Endoscopy in Image-Guided Interventions

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DISCLOSURES AND ACKNOWLEDGMENTS

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GOALS AND OBJECTIVES

- Indications
- Patient Selection
- Equipment
- Procedural Steps
- Post-Procedural Care
- Clinical Cases

HISTORICAL PERSPECTIVE

Burhenne et al. 1973

Picus et al. 1992

Courtois et al. 1996

Ohashi et al. 1998

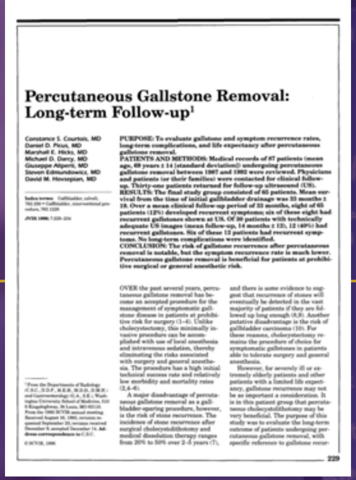
Kim et al. 2000

Patel et al. 2018

LITERATURE REVIEW


NONOPERATIVE RETAINED BILIARY TRACT STONE EXTRACTION*
A NEW ROENTGENOLOGIC TECHNIQUE
By H. JOACHIM BURHENNE, M.D.


Percutaneous Cholecystolithotomy: Analysis of Results and Complications in 58 Consecutive Patients


Percutaneous Gallstone Removal: Long-term Follow-up


Percutaneous Transhepatic Cholecystoscopic Lithotomy in the Management of Acute Cholecystitis Caused by Gallbladder Stones
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Percutaneous Transhepatic Cholecystoscopic Lithotomy in the Management of Acute Cholecystitis Caused by Gallbladder Stones
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Safety and usefulness of percutaneous transhepatic cholecystoscopy examination in high-risk surgical patients with acute cholecystitis


Safety and usefulness of percutaneous transhepatic cholecystoscopy examination in high-risk surgical patients with acute cholecystitis


Erosion of Embolization Coils into the Renal Collecting System: Removal with Prone Transradial Renal Arteriography and Nephroscopy


Prone Transradial Renal Arteriography and Interventional Nephroscopy for the Visualization and Retrieval of Migrated Renal Embolization Coils Causing Flank Pain and Hydronephrosis

LITERATURE REVIEW


Disposable Single-Use Ureteroscopy-Guided Nephroureteral Stent Placement in a Patient with Pyelovesicostomy Stricture and Failed Prior Nephroureteral Stent Placement


Percutaneous transgastrostomic interventional radiology-operated endoscopy facilitates foreign body removal using rigid endobronchial forceps


Interventional Radiology-Operated Cholecystoscopy and Cholecystolithotripsy: A Guide for Interventionalists


Percutaneous transgastric interventional radiology-operated duodenoscopy for the identification of duodenal perforation and Graham patch dehiscence


Interventional Radiology–Operated Cholecystoscopy for the Management of Symptomatic Cholelithiasis: Approach, Technical Success, Safety, and Clinical Outcomes


Disposable single-use choledochoscopy may facilitate recanalization of occlusive biliary anastomotic strictures

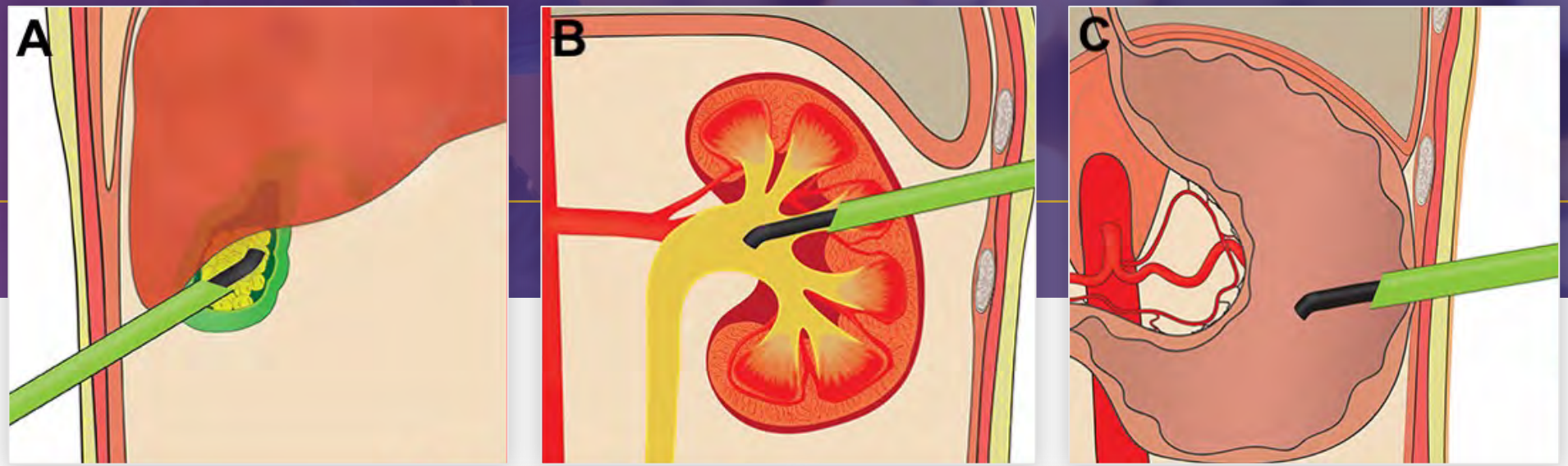

Gastrojejunoscopy facilitates placement of a percutaneous transgastric jejunostomy in a patient with a pancreaticoduodenectomy and multiple-failed feeding tube placements


Interventional Radiology-Operated Endoscopy as an Adjunct to Image-Guided Interventions


Interventional radiology-operated endoscopy using the LithoVue disposable endoscope: Approach, technical success, clinical outcomes, and complications


Interventional Radiology-Operated Endoscopy: Indications, Implementation, and Innovation

GLOBAL INDICATIONS



Biliary	Gastrointestinal
Genitourinary	Miscellaneous

PREPARATION AND PATIENT SELECTION

- Multidisciplinary Discussion
- Medical Comorbidities
- Complete Blood Count
- Basic Metabolic Panel
- Coagulation Studies

