

## Background & Purpose

Cholangioscopy is a technique used for diagnosing and treating patients with pathologies of the gallbladder, liver, and pancreas. It has been available since 1976 but with limited use in interventional radiology (IR) due to issues with steerability, irrigation capabilities, requirement for more than one operator, and poor percutaneous access options; however, direct intraluminal visualization of the gallbladder, common bile ducts, and even the ampulla and duodenum has become more practical with the advent of single operator percutaneous systems. Access to the biliary system can now be made through smaller 11 French sheath/delivery systems allowing for improved maneuverability into the common bile duct. The purpose of this study was to evaluate the efficacy and describe various applications of percutaneous cholangioscopy in patients with gallbladder and biliary stone duct disease who are ineligible for surgery and/or endoscopic retrograde cholangiopancreatography (ERCP).

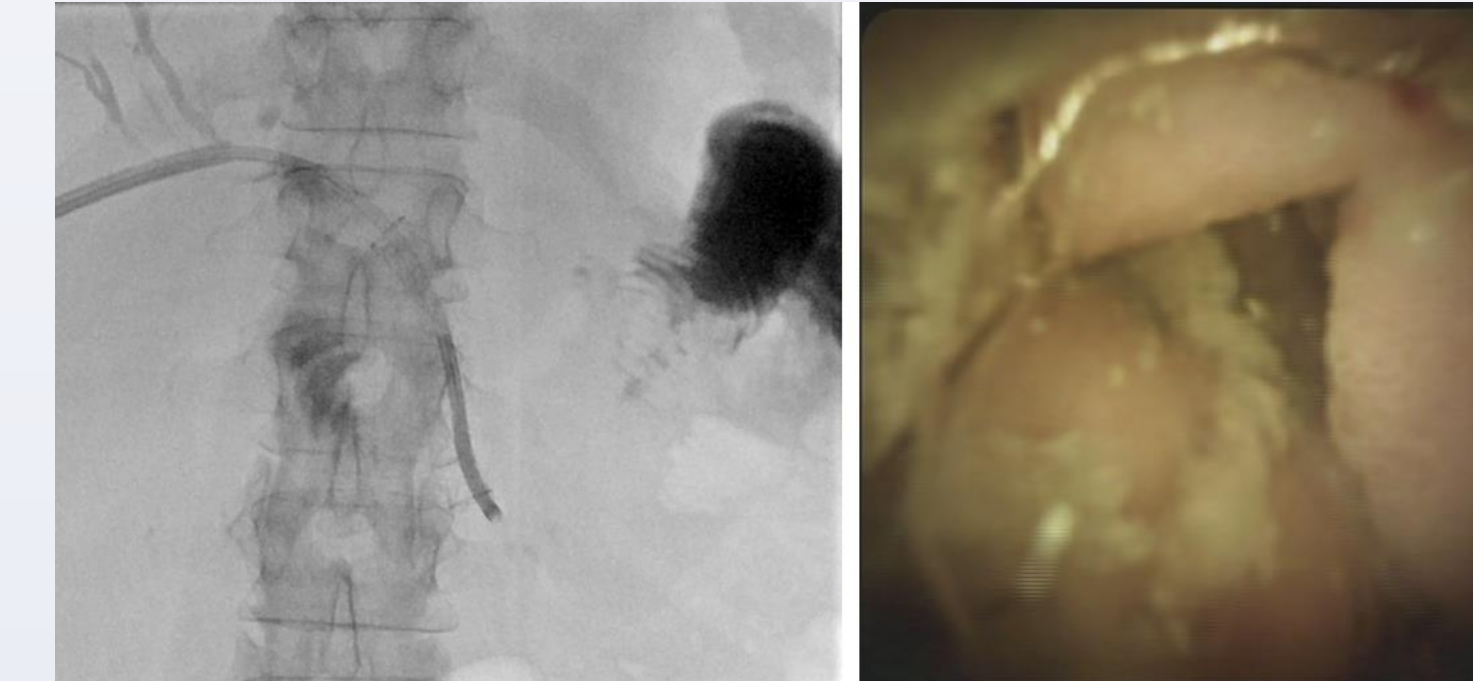
## Methods

A retrospective review was conducted for 16 patients who underwent PTC at a single institution between September 2022 to August 2023. Indications included electrohydraulic lithotripsy for stone removal, forceps biopsy after failed brush biopsy, evaluation of ampulla patency, bile duct exploration, and common bile duct stent inspection. All the patients selected were poor candidates for surgery, peroral cholangioscopy, and/or endoscopic retrograde cholangiopancreatography (ERCP). Complications and clinical follow up were assessed, along with the following outcome measures: technical success, tube removal rate, tube-free survival, number of sessions required, and time between intervention and tube removal.

