ERCP Cannulation Tips and Tools of the Trade

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ERCP Similar to Golf
INTRODUCTION

ERCP

- First described by McCune and coworkers in 1968
  - First report of 50 pts revealed a cannulation rate of 25%
- Sphincterotomy first developed in 1970s
- Wire guided cannulation first described in 1987.
- ERCP is successful in over 95% of patients.
- Predominantly a therapeutic procedure.
ERCP

• Indications:
  – Relief of biliary obstruction
    • Stones
    • tumors
    • stricture
  – Management of post-operative complications
    • Bile leak
    • Bile duct injury
    • Anastomotic/ischemic stricture

• Complications:
  – Pancreatitis (5-10%)
  – Perforation (0.1-0.6%)
  – Bleeding (1.3%)

ASGE Guidelines: Complications of ERCP, 2012
Increased risk of pancreatitis

- Young female
- Sphincter of Oddi dysfunction
- Difficult cannulation
- Pancreatic duct opacification
- Pancreatic sphincterotomy
- Previous history of post-ERCP pancreatitis
- Operator experience

Etiology of Pancreatitis

- Trauma to the papilla and PD may lead to edema and obstruction of pancreatic ductal flow.
- Opacification of the PD may lead to both chemical and hydrostatic injury to the pancreas
Preparation: Patient position

- Traditionally ERCP is performed in a prone position
  - Easier for passage of scope
  - Lower risk of aspiration
  - Effective approach to the papilla
- Other positions include left lateral and supine.
- Left lateral similar to prone.

Preparation: Equipment

- Diagnostic catheter
  - Standard
  - Ultra-tapered (3Fr-5Fr)
- Sphincterotome
  - Double lumen sphincterotome
  - Triple lumen sphincterotome
  - Rotatable sphincterotome
- Needle knife
- Guide wires
  - 0.025 inch wire
  - 0.035 inch wire
  - Loop tip wire
Preparation: Scope position

Prominent intraduodenal portion
Smaller Papilla Under a Hood

Deceiving Papilla
Patulous Papilla

CANNULATION
Cannulation

- Wire-guided
- Contrast injection
- Double wire
- Access sphincterotomy

Guide wire-assisted cannulation is the standard technique for cannulation.

- Engage tip of papillotome into the orifice before advancing the wire
- Advance tip of wire a few millimeters out of the papillotome
Guide wire Technique

- Meta-analysis of 12 RCT studies including 3450 patients demonstrated:
  - Decreased with PEP in the wire group vs contrast based on ITT (3.5% vs 6.7%, RR 0.51 95% CI 0.32-.082)
  - NNT was 31.
  - Greater primary cannulation success (83.6% vs 77.3%, RR 1.07, 95%CI 1.15)
  - Fewer precut sphincterotomies (9.3% vs 12.4%, RR 0.75, 95%CI 0.60-0.95)
  - No increase in other post ERCP related complications

Tse, Endoscopy, 2013
Manipulation of wire

- First randomized clinical trial comparing safety and efficacy of endoscopist controlled vs assistant controlled wire guided cannulation.
- 216 patients enrolled in the study.
- Lower rate of complications in the endoscopist controlled group: 2.8% vs 11.2% (p=0.016)
  - PEP 2.8% vs 9.3% (p=0.049)

Buxbaum, AmJGastr, 2016

Injection Technique

- Flush the catheter with contrast (full strength vs half strength)
- Helps to delineate the anatomy
- Caution with injection:
  - Initial injection can cause submucosal injection
  - Opacification of the PD
Delineation of PD
Double wire/PD stent

- If a wire has been inadvertently placed in the PD it can sometimes help with cannulation of the CBD.
  - Stabilize scope position
  - Straighten the “S” turn
  - Separate the orifices
  - Identify the pancreatic axis
  - Occlude the pancreatic duct orifice

Double Wire Technique
Technique

• Wire and/or pancreatic duct stent is placed.
• A sphincterotome is loaded with a second wire and placed above the initial wire at the 10-11 o’clock position.
• Increase the bowing of the sphincterotome using fluoroscopic guidance
• If unsuccessful or repeated manipulation then place a 3Fr or 5Fr pancreatic duct stent
Double wire technique:
**EDUCATION Trial**