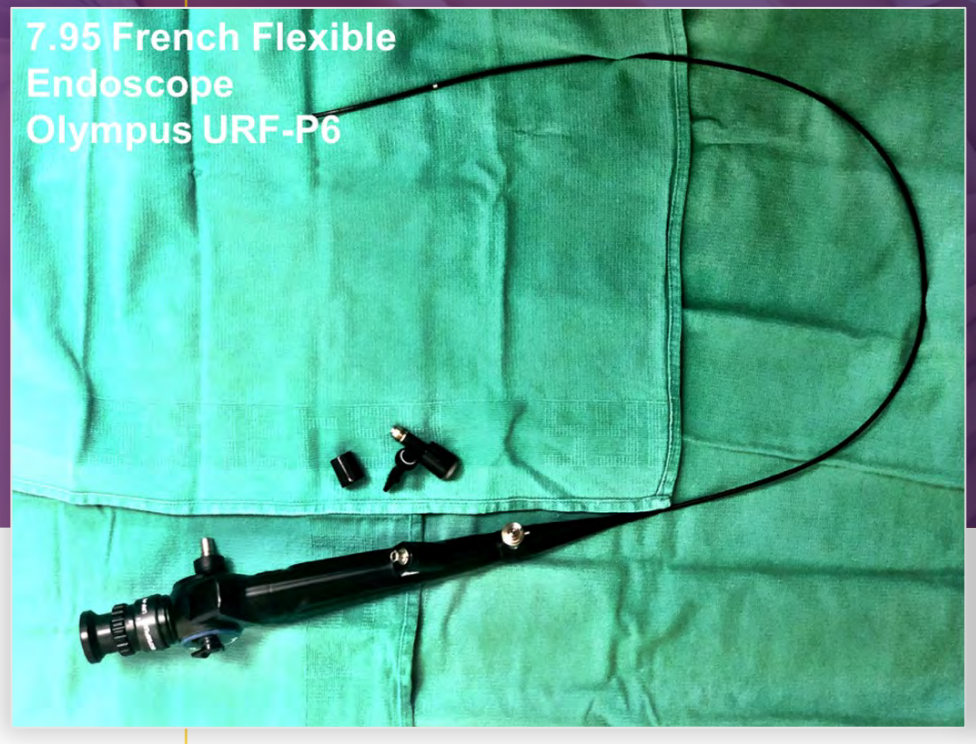
ENDOSCOPIC EQUIPMENT

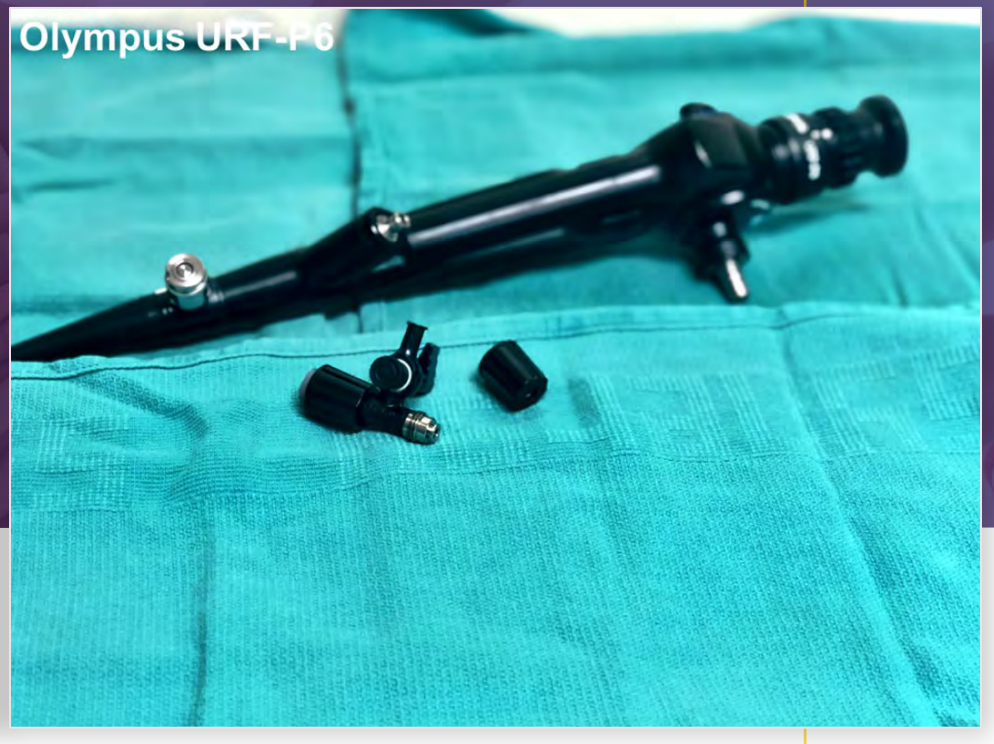
- 7.9-French Flexible Reusable
- 9-French Flexible Reusable
- 9.5-/10.8-French Disposable
- 16.5-French Flexible Reusable
- 22.5-French Rigid Reusable

- Nitinol Retrieval Baskets
- Thrombectomy Devices
- Electrohydraulic Lithotripters
- Ultrasonic Lithotripters
- Holmium Lasers

