NEW YORK SOCIETY FOR GASTROENTEROLOGY & ENDOSCOPY
48th Annual
NEW YORK COURSE
December 12-13, 2024 • New York, NY

The Nurses Role in Post ERCP Management of Pancreatitis

John Poneros MD, FASGE, NYSGEF
Professor of Medicine
Columbia University Vagelos College of Physicians and Surgeons
Clinical Chief, Division of Digestive and Liver Diseases
Director of Endoscopy, NYP/Columbia Campus
President NYSGE 2024-25

- No Disclosures for 2024

Post ERCP Pancreatitis (PEP)

- Definition: New or worsened abdominal pain with amylase and lipase >3 times normal > 24 hours after ERCP and hospital admission
- Incidence of PEP: 3.5 to 9.7%
- Most PEP is mild, and rates of severe pancreatitis low (0.3 to 0.8%)
- PEP mortality rates also low (0.1 to 0.7%)

Andriulli et al Am J Gastro 2007
Kochar et al GIE 2015
Williams et al Endoscopy 2007
Wang et al Am J Gastro 2009

When you think about Risk Factors for PEP

- Operator Factors
- Patient related Factors
- Procedure Related Factors

NYSGE
48th Annual
New York Course

Operator Related Factors

- Inadequate training
- Lack of experience

Patient Related Factors

- Younger age
- Female sex
- Normal serum bilirubin (Normal LFTs)
- Normal sized CBD (not dilated)
- Recurrent pancreatitis
- Prior ERCP induced pancreatitis
- Sphincter of Oddi dysfunction

ERCP Quote #1

“Patients that do the worst are the ones that need it the least”

NYSGE
48th Annual New York Course

Sphincter of Oddi Dysfunction: Type III

"Should I do an ERCP on this young woman s/p CCY with normal LFTs and a 6mm CBD with RUQ pain?"

(BTW her husband is a lawyer)

PEP: Procedure Related Factors

- Difficult cannulation
- Pancreatic duct injection
- Sphincter of Oddi manometry
- Biliary balloon sphincteroplasty
- Endoscopic snare ampullectomy
- Needle Knife “Precut” sphincterotomy

ERCP Quote #2

“You always get the duct you don’t want”

NYSGE
48th Annual
New York Course

REVIEW ARTICLE

International consensus recommendations for difficult biliary access

Wei-Chih Liao, MD,[1,*] Phonthep Angsuwatcharakon, MD,[2,*] Hiroyuki Isayama, MD,[3] Vinay Dhir, MD,[4] Benedict Devereaux, MD,[5] Christopher J. L. Khor, MD,[6] Ryan Ponnudurai, MD,[7] Sundeep Lakhtakia, MD,[8] Dong-Ki Lee, MD,[9] Thawee Ratanachu-ek, MD,[10] Ichiro Yasuda, MD,[11] Frederick T. Dy, MD,[12] Shiaw-Hooi Ho, MD,[13] Dadang Makmun, MD,[14] Huei-Lung Liang, MD,[15] Peter V. Draganov, MD,[16] Rungsun Rerknimitr, MD,[17] Hsiu-Po Wang, MD[1]

Taipei, Taiwan; Bangkok, Thailand; Tokyo, Kawasaki, Japan; Mumbai, India; Brisbane, Queensland, Australia; Singapore; Kuala Lumpur, Malaysia; Hyderabad, Telangana, India; Seoul, Korea; Manila, Philippines; Jakarta, Indonesia; Gainesville, Florida, USA

How do we define a “difficult cannulation”?

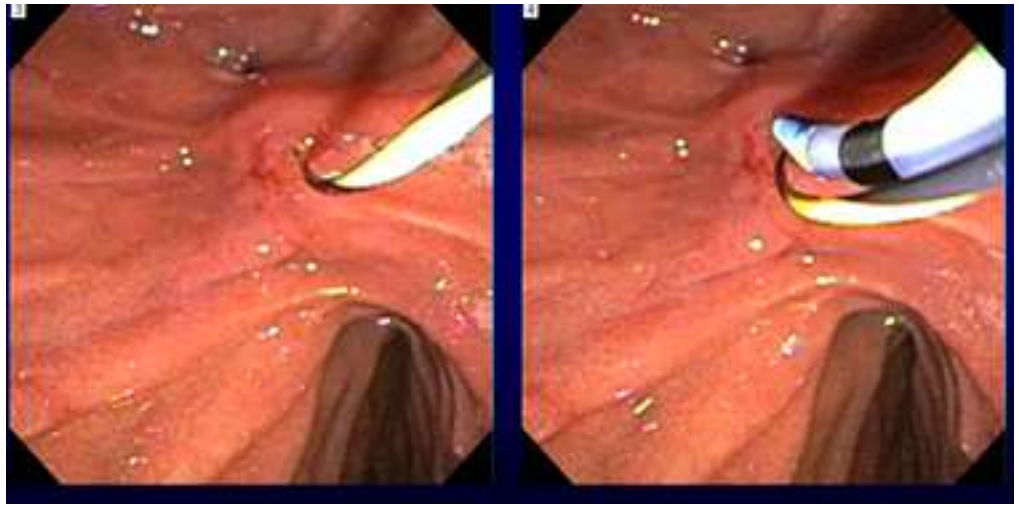
TABLE 2. Definition and incidence of difficult cannulation in RCTs

First author (year)	Definition of difficult cannulation
Maeda (2003)[8]	>10 min
Tang (2005)[9]	>12 min (7 by trainee and 5 by faculty)
Zhou (2006)[10]	>10 min >3 PD cannulation
Cennamo (2009)[11]	>5 min >3 PD cannulation
Herreros de Tejada (2009)[12]	>5 attempts
Manes (2009)[13]	>10 min >5 PD injection
Ito (2010)[19]	>5 attempts
Angsuwatcharakon (2012)[14]	>15 min (5 by trainee 10 min by faculty)
Coté (2012)[17]	>6 min >3 PD injection or cannulation
Lee (2012)[18]	>10 min >5 PD cannulation >10 attempts
Swan (2013)[15]	>10 min* >10 attempts* >4 PD cannulation*
Yoo (2013)[16]	>10 attempts >10 min
Zang (2014)[42]	>10 min >5 PD cannulation
Total	

DGW, Double guidewire; *PC*, persistent standard cannulation; *NKP*, needle-knife papillotor
*By trainee and faculty: >5 minutes, >5 attempts, >2 PD cannulation, respectively.

