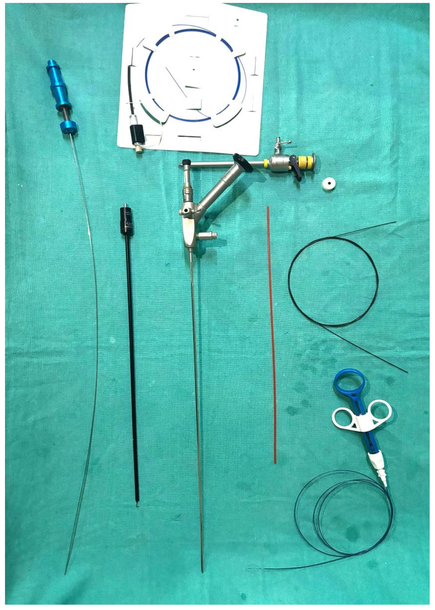
CHOLEDOCHOLITHOTRIPSY USING HOLMIUM LASER IS A NOBLE PROCEEDURE IN SELECTED CASES

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Introduction: Choledocholithiasis is the second most common complication in patients with gallstones, and it is seen in approximately 5% of asymptomatic patients and in 10–15% of symptomatic patients requiring laparoscopic cholecystectomy. ERCP before laparoscopic cholecystectomy is traditional, but single-stage LC with LCBDE is now the preferred technique for gallstones with choledocholithiasis. Despite its technical challenges, Transcystic (TC) LCBDE or Micro-choledochotomy (2-3mm) is linked to lower morbidity. Traditionally, TC LCBDE focuses on smaller CBD stones, enabling passage into the duodenum with flushing or extraction via the cystic duct using standard techniques. The introduction of the Holmium laser allows for the fragmentation and flushing of larger stones into the duodenum.

Instruments used

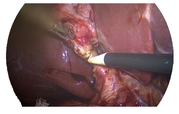


PORT POSITION





TRANSCYSTIC APPROACH



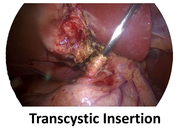
Exposing the cystic duct



Cystic duct rent made



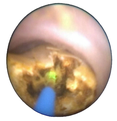
Bile coming out through the duct



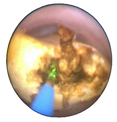
Transcystic Insertion of ureteroscope



CBD stone with guidewire



Laser lithotripsy



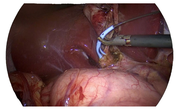
Laser lithotripsy



Clearance of CBD



View of duodenum with fragments of the stones



Transcystic Biliary stenting

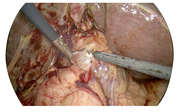


Transcystic Biliary stenting

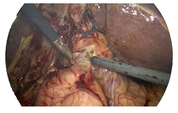


Clipping of the cystic duct

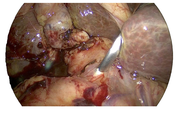
MICROCHOLEDOCHOTOMY (2-3 mm)



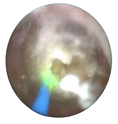
Micro Cholechotomy



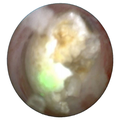
Micro Cholechotomy



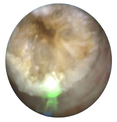
Insertion of ureteroscope via micro choledochotomy



Laser lithotripsy



Laser lithotripsy



Laser lithotripsy



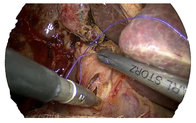
Clearance of the distal CBD



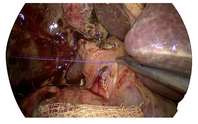
View of left and right Duct



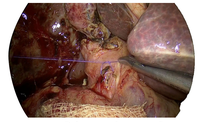
View of left and right Duct



Primary closure of microcholedochotomy



Primary closure of microcholedochotomy



Primary closure of microcholedochotomy

Materal and Methods: Patient undergoing LCBDE with selected case having <4 calculi and calculi distal to the cystic duct insertion to CHD, normal or minimally dilated CBD, intraoperatively detected dilated CBD or calculi on Inta-operative Cholangiogram, transcystic route was attempted in all cases with choledocholithotripsy with Holmium laser. However in failed cases of transcystic route, LCBDE with trans-ductal route with Micro- choledochotomy(2-3mm) was followed. We have used ureteroscope instead of choledochoscope for the procedure. We used 5 ports as standard for this procedure (Shown in the Pic) : Periumbilical Camera port, two subcostal ports over midclavicular and anterior axillary line and one special working port over the palmer point and one smart port over the epigastrium as high as possible for visualisation of the CBD through transcystic or micro choledochotomy route with ureteroscope. In TC LCBDE with a ureteroscope ,scope passed over guide wire. The use of Holmium laser was indicated when stone size is more than 5mm or < 4 calculi, stone distal part of the CBD. Cases initially failing TC approach LCBDE was performed with micro choledochotomy(2-3mm). The fibre optic holmium laser with a calibre range of 200–365 µm was introduced through the working channel of the semi rigid ureteroscope 6.5 Fr (Karl Storz, Germany). Lithotripsy was achieved by aiming a light diode at the stone and activating the laser. initially laser energy was set to 0.8 J in dusting mode with a frequency of 10 Hz as standard but was incrementally increased to 1 j if there was failure of stone fragmentation. During Fragmentation fragments were flushed into the duodenum through the ampulla in all the cases. Ureteroscope used to view the entire CBD, including the proximal ducts to ensure complete stone clearance in TD micro choledochotomy LCBDE . However in TC route proximal CHD could not be visualised. In every cases we used antegrade Amsterdam biliary stenting (5, 7 or 8 Fr). Benefits of Biliary stenting are less chances of stricture formation , bile leakage and it can be a facilitation for future ERCP easy cannulation if there is any unfortunate retained stones.

Results: 523 cases of LCBDE has been performed during a period of 2017-2023. However since last 1 year, we are using Holmium Laser for choledocholithotripsy and 29 cases has been performed so far. patients were discharged on 3rd post op day without any complications like pancreatitis or bile leak etc. All patients were followed up with abdominal ultrasound at 1 month.

Conclusion: Laparoscopic CBDE with Holmium laser emerges as an effective and single stage minimally invasive approach for managing choledocholithiasis. The synergistic application of advanced technology, such as the Holmium laser, with precise port placement enhances the success of stone clearance while minimizing patient morbidity. The benefits of this procedure, including reduced postoperative complications and shorter hospital stays, underscore its potential as a preferred method for treating choledocholithiasis. Further studies and long-term follow-ups are warranted to validate the durability of stone clearance and assess the overall efficacy and safety of this technique.