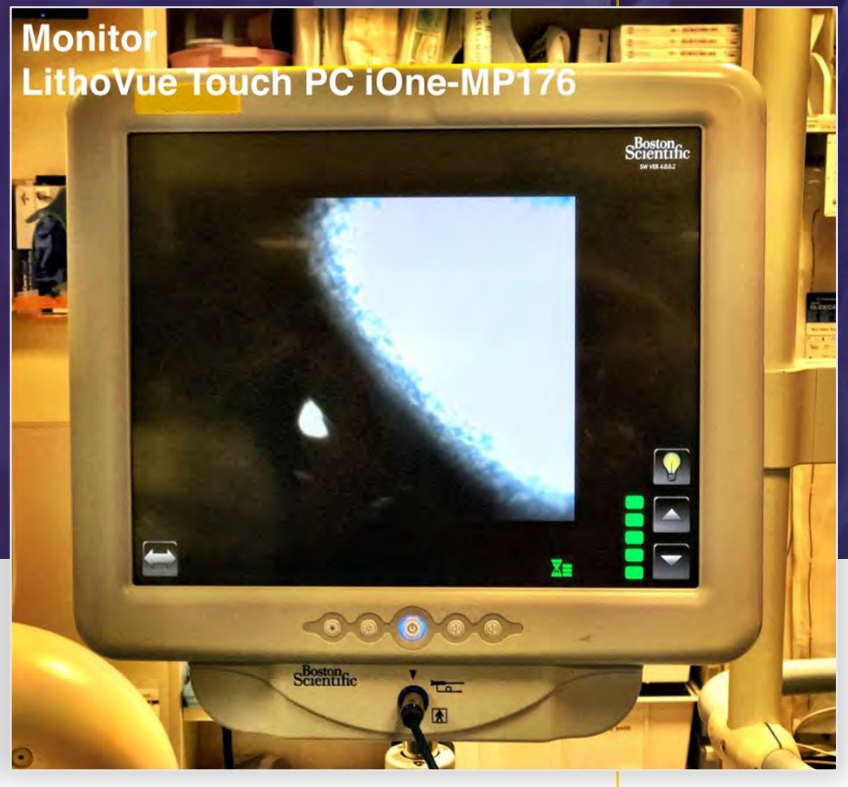
ENDOSCOPIC TOWERS

FLEXIBLE REUSABLE ENDOSCOPES





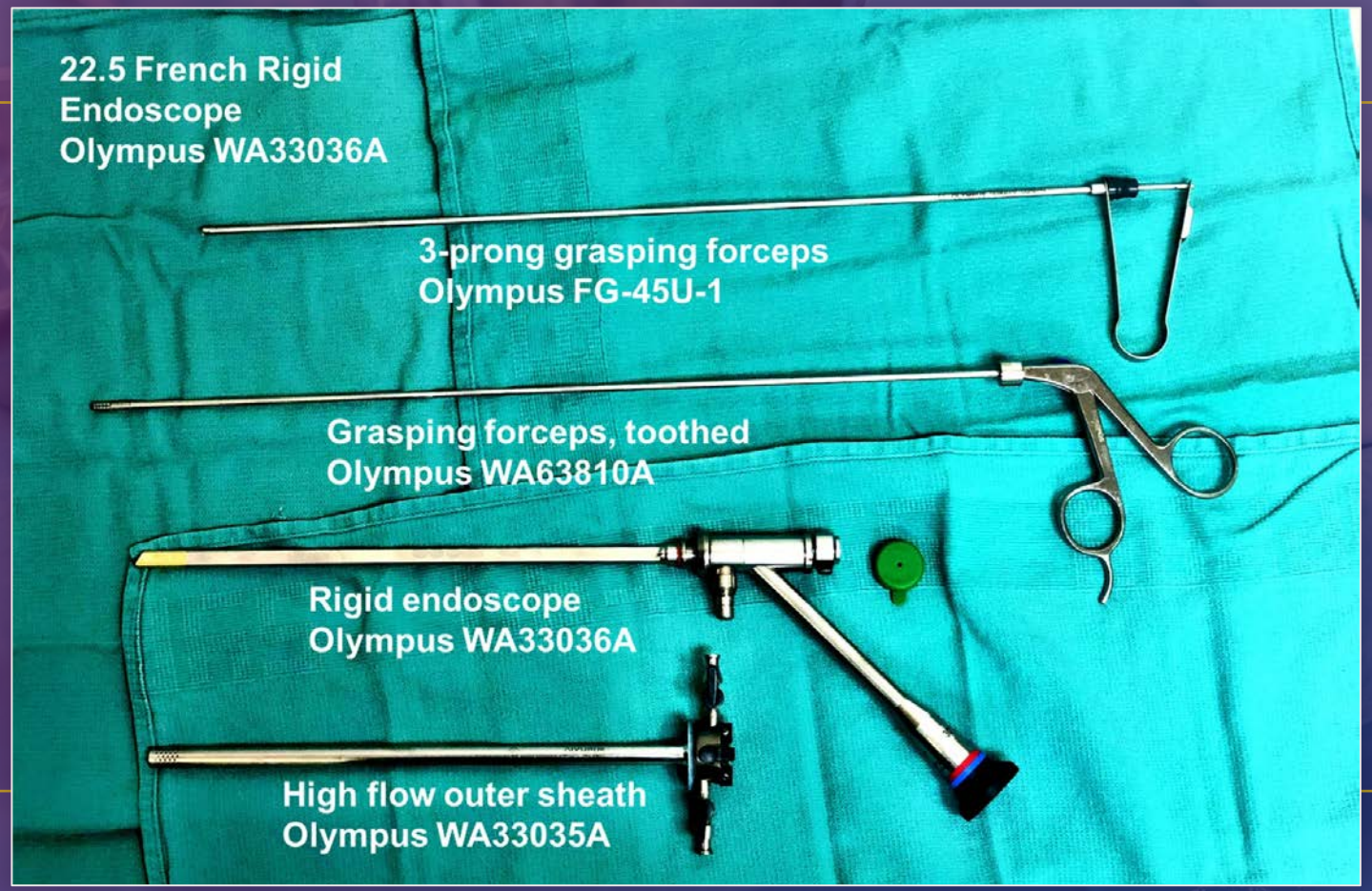
FLEXIBLE DISPOSABLE ENDOSCOPES



FLEXIBLE DISPOSABLE ENDOSCOPES

FLEXIBLE REUSABLE ENDOSCOPES

RIGID REUSABLE ENDOSCOPES

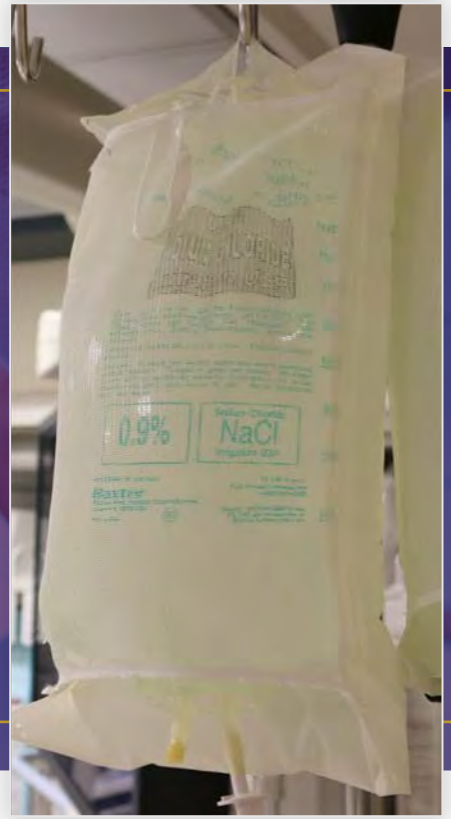


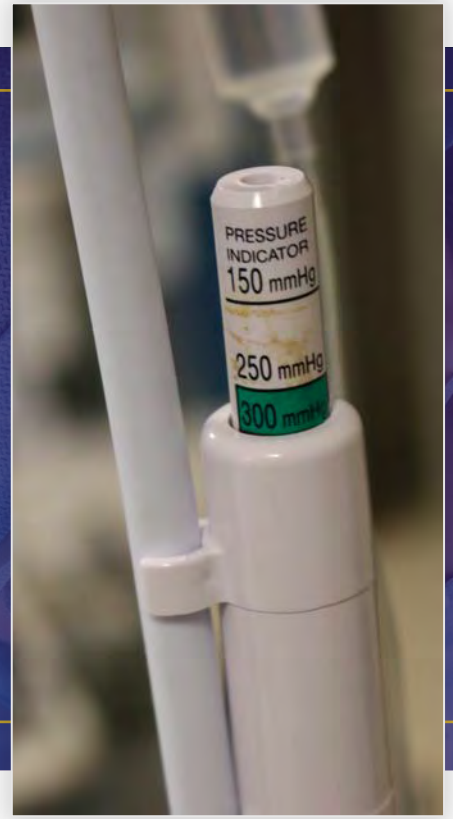
SETUP AND IMPLEMENTATION

- Antibiotics
- ± Anesthesia
- ± Orogastric Tube
- ± Rectal Tube

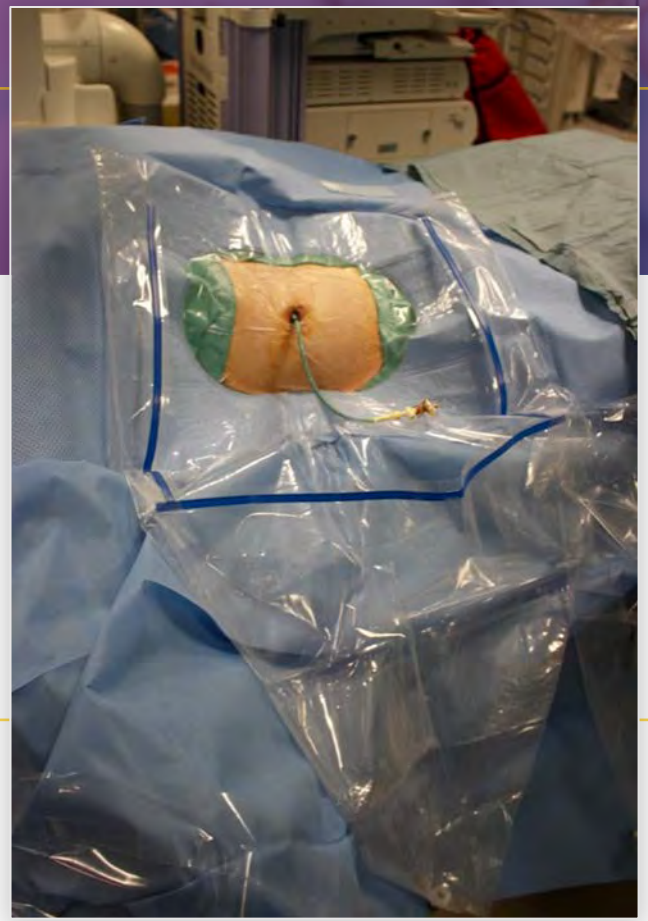
- Bair Hugger
- Pressurized Saline/Irrigation
- Water-Tight Cranial Drapes
- ± Neptune Drainage System