Difficult cannulation: Tricks

- Needle knife sphincterotomy
- “Double wire” cannulation
- Never abort ERCP without performing a needle knife “pre-cut” sphincterotomy



NYSGE
48th Annual
New York Course

Difficult cannulation and PEP

- Traumatic, repeated attempts at cannulation (do not get into a grudge match with the papilla!)
- PEP: 3% of patients with < 5 attempts, 7% after 6-15 attempts and 13% with > 15 attempts
- The harder it is to cannulate, the higher the risk of PEP
- Rescue Maneuvers: Double wire technique, needle knife sphincterotomy, trans pancreatic sphincterotomy, etc.

NYSGE
48th Annual New York Course

Freeman et al GIE 2001

ERCP Quote #3

"The Definition of Insanity: Doing the same thing over and over again and expecting a different result"

Albert Einstein

Synergistic Effect of Multiple PEP Risk Factors

	Adjusted OR of PEP
Female Patient	2.9
Female Patient + Normal Bilirubin	4.8
Female Patient + Normal Bilirubin + SOD	12.4
Female Patient + Normal Bilirubin + Difficult Cannulation	16.2
Female Patient + Normal Bilirubin + SOD + Difficult Cannulation	42.1

Freeman et al GIE 2001

Communication from the ASGE Standards of Practice Committee

GUIDELINE

Adverse events associated with ERCP

TABLE 3. Independent risk factors for post-ERCP pancreatitis identified with multivariable analysis.[168]

	Odds ratio (95% confidence interval)
Patient-related risk factors	
Prior post-ERCP pancreatitis	8.7 (3.2-23.86)
Female sex	3.5 (1.1-10.6)
Previous recurrent pancreatitis	2.46 (1.93-3.12)
Suspected sphincter of Oddi dysfunction	1.91 (1.37-2.65)
Younger patient age (<40 years old)[14] 30 vs 70 years old[7]	1.8 (1.27-2.59) 2.14 (1.413.25)
Absence of chronic pancreatitis	1.87 (1.003.48)
Normal serum bilirubin	1.89 (1.222.93)
Procedure-related risk factors	
Difficult cannulation (>10 minutes)	1.76 (1.13-2.74)
Repetitive pancreatic guidewire cannulation	2.77 (1.79-4.30)
Pancreatic injection	2.2 (1.60-3.01)
Pancreatic sphincterotomy	3.07 (1.64-5.75)
Endoscopic papillary large-balloon dilation of an intact sphincter	4.51 (1.51-13.46)

- Patient related factors are *as important* as procedure-related factors in determining the risk of PEP
- Need to have careful patient selection as well as choice of technique

ASGE Standards of Practice Cmte 2017

NSAID prophylaxis against PEP

- Noninvasive, inexpensive non-toxic
- NSAIDs reduce risk of PEP by 50-60%
- Diclofenac or indomethacin
- At least 6 positive RCTs and numerous meta-analyses
- Contraindication of administration: Renal failure (Cr > 1.4 $\mu g/mL$)
- Theoretical increased bleeding risk

NSAIDs for PEP

SYSTEMATIC REVIEW AND META-ANALYSIS

Indomethacin and diclofenac in the prevention of post-ERCP pancreatitis: a systematic review and meta-analysis of prospective controlled trials CME

Árpád Patai, MD, PhD,[1] Norbert Solymosi, PhD,[2] László Mohácsi, PhD,[3] Árpád V. Patai, MD[4]
Szombathely, Budapest, Hungary

- 4741 patients from 17 trials
- Diclofenac and Indomethacin both significantly ↓ PEP
- Similar efficacies
- Substantial adverse events not detected

Patai et al GIE 2017

Indomethacin can protect again post ERCP pancreatitis whether it is given orally or rectally

True or False?

NYSGE
48th Annual
New York Course

False

Indomethacin needs to be given rectally in order to be effective

Patai et al GIE 2017

In order to protect against PEP, rectal NSAIDs need to be given before the ERCP.

True or False?