## Diagnostic Applications

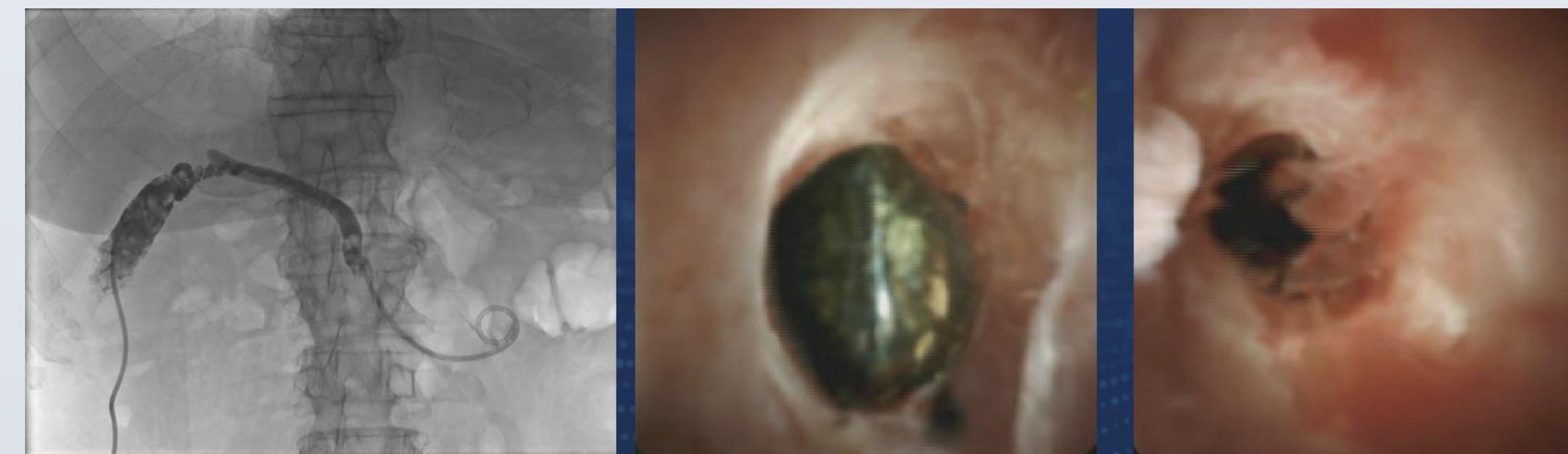


A) Forceps Biopsy: A 66 year-old female with a pancreatic mass, obstructive jaundice, and a dilated common bile duct (CBD) after a failed brush biopsy of the CBD.



B) Indeterminate filling defect: A 53 year-old female with a distal stent filling defect seen on cholangiogram and raised suspicion for stent dysfunction.

## Therapeutic Applications



C) Ascending cholangitis: A 60 year-old male with ascending cholangitis due to several gallstones (a) and an impacted stone in the ampulla of Vater (b) was fragmented and extracted using PTCS (c).

D) Acute cholecystitis: A 62 year old male with chronic cholecystitis due to cystic duct stone and obstruction underwent PTCS for hepatic stone with snare retrieval.



E) Malignant CBD Stenosis: A 63-year-old female with metastatic renal cell carcinoma (RCC) to the pancreatic head. Previously treated with a common bile duct (CBD) stent, complicated by calculus cholecystitis, and managed with a percutaneous cholecystostomy tube.

## Outcomes

13 out of 16 (81.25%) patients achieved complete tube removal.

- 11 patients are still alive tube-free;
- 1 deceased 2 months after removal;
- 1 was lost to follow-up after tube removal.

3 out of 16 (18.75%) patients did not achieve complete tube removal.

- 2 patients were lost to follow-up;
  - 1 deceased 2 months after a successful capping trial.
- Complete stone extraction was achieved in 14 of 14 patients (100%).

## Discussion

Until recently, Interventional Radiology evaluation and treatment of biliary tract disease has primarily been performed utilizing fluoroscopy. Single user percutaneous cholangioscopy has improved the diagnosis and treatment of gallbladder and biliary disease in patients who are poor surgical or peroral endoscopic candidates. After placement of cholecystostomy and/or biliary drain and subsequent tract maturation, percutaneous access was upsized and intervention could be achieved. We were then able to successfully visualize and treat biliary stones, strictures and masses utilizing minimally invasive techniques through existing cholecystostomy access.

## References

- [https://www.techvir.com/article/S1089-2516\(19\)30028-9/fulltext](https://www.techvir.com/article/S1089-2516(19)30028-9/fulltext)
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