PRESSURIZED SALINE/IRRIGATION

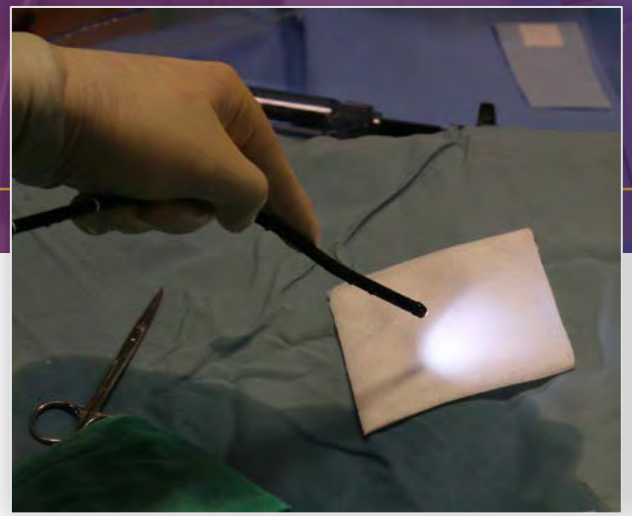




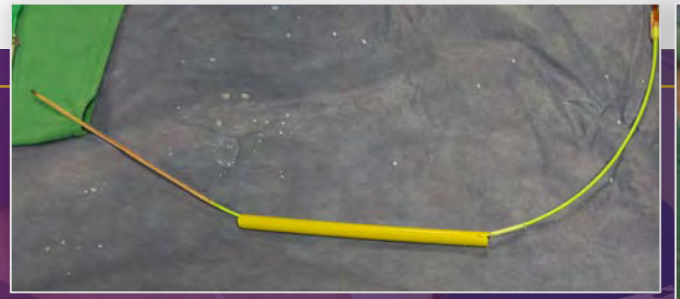
WATER-TIGHT CRANIAL DRAPES

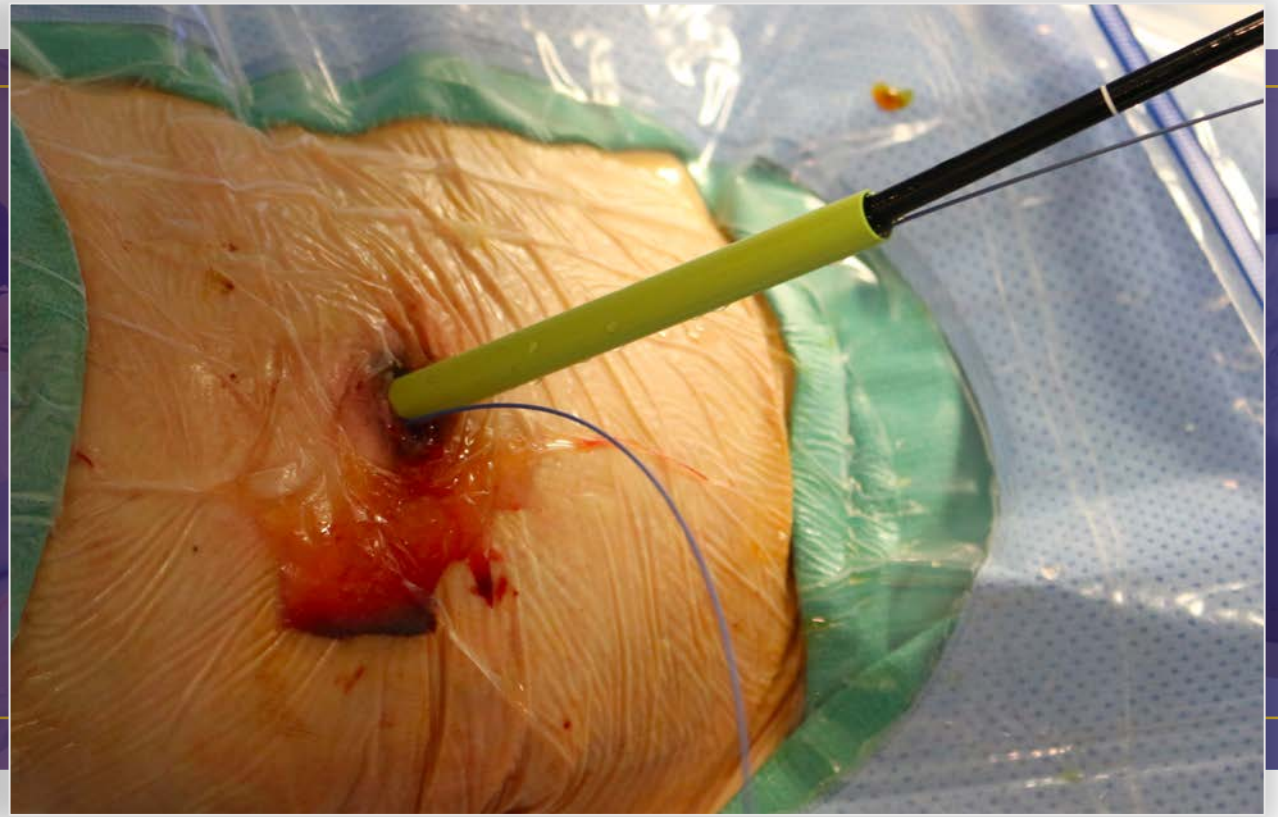


BALANCE AND FOCUS

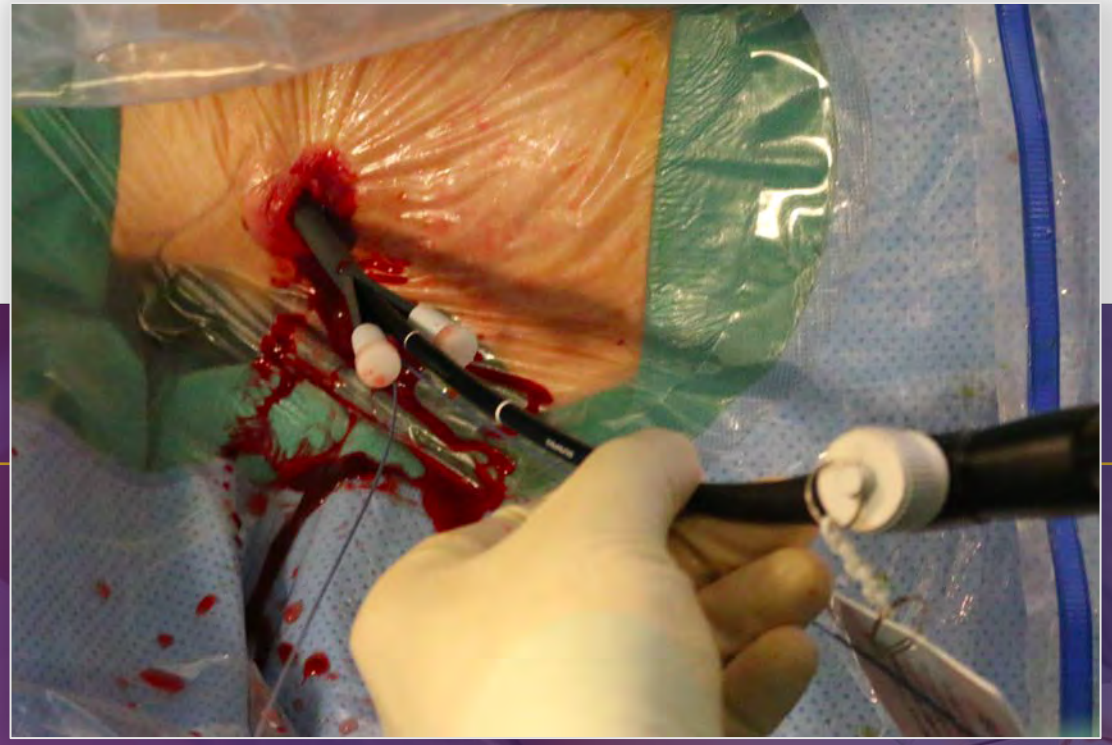


TRACT DILATION