NYSGE
48th Annual
New York Course

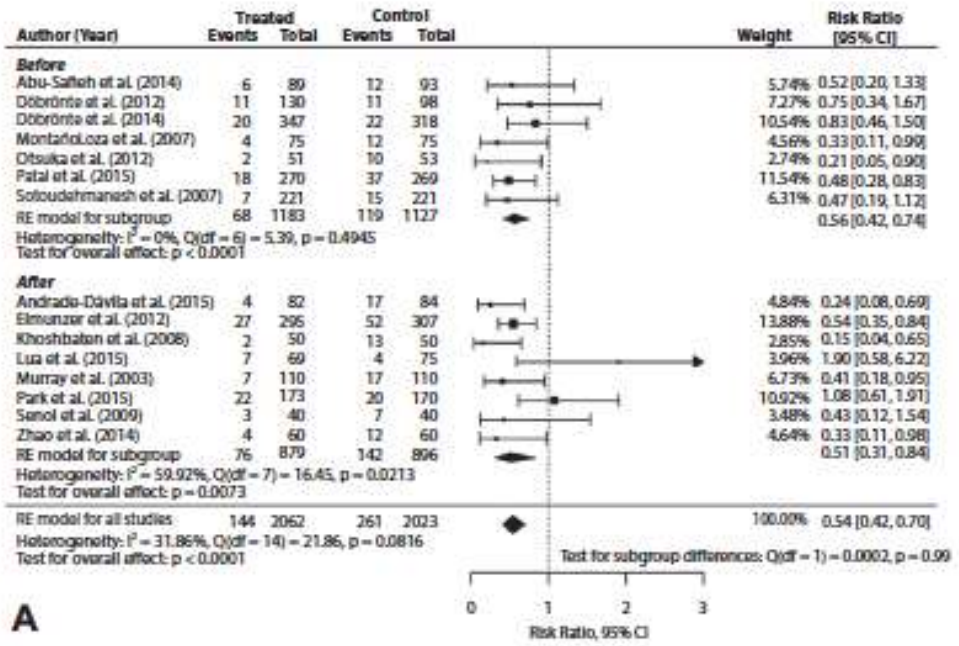
False

It does not matter if you give the NSAID before or after the procedure.

NYSGE
48th Annual
New York Course

Patai et al GIE 2017

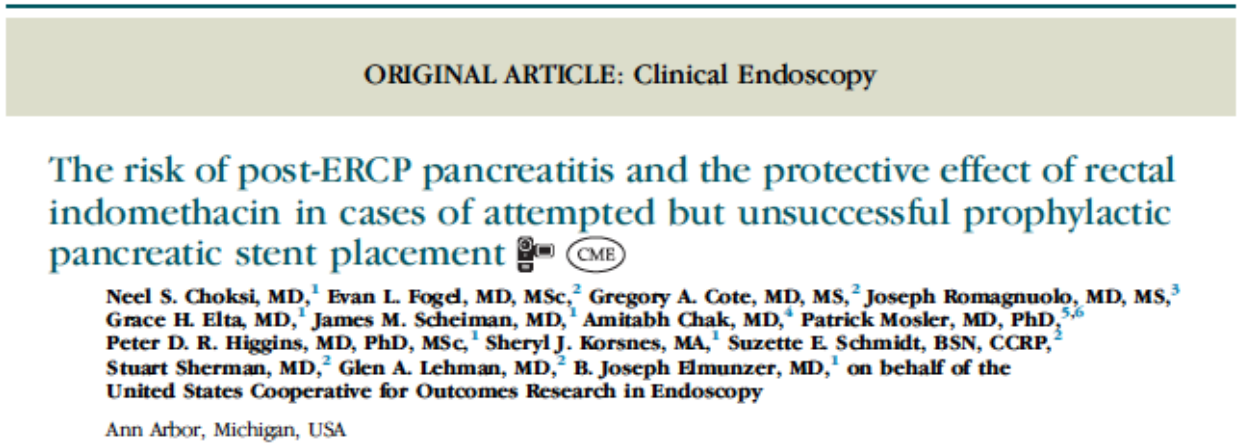
Timing of NSAID for PEP



- Efficacy of indomethacin or diclofenac did not differ according to timing

Patai et al GIE 2017

PEP, Pancreatic stents and NSAIDs



ORIGINAL ARTICLE: Clinical Endoscopy

The risk of post-ERCP pancreatitis and the protective effect of rectal indomethacin in cases of attempted but unsuccessful prophylactic pancreatic stent placement CME

Neel S. Choksi, MD,[1] Evan L. Fogel, MD, MSc,[2] Gregory A. Cote, MD, MS,[2] Joseph Romagnuolo, MD, MS,[3] Grace H. Elta, MD,[1] James M. Scheiman, MD,[1] Amitabh Chak, MD,[4] Patrick Mosler, MD, PhD,[5,6] Peter D. R. Higgins, MD, PhD, MSc,[1] Sheryl J. Korsnes, MA,[1] Suzette E. Schmidt, BSN, CCRP,[2] Stuart Sherman, MD,[2] Glen A. Lehman, MD,[2] B. Joseph Elmunzer, MD,[1] on behalf of the United States Cooperative for Outcomes Research in Endoscopy

