

# Clip-Assisted Common Bile Duct Cannulation During ERCP for Complex CBD Stones: A Novel Life-Saving Approach

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ABSTRACT

**Background:** Common bile duct (CBD) stones are a potentially serious complication of gallstone disease, requiring timely removal to prevent life-threatening sequelae. Endoscopic retrograde cholangiopancreatography (ERCP) is the standard of care, but challenging anatomical variations—such as a perampullary diverticulum—can make biliary cannulation extremely difficult or impossible with standard techniques.

**Case Presentation:** We report the case of a 28-year-old female doctor who developed severe sepsis and hepatic microabscesses following a laparoscopic cholecystectomy which was complicated by retained CBD stones. Initial ERCP attempts failed due to an intradiverticular papilla hidden within a large perampullary diverticulum. At Evercare Hospital Dhaka, after hemodynamic stabilization, a novel clip-assisted technique was employed. By applying a hemoclip to the edge of the diverticulum, the papilla was repositioned, enabling successful CBD cannulation, sphincteroplasty, and complete stone extraction with stent placement. The patient's liver function and sepsis parameters improved rapidly, and she achieved a full recovery.

**Conclusion:** This case demonstrates the life-saving potential of innovative endoscopic techniques in managing complex biliary anatomy. To our knowledge, this is the first reported use of clip-assisted papilla repositioning for ERCP in Bangladesh, underscoring the importance of advanced skills, creativity, and multidisciplinary expertise in overcoming procedural challenges.

**Keywords:** ERCP, Common bile duct stones, Perampullary diverticulum, Clip-assisted cannulation, Innovative endoscopy

## INTRODUCTION

Gallstones are a common condition among the general population. Generally, this situation does not cause symptoms, but 10%-25% of affected people may have specific symptoms, such as biliary pain and acute cholecystitis, and 1%-2% of these may have major complications<sup>1</sup>. The rate of coexisting common bile duct stones in patients undergoing cholecystectomy for cholelithiasis is approximately 7%-20%<sup>2</sup>. It is generally accepted that bile duct stones should be removed (even if asymptomatic), because they may be associated with severe complications such as pancreatitis and cholangitis<sup>3</sup>. The management of coexisting CBD stone should be ERCP with removal of CBD stone followed by Cholecystectomy<sup>4</sup>.

In a recent complex medical case, a young female doctor's life was saved at Evercare Hospital Dhaka through the use of an innovative endoscopic tech

nique. This case highlights how the application of advanced technology and expert decision-making can deliver life-saving treatment, even in the most critical scenarios.

## CASE SUMMARY

A 28-year-old lady doctor underwent laparoscopic cholecystectomy for acute cholecystitis in a reputed Private Hospital in Chattogram. Following the procedure, she developed fever, jaundice and recurrent upper abdomen pain. Magnetic resonance cholangiopancreatography (MRCP) revealed the presence of common bile duct (CBD) stones. Then a senior and expert ERCP specialist in Chattogram took attempted for ERCP; the papilla could not be visualized within the duodenum, and biliary cannulation was unsuccessful. Thereafter again she was referred back to the operating surgeon who performed laparoscopic cholecystectomy. He later

## Case Report

did Choledocholithotomy with T-tube drainage. Despite this intervention, her condition progressively worsened, with the development of sepsis and multiple hepatic microabscesses as impacted stones at distal CBD could not be removed. The T tube was removed, and she was referred to Evercare Hospital Dhaka for further management. On arrival, she was admitted under our supervision with septic shock and transferred to High Dependency Unit (HDU). During admission, her blood pressure (BP) was 80/40 mmHg and pulse rate was 128 bpm (low volume, feeble) and she appeared acutely ill. Relevant laboratory findings are summarized in Table 1 below. The investigations revealed anemia, marked leukocytosis with neutrophilia, and elevated inflammatory markers (CRP, procalcitonin) consistent with severe sepsis. Renal function was mildly impaired. Liver function tests showed cholestatic liver injury with hyperbilirubinemia with significantly elevated ALP and GGT, suggestive of obstructive jaundice secondary to impacted CBD stones.