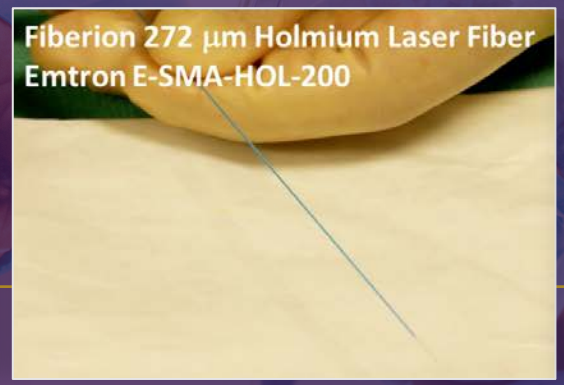




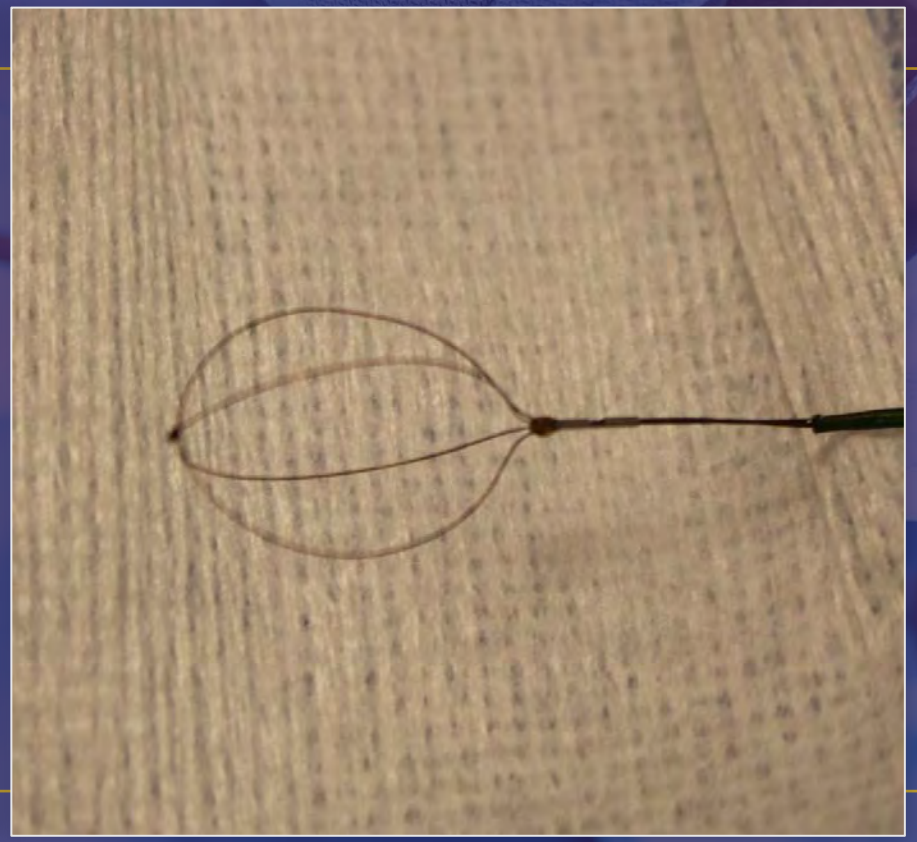
SHEATH PLACEMENT



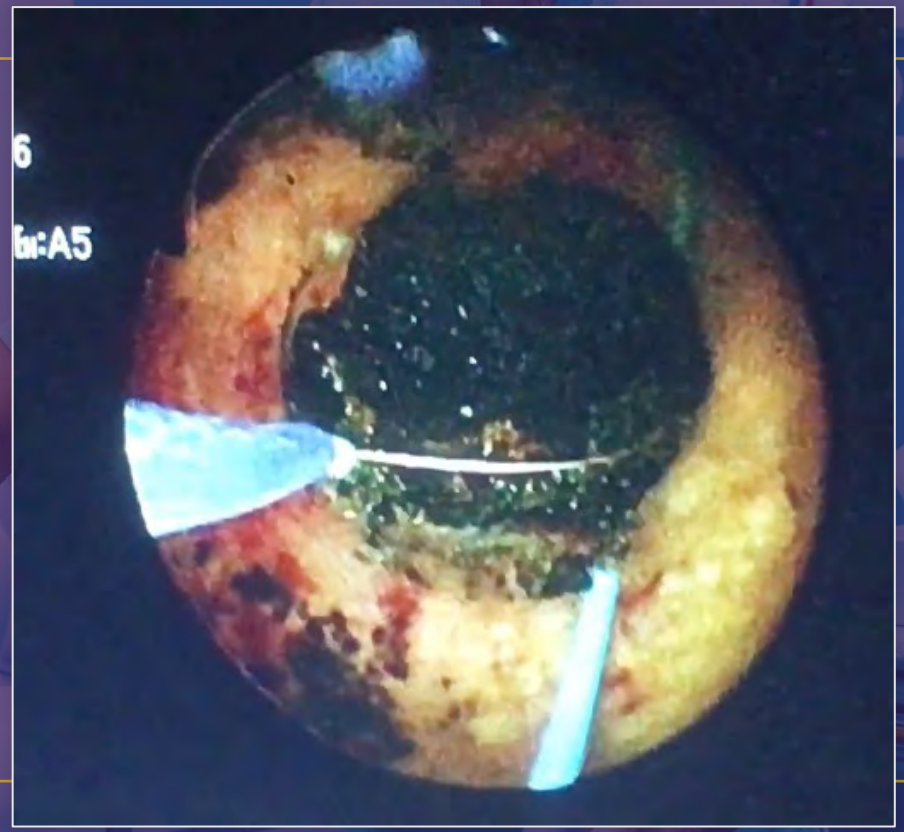
ANCILLARY DEVICES



ENDOSCOPIC BASKETS

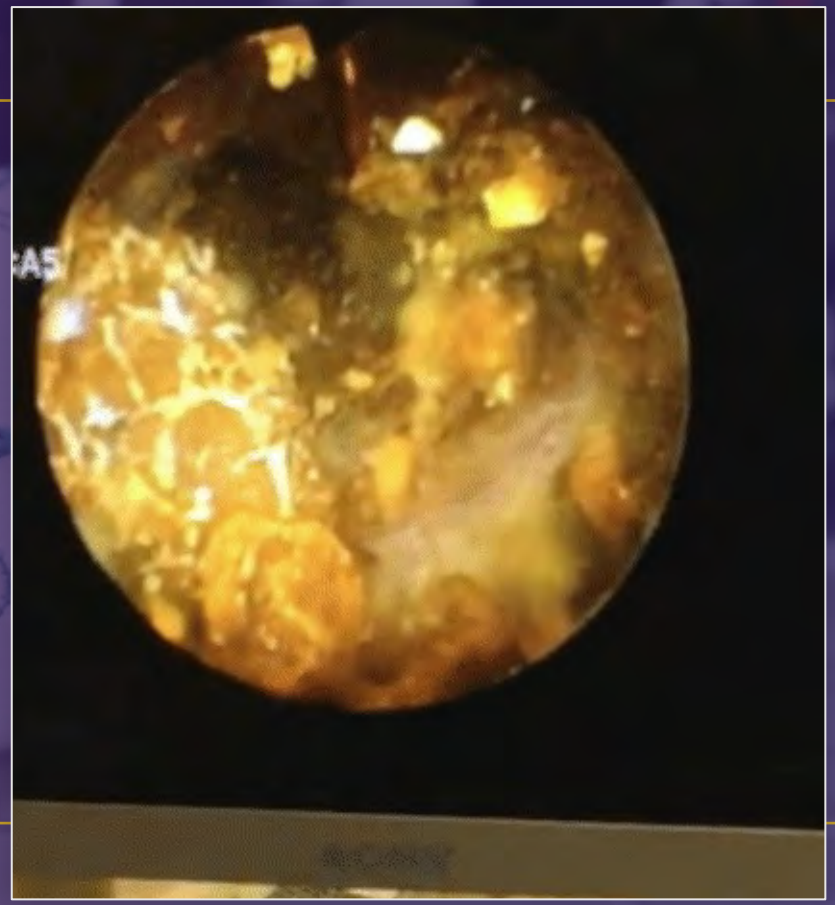


BASKET RETRIEVALS



NETS

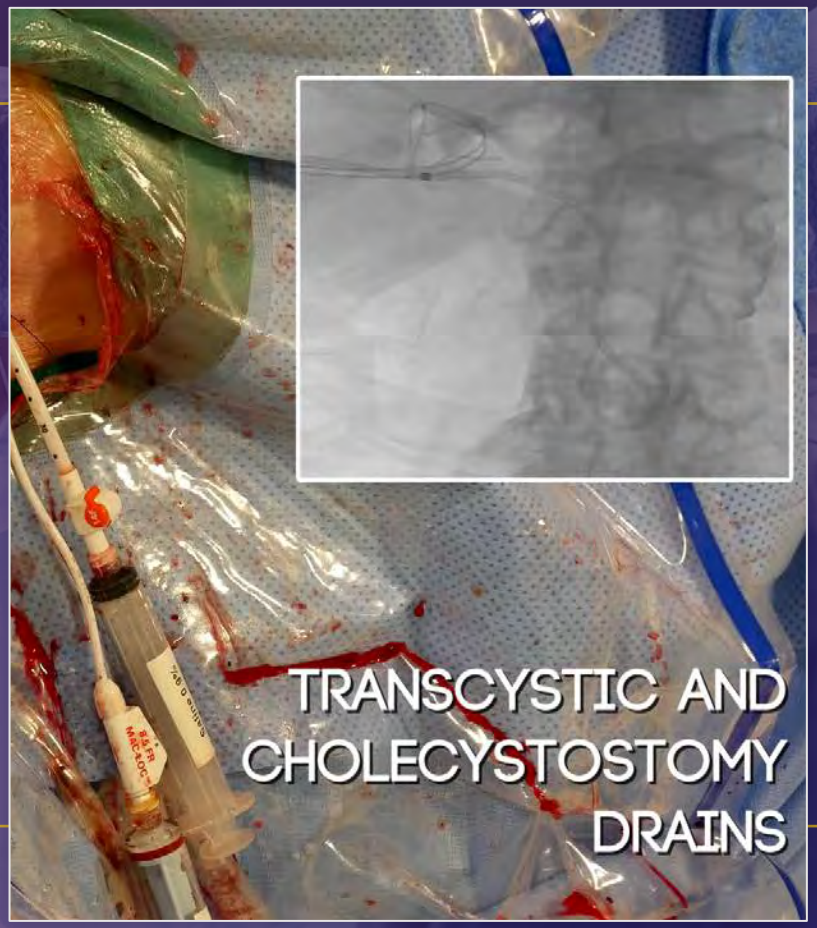