Ann Arbor, Michigan, USA

Secondary analysis of data from RCT of indomethacin in PEP NEJM article

NYSGE 48th Annual New York Course

Choksi et al GIE 2015
Elmunzer et al NEJM 2012

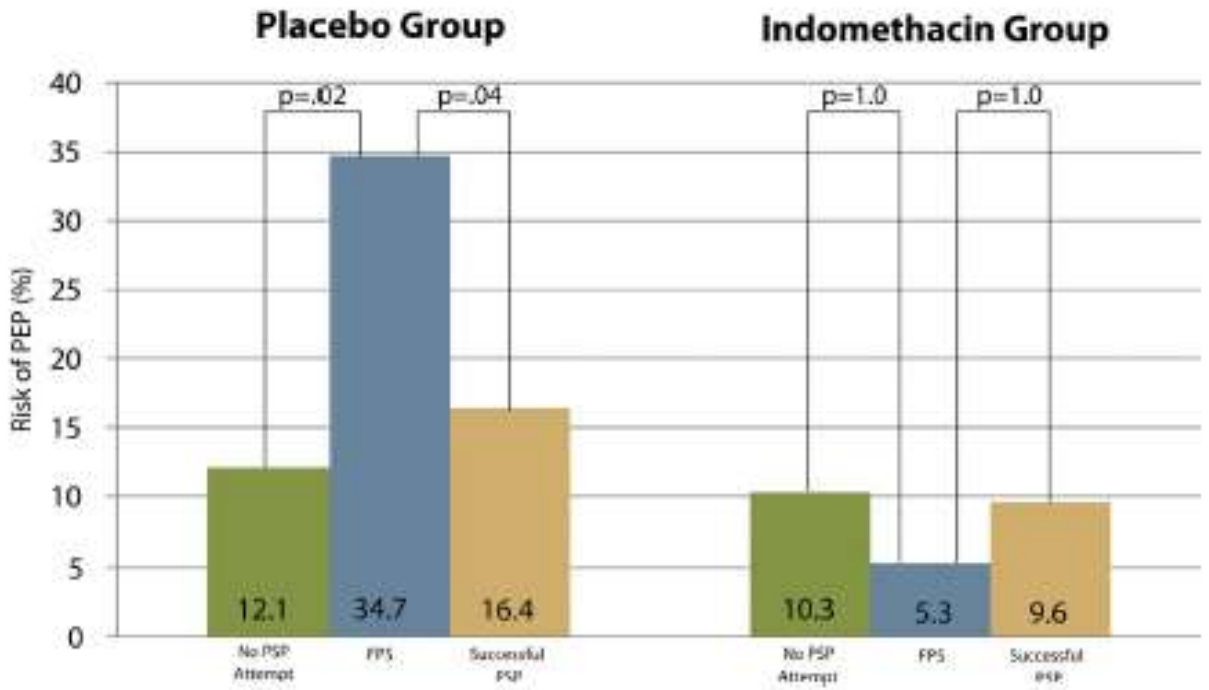


Figure 1. Risk of PEP among patients with FPS compared with no attempt and successful PSP in the placebo group (*left panel*) and indomethacin group (*right panel*). *PEP,* post-ERCP pancreatitis; *PSP,* pancreatic stent placement; *FPS,* failed pancreatic stent placement.

NYSGE
48th Annual New York Course

Choksi et al GIE 2015
Elmunzer et al NEJM 2012

Which of the following routine lab tests best predicts in hospital mortality from acute pancreatitis?

A. Hgb
B. WBC
C. Calcium
D. BUN
E. Creatinine
F. Glucose

D. BUN

Both the INITIAL BUN and the subsequent CHANGE in BUN during the first 24 hrs are INDEPENDENT predictors of mortality

