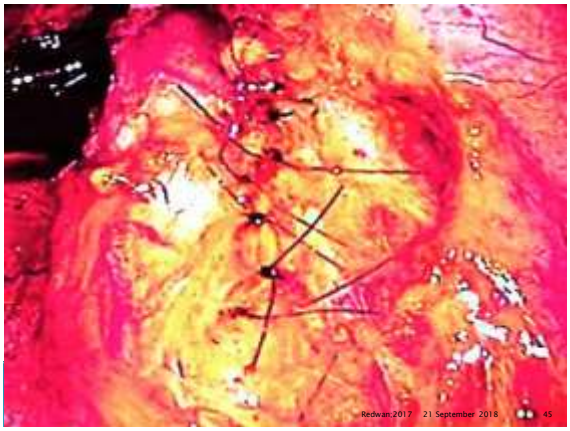

Redwan;2017 21 September 2018 40


Redwan;2017 21 September 2018 41


Redwan;2017 21 September 2018 42









## Complications

| The item | No. | Percent |
|---|---|---|
| Post operative hypothermia | 2 | 4% |
| Post op. fever and hyperamylasemia | 1 | 2% |
| Missed stone | 2 | 4% |
| Total | 5 | 10% |

Redwan;2017 21 September 2018 47

| The item | Group I (surgery ) | Group II (endoscopy) | Group III (laparoscopy) | P Value |
|---|---|---|---|---|
| *-Invasiveness | Invasive | Minimally invasive | Minimally invasive | - |
| *-Operative time (min<br>*-Mean ± S.D | 60-180 min.<br>90.81±21.45 | 20-45 min.<br>30.24±8.72 | 70-292 min<br>111.22±41.5 | 0.000<br>H.signif. |
| *-Success rate of the attempted procedures<br>*-Failed cases | 100%<br>- | 96%<br>2 | 98%<br>1 | 0.245<br>Not signif. |
| *-CBD Clearance<br>*-Missed stone(s) | 93%<br>7 | 100%<br>- | 98%<br>2 | - |
| *-Procedural mortality | - | - | - | - |
| *-Post procedural morbidity | 15% | 9% | 10% | 0.425<br>Not signif. |
| *-Hospital stay (day)<br>*-Mean ± S.D | (5-12 days)<br>8.3±3.84 | (1-2 days)<br>1.21±0.27 | (2-4 days)<br>3.2±1.18 | 0.002<br>Significant |
| *-Return to work (day)<br>*-Mean ± S.D | 12-20 days<br>14.3±3.71 | 2-5 days<br>3.2±1.86 | 5-10 days<br>7.61±3.9 | 0.030<br>Significant |
| *-Difficulty | Easy | Difficult | Difficult | - |
| *-Feasibility | Feasible | Not feasible | Not feasible | - |

Redwan;2017 21 September 2018 48

Endoscopic management of choledocho-lithiasis (ERCP) has the advantage of minimally invasive maneuvers, could be done as out patient clinic, short procedure time, short hospital stay, very low if no mortality and morbidity, rapid return of the patients to work, but the cost effectiveness and feasibility is still a problem.



On the other hand; laparoscopic CBDE is a feasible minimally invasive procedure, with low morbidity and mortality, but it requires very high laparoscopic surgical skills, long learning curve, and up to date complete equipment, and a good selection of patients.



- ERCP is a versatile technique that can be applied to almost all patients, However, LCBDE is selectively done - till now – nictitating special prerequisites. Moreover, both share high coast, and great difficulties
- The association between LCBDE with intra-operative cholangiogram has a high clearance rate for CBD, which was not achieved by choledochoscopic approaches



## Conclusion:

**LCBE is feasible, effective, with promising results, but it still can not substitute ERCP technique either in pre- post- or intra operative period.**




ProfAlaaRedwan@Yahoo.com