ELECTROHYDRAULIC LITHOTRIPTORS



ULTRASONIC LITHOTRIPTORS

HOLMIUM LASERS

POST-PROCEDURAL CARE



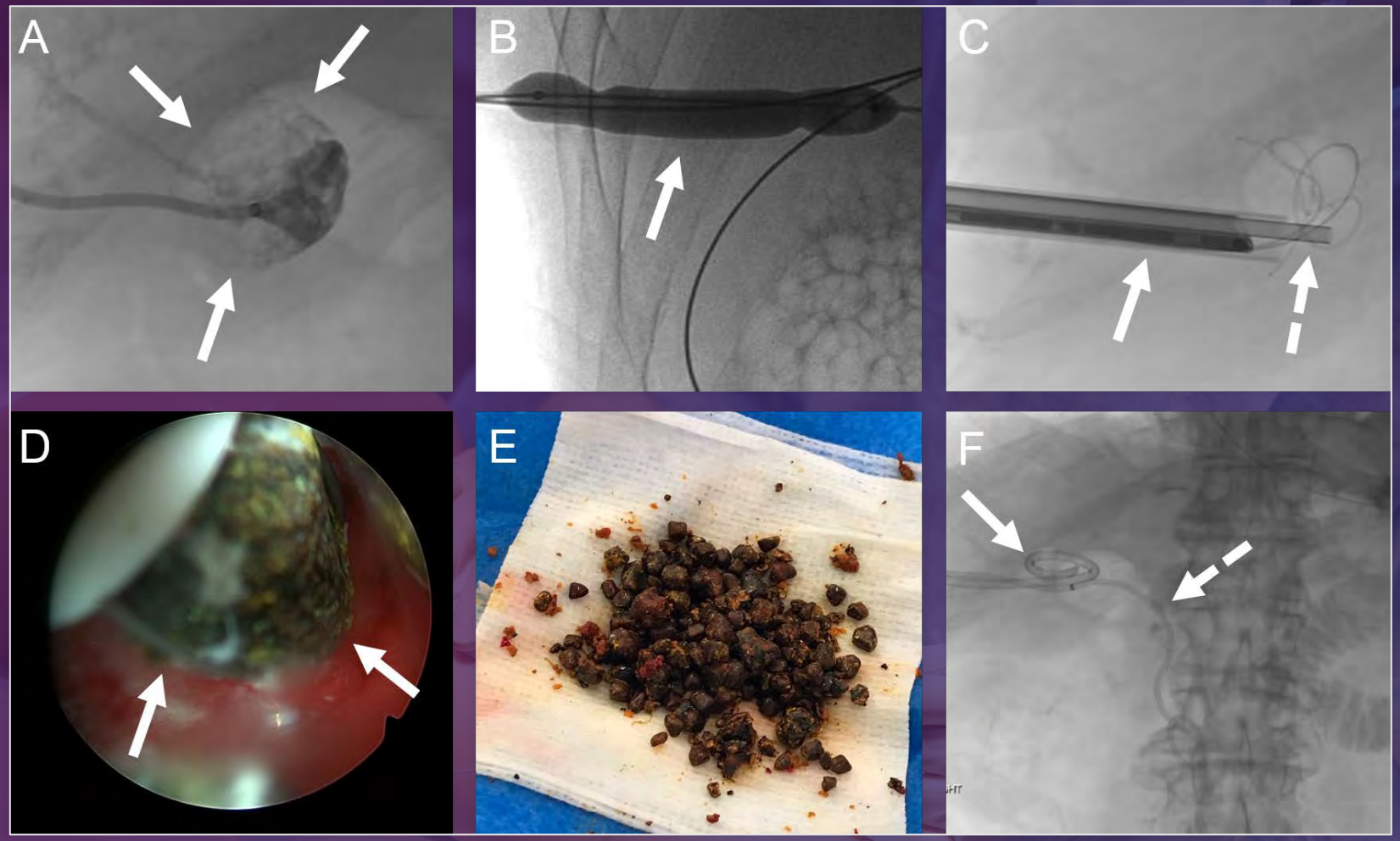
CASE 1

Cholecystoscopy (Gallbladder Endoscopy)

CASE 1

History of recurrent acute cholecystitis and cholecystostomy which is frequently dislodged.