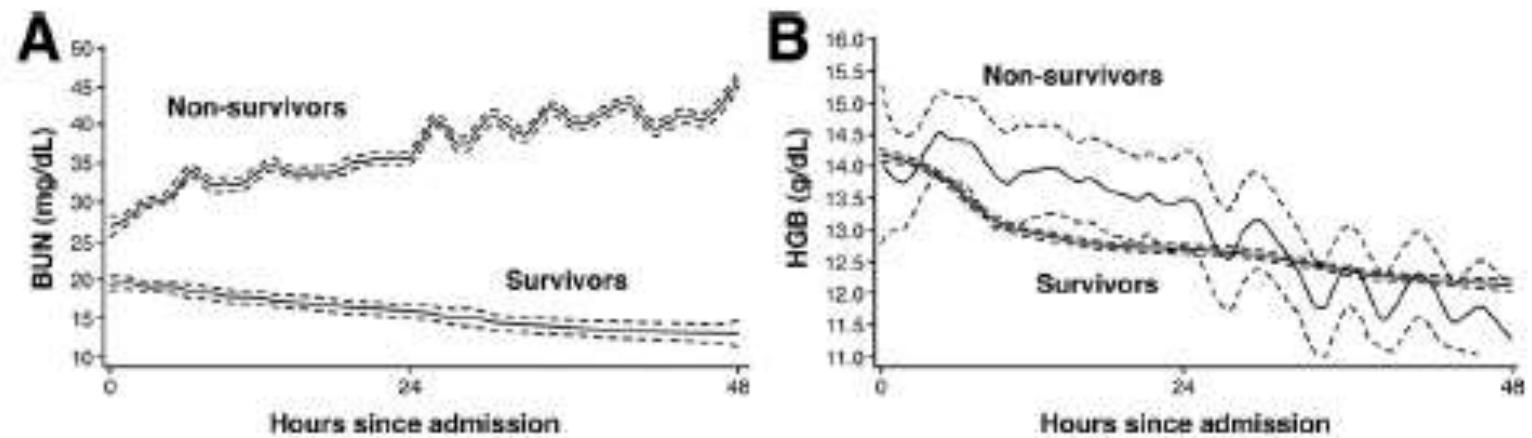
NYSGE
48th Annual
New York Course

Wu et al Gastro 2009

Early Changes in Blood Urea Nitrogen Predict Mortality in Acute Pancreatitis

BECHIEN U. WU,* RICHARD S. JOHANNES,*,‡ XIAOWU SUN,‡ DARWIN L. CONWELL,* and PETER A. BANKS*

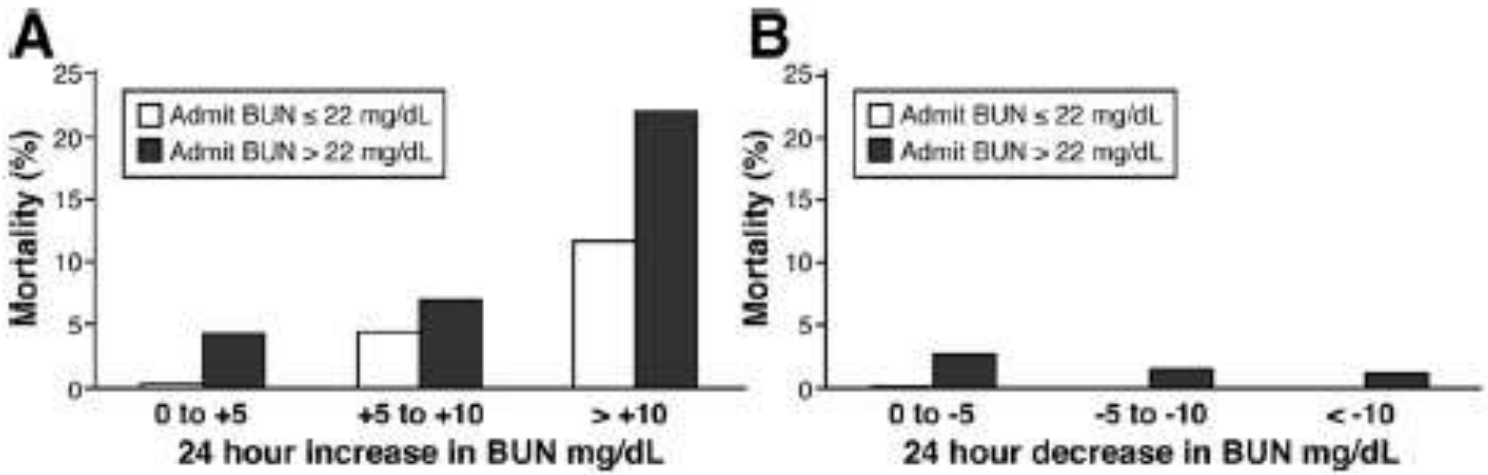
*Brigham and Women's Hospital, Center for Pancreatic Disease, Division of Gastroenterology, Harvard Medical School, Boston, Massachusetts; and the ‡Cardinal Health, Marlborough, Massachusetts



NYSGE
48th Annual
New York Course

Wu et al Gastro 2009

Get the BUN down STAT!
The patient is third spacing..



Wu et al Gastro 2009

The TYPE of IV fluid that the patient receives post ERCP does NOT make a difference with regards to preventing PEP

True or False?

NYSGE
48th Annual
New York Course

False

Aggressive hydration with Lactated Ringer Solution is an effective and safe therapy for prevention of PEP

NYSGE
48th Annual
New York Course

Zhang et al Clin Gastroenterol 2017

Lactated Ringers (LR)

- Balanced crystalloid solution with 28mEq of lactate that is converted to sodium bicarbonate in liver
- Raises both serum and intra-acinar cell pH
- ↑ pH increases the threshold to develop pancreatitis and reduce its severity in animal models
- Patients are typically fasting and dehydrated
- Hypoperfusion of pancreatic microcirculation plays a role in PEP
- ↑ pre-procedural BUN correlates with the PEP and its severity

Ashley et al Surgery 1994
Noble et al Gut 2008
Foitzik et al Dig Dis Sci 1995
Cote et al Pancreas 2013

Aggressive Hydration With Lactated Ringer Solution in Prevention of Postendoscopic Retrograde Cholangiopancreatography Pancreatitis

A Meta-analysis of Randomized Controlled Trials

Zhi-Feng Zhang, MS, Zhi-Jun Duan, MD, PhD,* Li-Xia Wang, MS,*
Gang Zhao, MB,* and Wu-Guo Deng, PhD†*

- 7 RCT studies
- Aggressive hydration vs standard hydration with LR
- 3.5 Ls in 9 hours
- Hydration started before or at the time of the ERCP

Zhang et al J Clin Gastroenterol 2017

Aggressive Hydration with LR

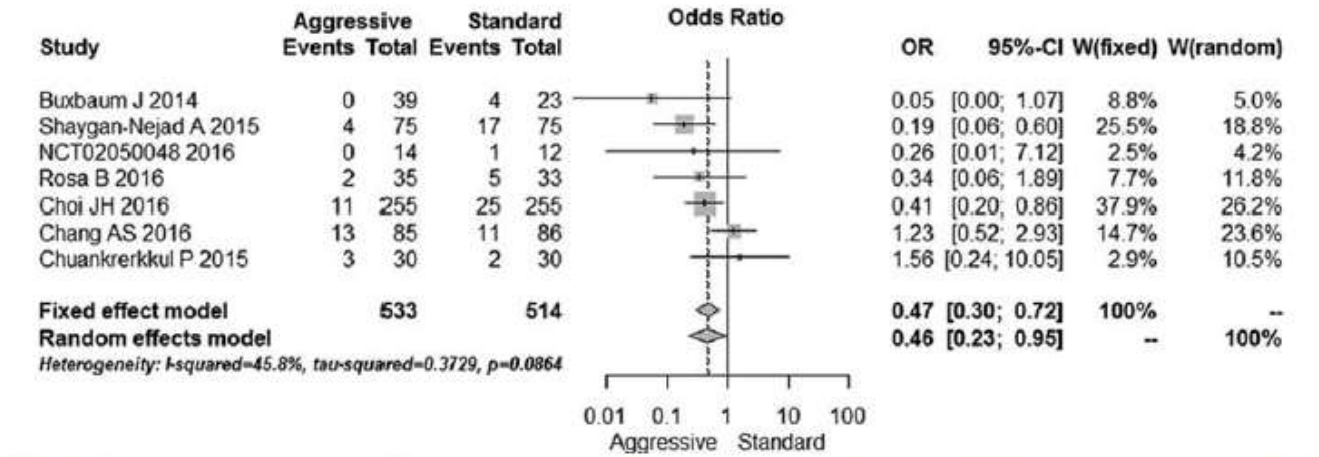


FIGURE 3. Forest plot of incidence of PEP between aggressive hydration and standard hydration. CI indicates confidence interval; OR, odds ratio; PEP, post-ERCP pancreatitis.