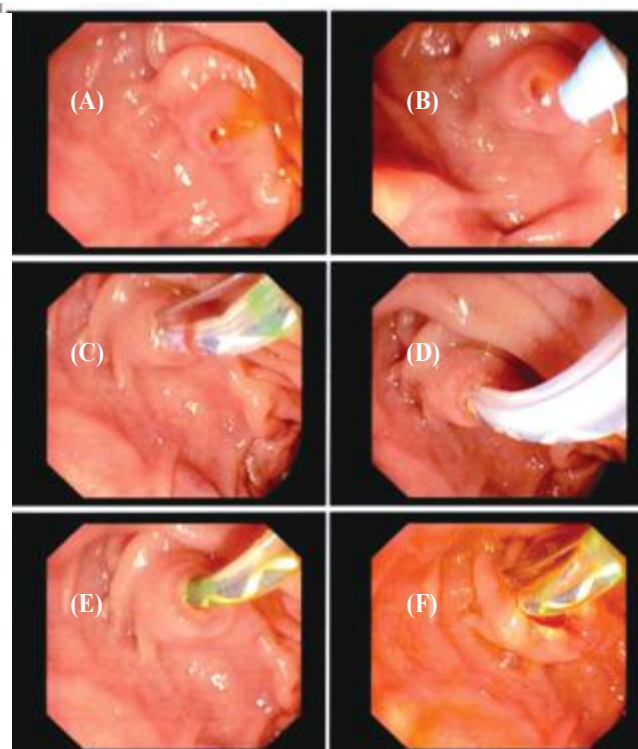
**Table 1:** Laboratory Investigations on Admission

| Investigation  | Report                    |
|----------------|---------------------------|
| Hemoglobin     | 9.8 gm/dL                 |
| WBC count      | 22x10 <sup>9</sup> / L    |
| Neutrophils    | 93%                       |
| Lymphocytes    | 5%                        |
| Platelet count | 336 x10 <sup>9</sup> / L  |
| CRP            | 18 mg/dL (Normal: <0.37)  |
| Procalcitonin  | 5.6 ng/mL (Normal: <0.05) |
| Creatinine     | 1.4 mg/dL                 |
| Bilirubin      | 4.6 g/dL                  |
| SGPT           | 206 U/L                   |
| SGOT           | 128 U/L                   |
| ALP            | 833 U/L                   |
| GGT            | 1043 U/L                  |

The patient was started immediately with intravenous antibiotics. urgent abdominal ultrasound done in HDU showed Choledocholithiasis with dilated CBD with multiple hepatic micro abscesses.

After two days of supportive treatment, the patient's vitals stabilized. Then ERCP was attempted. Endoscopic examination revealed a very small papilla at one edge of a large periampullary diverticulum facing towards the bottom of the diverticulum. It

was really difficult to find and difficult for cannulation. Manipulating the papilla by Sphincterotome, the papilla could not be brought at the front of Endoscope tip. Then, a creative technique was planned and a metallic hemoclip was applied at the lower left edge of the diverticulum to make the papilla a more accessible orientation to endoscope tip. Thereby papilla was brought to proper position and successful cannulation of CBD with Tapered cannula was done. Thereafter small papillotomy followed by sphincteroplasty was done by controlled radial expansion (CRE) balloon. Three stones with sludge were extracted by Balloon catheter and a plastic stent was deployed in the CBD to ensure biliary drainage. Representative ERCP images are shown in Figures 1 & 2, illustrating the periampullary anatomy, papilla localization, and sequential therapeutic steps including clip-assisted cannulation, sphincterotomy, and stone extraction-

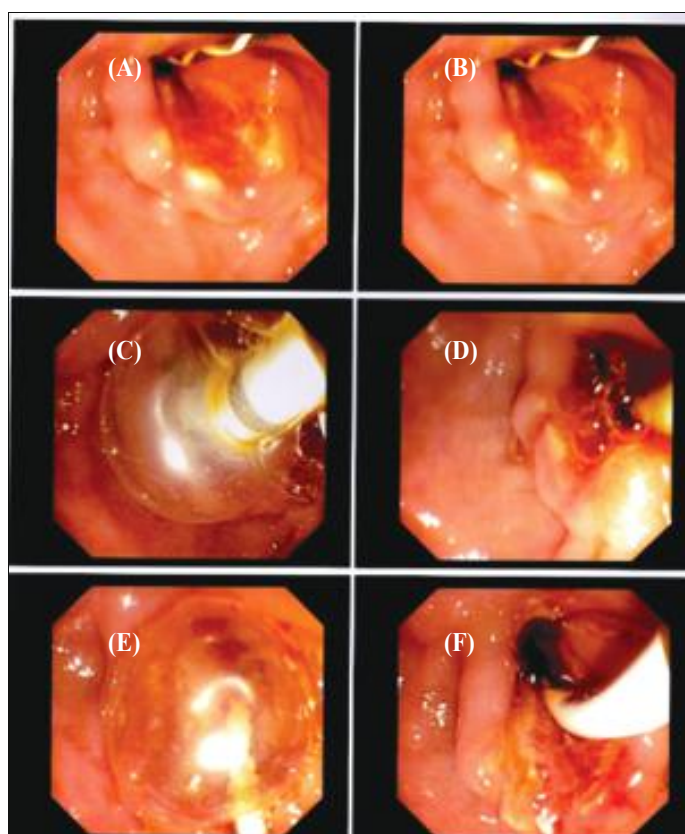


**Figure 1:** Endoscopic retrograde cholangiopancreatography (ERCP) showing

**A–B:** Visualization of the periampullary area with the papilla located at the edge of a diverticular fold.

**C–D:** CBD cannulation.

**E–F:** sphincterotomy.



**Figure 2:** Therapeutic steps during ERCP (A–F): Balloon dilation of the common bile duct followed by removal of CBD stones using a balloon catheter after sphincterotomy, and subsequent clearance of residual sludge and debris.