CASE 1



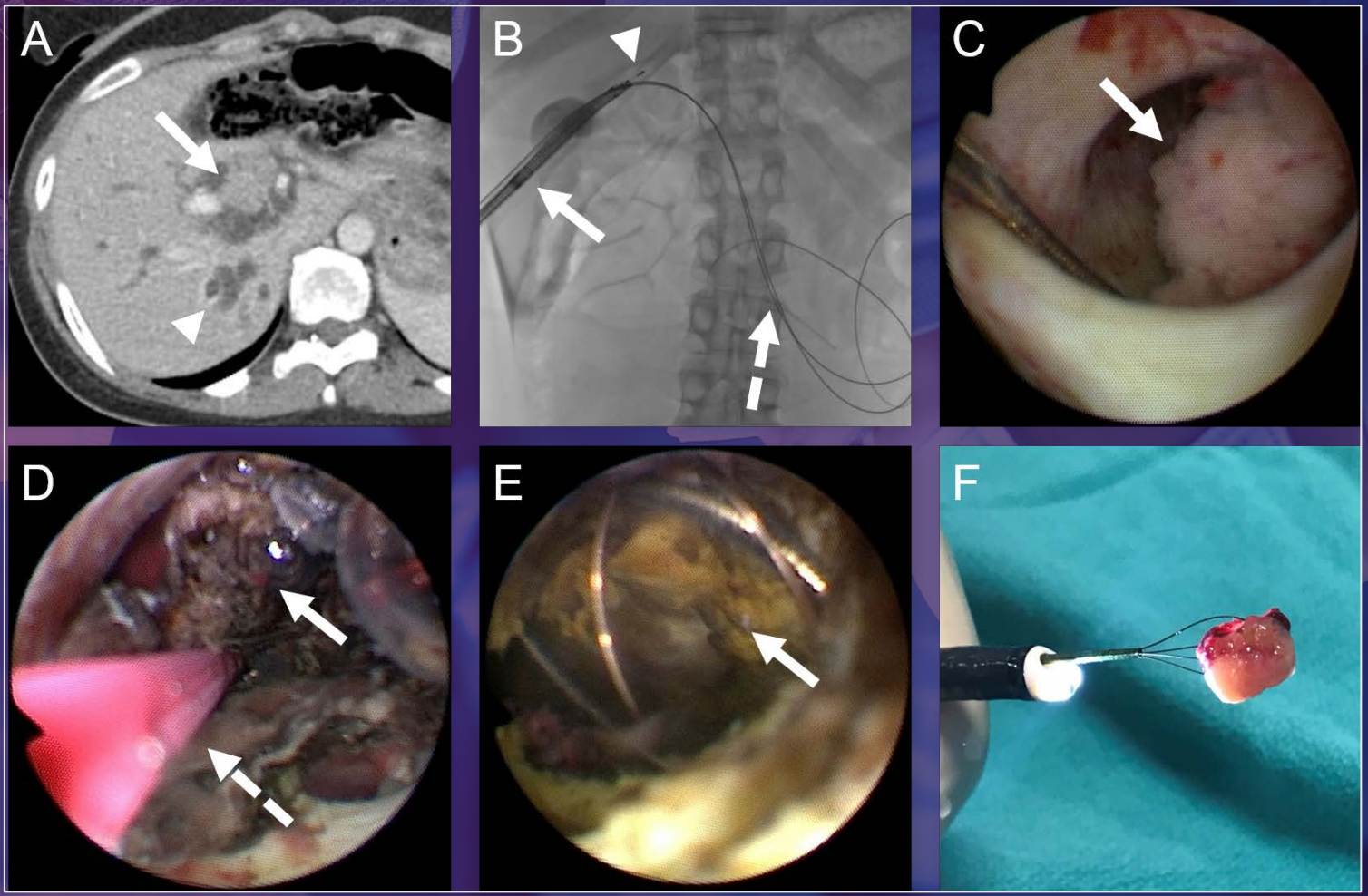
CASE 2

Choledochoscopy (Biliary Endoscopy)

CASE 2

History of scleral icterus and pruritus and contrast-enhanced computed tomography showing biliary dilatation with multiple large intra-biliary filling defects.

CASE 2



CLINICAL CASES

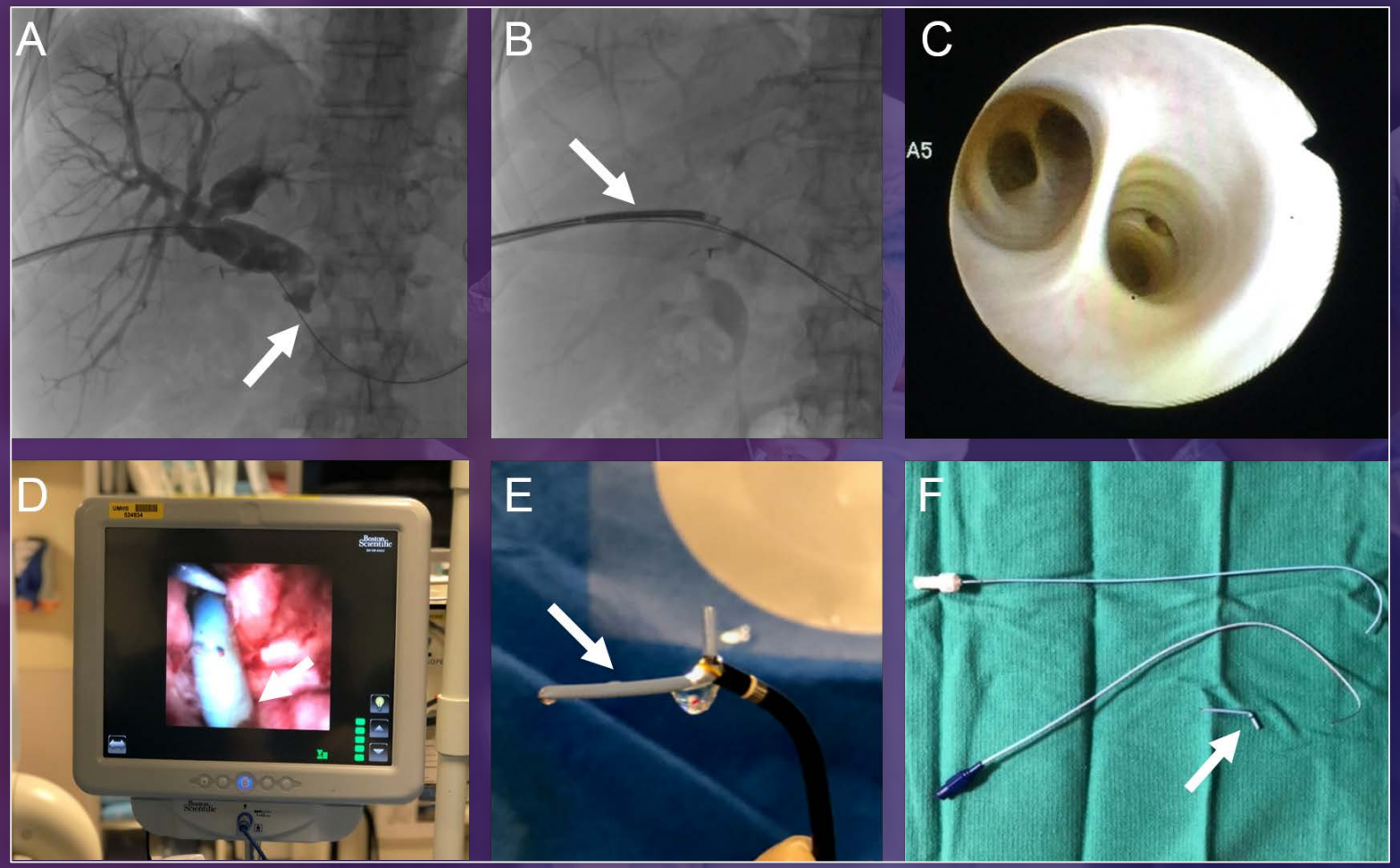
CASE 3

Choledochoscopy (Biliary Endoscopy)

CASE 3

History of recurrent cholangitis and hyperbilirubinemia and an inability to give chemotherapy.