- Aggressive hydration ↓ PEP
- No difference in adverse events between aggressive and standard hydration

NYSGE
48th Annual New York Course

Zhang et al Clin Gastroenterol 2017

Nurses Role in PEP (And All Pancreatitis)

- Patient is admitted for pancreatitis but is stable
- On Day 2 amylase is still > 2,000 and WBC is 12 but states that she is hungry and would like to eat..
- Should we feed the patient?

Early refeeding (< 48 hours after admission) when amylase and lipase are still high increases adverse effects and exacerbates symptoms.

True or false?

NYSGE
48th Annual
New York Course

False

Early feeding in AP patients does not increase adverse events and, in mild to moderate pancreatitis, may reduce LOS

Vaughn et al AIM 2017

Early Feeding Better in AP

- 2013 APA and ACG guidelines: Defer feeding AP patients until “inflammatory markers are improving” or “abdominal pain has resolved”
- More recent studies have suggested that this is not necessary
- Enteral nutrition stimulates the gut, maintains its protective barrier, thus ↓ bacterial overgrowth and preventing bacterial translocation and sepsis
- Enteral feeding better than TPN: fewer infections, shorter LOS and lower mortality
- AGA: “A trial of oral nutrition is recommended immediately in the absence of nausea/vomiting and no signs of ileus or GI obstruction”

Ammori et al Pancreas 2003
Ol et al World J Gastro 2014
Li et al Pancreatology 2010
Jiang et al World J Gastro 2007
McClave et al JPEN 2006
Tenner et al Am J Gastro 2013
Working Group IAP/APA Pancreatology 2013
Baron et al Gastro 2020

Nurses Role in PEP

Patient has a temperature of 100.2
WBC of 17 with this CT scan…

Case presentation continued

- Patient has blood cultures drawn which demonstrate no growth at 24 hours
- Aspiration of the fluid demonstrates no evidence of infection
- Patient has a normal HR, BP and does not appear toxic
- This patient should get prophylactic antibiotics, given the amount of necrosis? True or False

False

- ACG: Guidelines do not recommend prophylactic antibiotics

- AGA: “Antimicrobial therapy is best indicated for culture-proven infection in pancreatic necrosis or when infection is strongly suspected (ie gas in the collection, bacteremia, sepsis or clinical deterioration.) Routine use of prophylactic antibiotics to prevent infection of sterile necrosis is not recommended.”

Case Continues

- The patient slowly recovers but develops a large amount of pancreatic necrosis and eventually a heterogeneous collection forms.
- Patient is unable to tolerate a diet due to extrinsic compression on his stomach and begins spiking fevers.
- What is the best way to decompress the WOPN?

Pancreatic Fluid Collections (formerly Pseudocysts) vs Walled off Pancreatic Necrosis (WOPN)

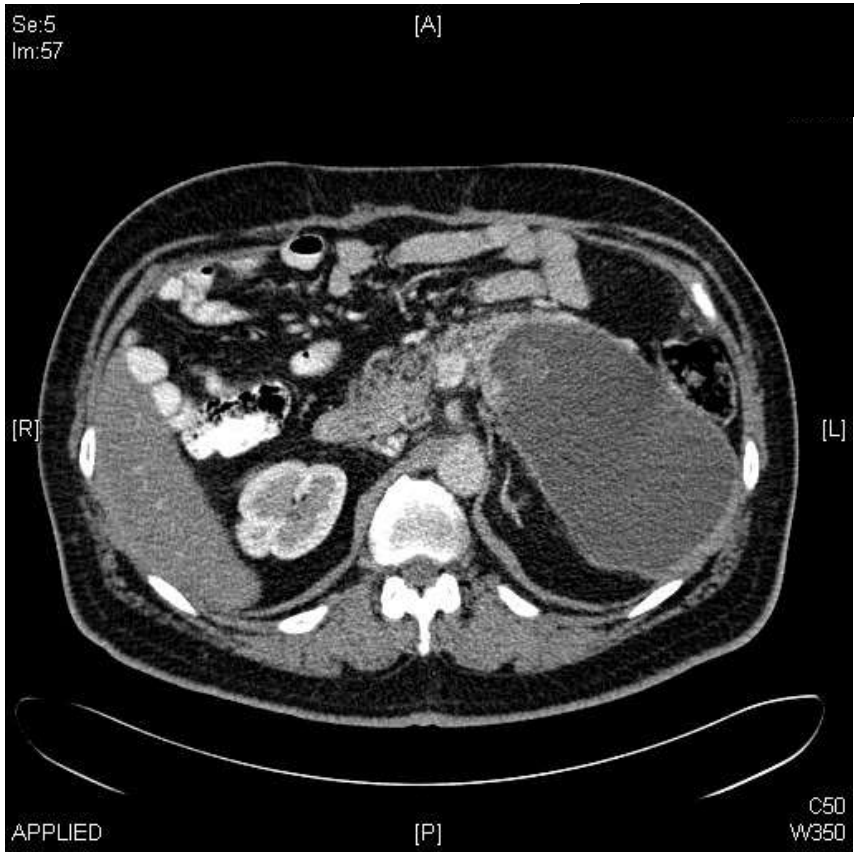
- Homogeneous fluid collection > 4 weeks old surrounded by a defined wall vs WOPN which can have solid debris
- Occur after acute pancreatitis in 10% of cases
- Can resolve without intervention in up to 40% of cases
- Depending on size and location can cause complications:
  - Pain, obstruction, fistula
  - Spontaneous infection
  - Digestion of adjacent vessel → pseudoaneurym → hemosuccus pancreaticus