- Multicenter randomized controlled trial of 274 patients were analyzed of the effectiveness and rate of PEP in early placement of a PD wire.
- 96 patients (70%) success in single wire vs 103 patients (75%) in double wire within 10 attempts and 10 mins.
  - Malignant biliary stricture
  - Intradiverticular ampulla
- PEP 23 patients (17%) in single wire vs 27 patients (20%)

Sasahira, Endoscopy, 2015

Retrospective, Cohort Study

- 177 patients were included.
  - 90 patients wire guide followed by PD stent
  - 87 patients with double wire
- Initial success 66.7% vs 70.1%
- Overall success (before needle-knife) 66.7% vs 86.2%.
- PEP 3.3% vs 10.3%
- *First try double wire, followed by PD stent, then needle knife*

Yang, BMC Gastro, 2015
Precut Sphincterotomy

- Precut papillotomy is creating an incision at the opening of the bile duct and extending it upward in the 11 o’clock position.
- Precut fistulotomy creating an incision at the apex of the bulge and cutting downward into the dilated duct or towards the impacted stone.
- Transpancreatic septotomy with a sphincterotome (PD cannulation)
- Intramucosal incision (false tract)

Precut Sphincterotomy

- Placing a pancreatic duct stent may help to prevent PEP and help guide the cut.
- If still unsuccessful the ERCP can be repeat in 2-5 days and there is usually a high success rate.
- If urgent access is needed then there are other alternatives.
Precut sphincterotomy

- Updated meta-analysis of 7 RCTs with a total of 1039 patients.
- Cannulation rate 90% in pre-cut vs 86.3% in persistent attempts (OR=1.98; 95% CI 0.70-5.65)
- Risk of pancreatitis 3.9% pre-cut vs 6.1% persistent attempts (OR =0.58, 95% CI 0.32-1.05)
- No statistically significant difference between the 2 groups for overall complication rate (6.2% vs 6.9%, OR=0.85, 95% CI 0.51-1.41)

Navaneethan, WJ GastroEndo, 2014

Fusion Loop Tip Wire Guide

- Prospective study in 8 centers of 320 patients comparing loop tip cannulation vs contrast
- GW cannulation 81% and contrast 73%.
- Lower rates of PEP with GW.
- Atraumatic loop may reduce injury.
- Loop may facilitate passage through the epithelial folds of the intraduodenal biliary segment

Masci, Endoscopy Internat Open, 2015,
Diverticulum

• The papilla is usually located along the lower rim of the diverticulum (between 4 and 8 o’clock) but sometimes the papilla can be located within the diverticulum.
• Cannulation is best achieved using a long position.
• A double wire technique can be very helpful to align the papilla in a more desirable position.
Other Reported Tricks

• A pediatric biopsy forceps or Spybite forceps may be used to manipulate the surrounding folds or proximal aspect of the papilla.
• Placing one or more clips to fix the papilla to outer margin.
• Placing a 15 mm balloon in the diverticulum
• Percutaneous rendezvous technique
• EUS guided rendezvous technique

Interventional EUS

• EUS assisted cholangiopancreatography is possible due to the close proximity of bile duct and the gastric and duodenal lumen.
• Previously failed ERCP secondary to an obstructing tumor or surgically altered anatomy
• Antibiotics should be given to all patients during the procedure and for 7-14 days afterwards
Interventional EUS

- Two techniques:
  - EUS guided rendezvous followed by traditional ERCP
  - Transmural drainage by creating a tract between the bile duct and stomach/duodenum and placing a stent

- Over 400 cases reported in the literature
  - 90% success rate
  - 10%-20% complication rate (pneumoperitoneum, bile peritonitis, bleeding)

Iwashita, Clin J Gasr, 2014

Take Home Points

- Wire guided cannulation with a sphincterotome is the standard technique
- Pancreatic duct wire placement +/- stent placement can help to facilitate cannulation
- Precut sphincterotomy can be safe and effective in experienced hands
- “PTC (or EUS rendezvous) is not a four letter word”