CASE 3



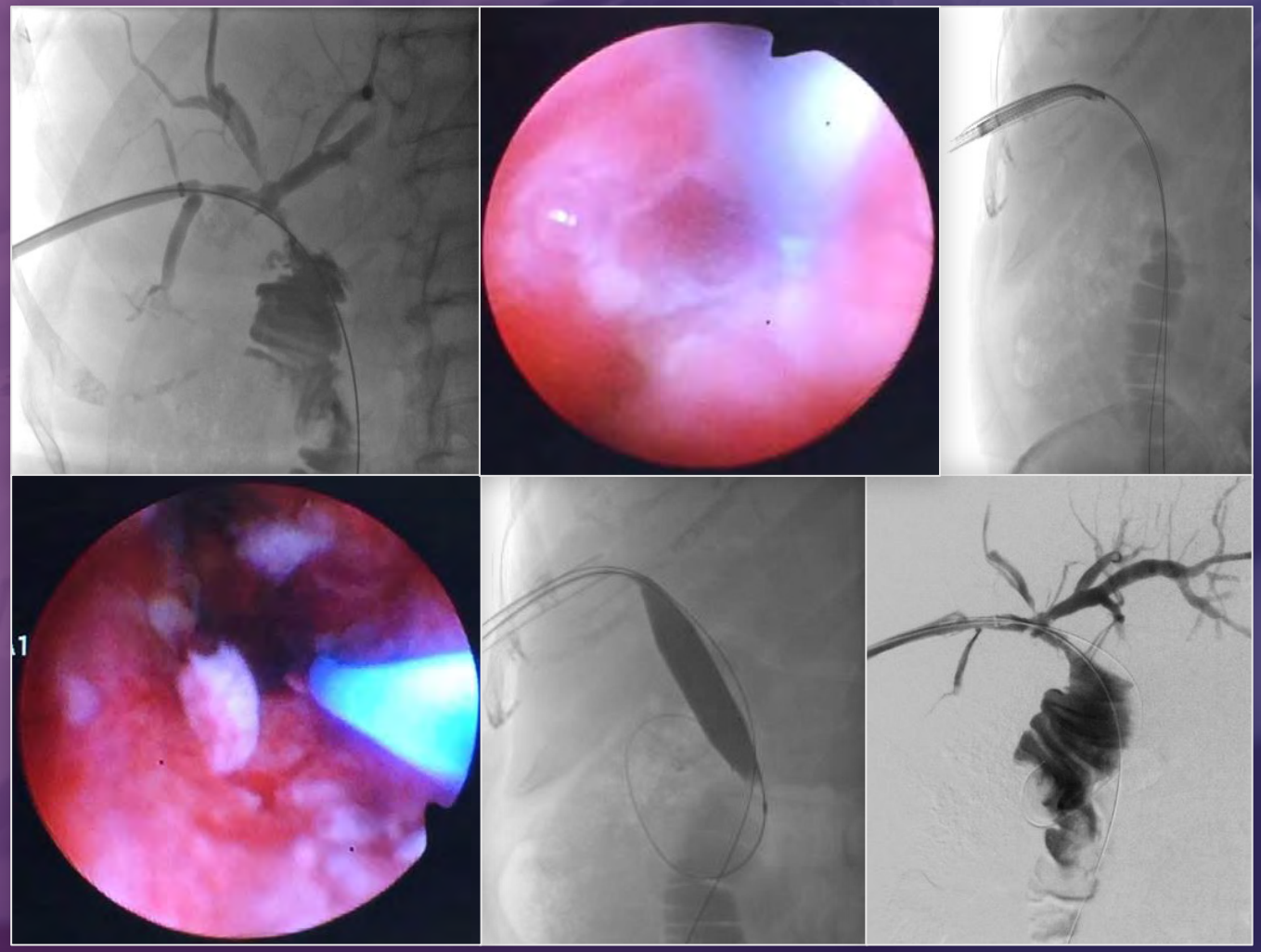
CASE 4

Choledochoscopy with Radiofrequency Ablation

CASE 4

History of liver transplantation complicated by biliary stricture post hepaticojejunostomy with recurrent anastomotic biliary strictures and biliary drainage catheter.

CASE 4



CONCLUSIONS

- Indications
- Patient Selection
- Equipment
- Post-Procedural Care
- Clinical Cases
  - Biliary
  - Genitourinary
  - Gastrointestinal
  - Miscellaneous

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SUGGESTED READING

Interventional Radiology-Operated Endoscopy: Indications, Implementation, and Innovation

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Interventional radiologists perform a variety of image-guided procedures utilizing a variety of tools to create minimally invasive access into the biliary, gastrointestinal, and genitourinary systems, as well as other structures. Endoscopy has been utilized by other specialists, namely gastroenterology and urology, to treat similar pathologies, but interventional radiology-operated endoscopy has only been implemented at a few academic centers to date.

The learning curve for an interventional radiologist to become proficient at endoscopic interventions is tempered by the technical dexterity and hand–eye coordination already required for other image-guided procedures. Moreover, the relative safety of endoscopy evidenced by the routine performance of laryngoscopy, bronchoscopy, esophagogastroduodenoscopy, colonoscopy, and cystoscopy at the bedside or in outpatient clinics supports its implementation by interventional radiologists.

This article discusses the application of interventional radiology-operated endoscopy in the biliary, gastrointestinal, and genitourinary systems (►Fig. 1).

Preparation and Equipment

Procedural Preparation

Procedures may be performed using moderate sedation with intravenous midazolam and fentanyl, although general anesthesia is favored. Periprocedural antibiotics are administered according to the Society of Interventional Radiology guidelines.[1] Orogastric and rectal tubes may be placed in patients during procedures expected to be longer than 1 hour to control fluid loads and help maintain body temperatures. Body warmers are also used in all patients to maintain core temperatures.

Preprocedural discussion with the referring medical or surgical subspecialties should be performed to ensure all clinicians are in agreement regarding the planned procedure. Initial access into the area of interest is gained using standard techniques for cholangiography, cholecystostomy, gastrostomy, or nephrostomy. Percutaneous access into the area of interest may be obtained in the same session as endoscopy. A mature tract, however, may decrease leakage and pain, especially when using larger endoscopes. Laboratory evaluation with particular attention to coagulation parameters should be performed, especially if same-day endoscopy is being considered. International normalized ratio greater than 1.5 and platelet count less than 50,000/μL are relative contraindications to percutaneous access procedures.

Endoscopes

Endoscopy may be performed with a 7-Fr flexible reusable 9.5-Fr flexible disposable, 9-Fr flexible reusable, 16.5-Fr flexible reusable (Olympus America), or 22.5-Fr rigid reusable endoscope (Olympus America), depending on the indication, access route, operator preference, and the availability of the endoscope. ►Fig. 2 demonstrates the types of endoscopes.

The endoscopes are connected to a large continuous saline flush bag system with a UroLok adapter and three-way stopcock. Light sources and suction devices are connected to the endoscopes.

Prior to endoscopy, a steel reinforced support wire is placed, followed by a second steel reinforced support wire that serves as a safety wire. For larger endoscopes, namely the 22.5-Fr rigid reusable endoscope, the tract is dilated using a high-pressure 8-mm × 15-cm X-Force balloon. Once the tract is dilated, a sheath is placed over one of the

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Interventional Radiology-Operated Endoscopy as an Adjunct to Image-Guided Interventions

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ABSTRACT

Purpose: Interventional radiology-operated endoscopy is an underused technique, which may have a significant impact on the ability to treat patients with a variety of conditions. The purpose of this article is to discuss the setup, equipment, and potential clinical uses of interventional radiology-operated endoscopy.

Methods: A number of new and innovative interventions may be performed in the biliary, genitourinary, and gastrointestinal systems through percutaneous access that interventional radiologists already create. When used in combination, endoscopy adds an entirely new dimension to the fluoroscopic-guided procedures of which interventional radiologists are accustomed.

Results: Interventional radiologists are in a unique position to implement endoscopy into routine practice given the manual dexterity and hand–eye coordination already required to perform other image-guided interventions.

Conclusion: Although other specialists traditionally have performed endoscopic interventions and local politics often dictate referral patterns, a collaborative relationship among these specialists and interventional radiology will allow for improved patient care. A concerted effort is needed by interventional radiologists to learn the techniques and equipment required to successfully incorporate endoscopy into practice.

Introduction

Endoscopy is an underused tool by interventional radiology departments and interventionalists as a whole. Few academic centers and proceduralists to date are currently performing endoscopic-guided procedures in interventional radiology despite its myriad of uses for biliary, genitourinary, and gastrointestinal procedures. Most of these procedures are instead being performed by other specialties such as urology and gastroenterology and often local politics dissuade other specialties from its implementation.

Interventional radiologists; however, are in a unique position to implement endoscopy into the arsenal of equipment used for image-guided procedures. On a daily basis, interventional radiologists perform numerous procedures requiring a high-degree of manual dexterity and hand–eye coordination; therefore, the learning curve for interventional radiologists to become proficient in endoscopic techniques is rather mild. As a testament to these relative safety, many of these endoscopic interventions are routinely performed at bedside or in outpatient centers including bronchoscopy, colonoscopy, cystoscopy, esophagogastroduodenoscopy, and laryngoscopy.

The purpose of this article is to describe the role of interventional radiology-operated endoscopy as an adjunct to image-guided interventions.

General Setup and Equipment

Patient Selection

Before performing any endoscopic-guided intervention a multidisciplinary discussion with the referring physicians is necessary. This includes both medical and surgical subspecialists to ensure that all parties are in agreement with the planned procedure. Often a surgical option may be a better treatment for the specific clinical scenario and diligence is needed to select appropriate patients.

Laboratory evaluation should include a basic metabolic panel, complete blood count and coagulation markers. Percutaneous access must be obtained prior to performing endoscopy and in general the international normalized ratio should be less than 1.5 and platelet count should be greater than 50,000/μL. Electrolyte disturbances should be corrected as these may lead to dangerous fluid shifts or arrhythmias during endoscopy.

Patient Setup

Before endoscopic interventions preprocedural antibiotics should be administered according to the Society of Interventional

Thank You

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