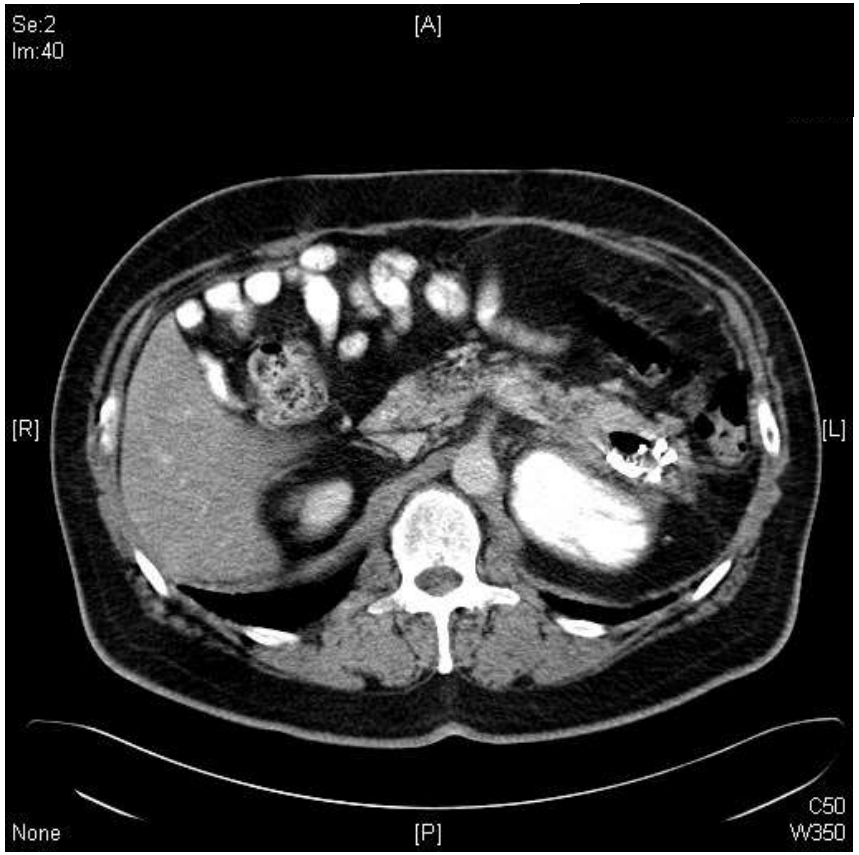
Cameron JL Acute pancreatitis 1983
O'Malley VP Am J Surg 1985
Cheruvu CV et al Ann R Coll Surg Engl 2003
Banks et al Gut 2013

Draining PFCs or WOPN

- Things to consider in a symptomatic, febrile or enlarging pseudocyst before deciding on method of drainage:
  - Location
  - Loculation
  - Mature wall
  - Debris and necrosis
  - Presence of a pseudo-aneurysm (considered an absolute contraindication unless embolization performed first)
- Multi-disciplinary approach at Columbia