On Day 2 of the post ERCP, the patient showed significant clinical improvement (Table-2). LFT showed Liver function tests demonstrated significant resolution of cholestasis:

**Table 2:** Liver Function Test Results on Day 2 Post-ERCP

| Investigation | Report    |
|---------------|-----------|
| Bilirubin     | 1.1 gm/dL |
| SGPT          | 92 U/L    |
| SGOT          | 80 U/L    |
| ALP           | 430 U/L   |
| GGT           | 413 U/L   |

Sepsis markers also improved notably (Table-3). There was normalization of leukocyte count, a downward trend in CRP and procalcitonin, and lactate returning to within the normal range indicating effective infection control and resolution of septic physiology.

**Table 3:** Sepsis Marker Profile on Day 2 Post-ERCP

| Investigation  | Report                    |
|----------------|---------------------------|
| WBC count      | 11.3x10 <sup>9</sup> / L  |
| Neutrophils    | 72%                       |
| Lymphocytes    | 26%                       |
| Platelet count | 406 x10 <sup>9</sup> / L  |
| CRP            | 3.3 mg/dL (Normal: <0.37) |
| Procalcitonin  | 0.8 ng/mL (Normal: <0.05) |
| Lactate        | 1.2 mmol/L                |

Following ERCP, patients' clinical condition improved significantly. 4 days later USG of upper abdomen was done which revealed almost complete resolution of hepatic micro abscess (not visualized in USG) and then patient was discharged the next day (Day 5 post ERCP) with smooth recovery.

At the two-week follow-up, there was complete resolution of jaundice, and the patient reported no abdominal pain or fever. Subsequently, the CBD stent was successfully removed without complications.

## DISCUSSION

Though the description in case summary may seem straightforward, the complexity and risk involved were significant. A single misstep could have led to fatal consequences. Throughout the procedure, our entire Endoscopy team remained extremely vigilant and coordinated.

The success of any Endoscopic retrograde cholangiopancreatography (ERCP) is dependent on achieving successful cannulation of the desired duct via the intended route. Proper cannulation technique is critical for achieving procedure success and minimizing complications<sup>5</sup>. The presence of a periampullary diverticulum increases the difficulty of biliary cannulation during ERCP. When the papillary orifice is inside the diverticular pouch, cannulation may be impossible due to distortion of normal ampullary anatomy<sup>6</sup>.

Duodenal diverticula are found during 10% to 20% of endoscopic examinations<sup>7</sup>. When juxta-papillary, duodenal diverticula are associated with an increased incidence of biliary tract disease, particularly biliary calculi<sup>8</sup>. The juxta-papillary diverticula

may encompass the papilla at its superior (most common) or inferior border. There are several techniques that may assist in obtaining biliary access in cases of challenging anatomic distortion caused by periampullary diverticula. Endoscopic clips can be placed to cause a temporary change in the anatomic position of the major papilla<sup>9</sup>.

Endoscopic mucosal clips have been used in a number of innovative ways: marking of luminal lesions<sup>10</sup>, hemostasis of variceal and nonvariceal sources of bleeding<sup>11</sup>, and fixation of feeding tubes<sup>12</sup>. In this case it has been used to evert the diverticulum to provide a more open view of the interior of the diverticulum.

The intervention done in this patient proved successful. Locating the papilla and performing ERCP in such a scenario would have been considered nearly impossible. To our knowledge, this is the first reported use of this technique in Bangladesh. The patient showed rapid clinical improvement, and the infection came under control. She was discharged in stable condition. She reported a full recovery and returned to her normal life.

This case illustrates the critical role of advanced endoscopic techniques, procedural innovation, and collaborative expertise in achieving successful outcomes in complex biliary interventions at Ever-care Hospital Dhaka.

### CONCLUSION

Prior assessment for concomitant Choledocholithiasis in a patient presenting with Cholelithiasis is essential before performing Laparoscopic Cholecystectomy. After assessment, if CBD stone is found, it should be removed by Therapeutic ERCP before Cholecystectomy. ERCP may fail by conventional techniques especially when papilla is inaccessible due to presence of large periampullary diverticulum. ERCP done with creative technique was almost lifesaving in this case. This experience is a powerful reminder that world-class treatment is now available within our borders. With the right technology, a skilled team, and timely decision-making, we can address even the most complicated and life-threatening medical cases.

### CONFLICT OF INTEREST

The authors declare no conflict of interest.

### INFORMED CONSENT

The authors took informed written permission of the patient to publish this case report.

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