PFC Drainage



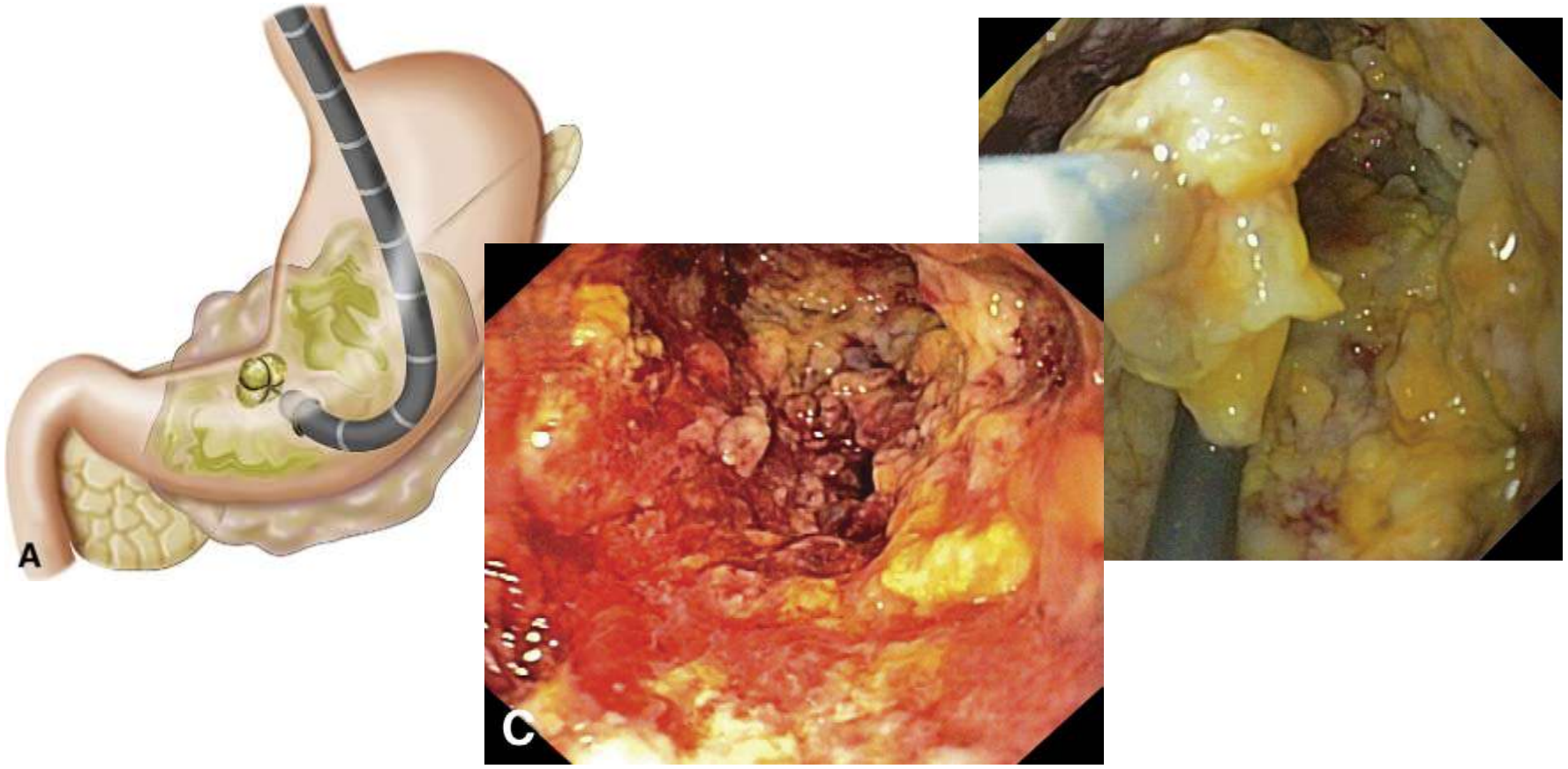


Pancreatic Fluid Collection Drainage

- Endoscopic drainage first performed in 1989
- Studies have reported technical success rates for EUS guided pseudocyst drainage of 84-94%
- Recurrence rates of 3-18%
- Complication includes immediate and delayed bleeding, perforation, secondary infection and stent migration
- Higher complication rates in those with necrosis
- Important to discuss risks/benefits with patients

Cremer M et al Gastrointest Endosc 1989
Baron TH et al Gastrointest Endosc 2002
Varadarajulu S et al Gastrointest Endosc 2008

Pancreatic Necrosectomy

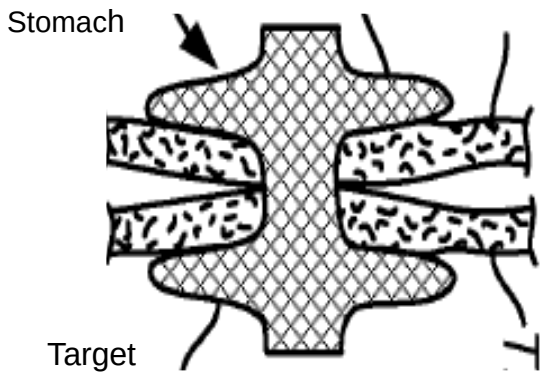


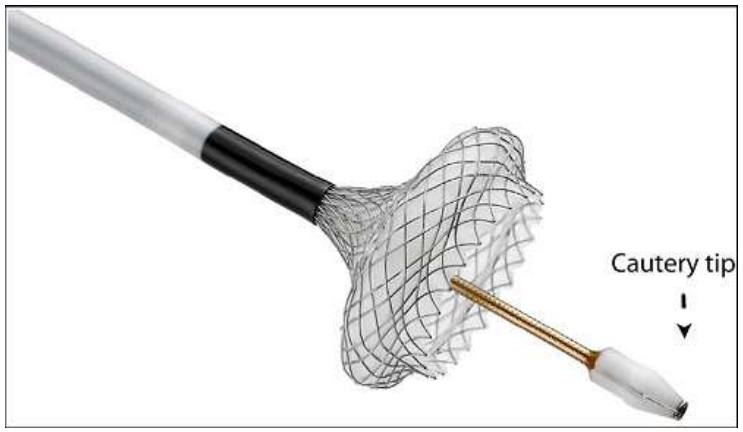
Seewald et al GIE 2005;62:92-100

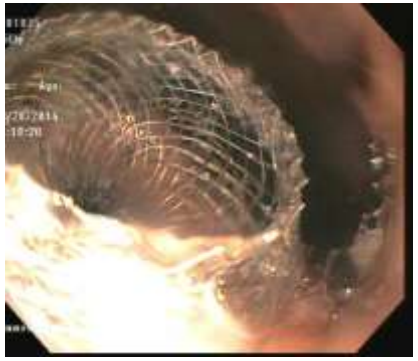
LAMS Platform

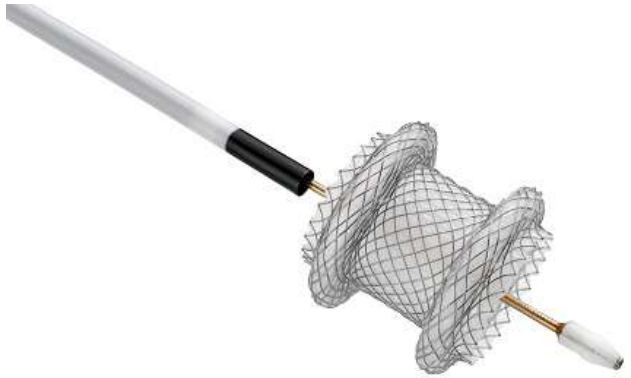
What it does: *Creates a durable anastomosis between two structures*

How it does it: *Perpendicular double-walled flanges*










ALOKA
NY PRESBY COLUMBI :No ID
UNIVERSITY
10.31.'16
13:54:09
MI =0.43 TIS< 0.4 100% 20Hz
R4.5 G61 D80 A1
:AR180-P Probe:LIN 180
AiP
Ext

NYSGE
48th Annual
New York Course


MEDCOM RESAMPLED
[H]
Se:602
Im:59
Spin: -0
Tilt: -0
[R]
[L]
A
CORONAL SOFT TISSUE POST
None
[F]
C56
W342

Final ERCP Quote

"Good judgement comes from experience. Experience comes from bad judgement."

NYSGE
48th Annual New York Course

Jim Horning