



Endoscopy and infection:

Prevention of infection during endoscopy

Treatment of infection by endoscopy

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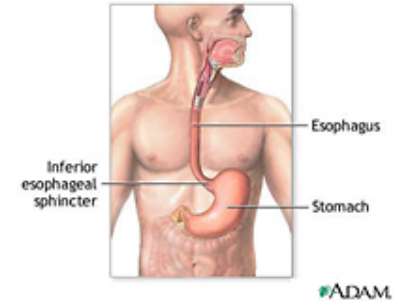
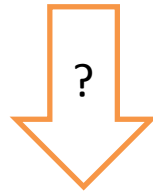
Outline

- Antibiotic prophylaxis during endoscopy
 - Upper GI endoscopy
 - Lower GI endoscopy
 - ERCP
 - EUS-guided FNA and drainage
 - Guidelines for prevention of infective endocarditis
- Treatment of infection with endoscopy
 - Cholangitis and ERCP
 - EUS-guided bilio-digestive drainage
 - Pancreatic collection transmural drainage
 - Necrosectomy

Antibiotic prophylaxis during endoscopy

Upper GI endoscopy

Similar to dental procedures → bacteremia



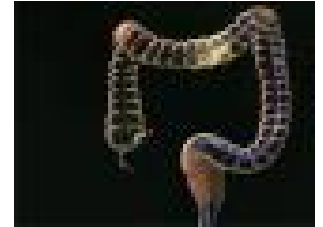
Procedure	Rate of bacteremia	Mean rate	Complications
EGD and biopsies	0-8%	4.1%	Endocarditis Meningococemia
EGD and injection Sclerotherapy Bicrylate	0-52% 32%	14.6%	Peritonitis (4%) Endocarditis Meningitis Oesophageal abscess
EGD and band ligation	0-25%	8.8%	Peritonitis Meningitis
Esophageal dilation	4-62%	22.8%	Endocarditis Meningitis Arthritis
EGD and EMR	5.3%		

Gastric varices

- RCT with injection of gastric varices (cyanoacrylate)
- 3 groups
 - I: bleeding gastric varices
 - II: non bleeding gastric varices
 - III: EGD without therapy
- Bacteremia rate (Blood cultures before, 5min and 30 min after the procedure)
- Results:
 - 4 positive blood cultures in group I (1 before the procedure)
 - None in group II

Bacteremia linked to bleeding status more than the injection

Lower GI endoscopy



Procedure	Rate of bacteremia	Mean rate	Complications
Rigid sigmoidoscopy	0-12%	7.6%	Endocarditis Sepsis
Flexible sigmoidoscopy	0-1%	0.5%	Endocarditis Sepsis
Colonoscopy	0-25%	4.4%	Peritonitis Meningitis Sepsis
Colonoscopy + Nd:YAG ablation	19%		Sepsis

Lower GI tract EMR

- Prospective study
- 40 patients
- EMR/ESD for colorectal tumors
- Blood cultures during procedure
- 1/40 (2.5%), no clinical symptoms

TABLE 1. Characteristics of patients, lesions, and procedures

	Conventional EMR (n = 30)	EMR-P or ESD (n = 10)
Age (y)*	60.0 (45-80)	68.5 (44-75)
Sex (M/F)	21/9	7/3
Diameter of largest lesions (cm)*	2.0 (0.8-4.0)	2.1 (1.5-5.5)
No. of lesions*	3.0 (1-7)	1.5 (1-12)
Procedure session*†	2.0 (1-5)	1.0 (1-11)‡
Procedure time (min)*	35.5 (12-103)	67.0 (36-159)
Bowel preparation (%)		
Excellent	4 (13.3)	4 (40.0)
Good	16 (53.3)	3 (30.0)
Fair	7 (23.3)	3 (30.0)
Poor	3 (10.0)	0 (0.0)
No. submucosal injections*	10.0 (1-44)	29.5 (9-64)
Total volume of submucosal injection (mL)*	24.5 (3-150)	70.0 (35-410)

*Data are expressed as median (range).

†The procedure session did not include the number of cold biopsies or hot biopsies performed.

‡In each case with an EMR-P or an ESD, only 1 EMR-P or ESD was performed.

PEG

- Local wound infection: 7.5-33.3%
- Factors:
 - Contamination from the oropharynx
 - Traction from the bumper?
- Meta-analysis of 10 RCT
 - RR reduction of 64%
 - NNT: 8
 - Penicillin- or cephalosporin-based regimen recommended

Jafri et al, Aliment Pharmacol Ther 2007

Nelson et al, Gastrointest Endosc 2003

ERCP

- Bacteremia after contrast injection or instrumentation
 - Unobstructed: 0-15.1%
 - Obstructed: up to 26.5%
- Post-ERCP sepsis or cholangitis: 0.5-3%
- Cholecystitis: 0.1-8.6%
- Meta-analysis → decreased risk of bacteremia but no difference for cholangitis
- Retrospective study over 11 years
 - Decrease infection rate with limited antibioprophylaxis
 - Transplant patients at risk (1.2% vs 0.25%, OR:5.2)

Harris et al, Endoscopy 1999

Cotton et al, Gastrointest Endosc 2008

ERCP

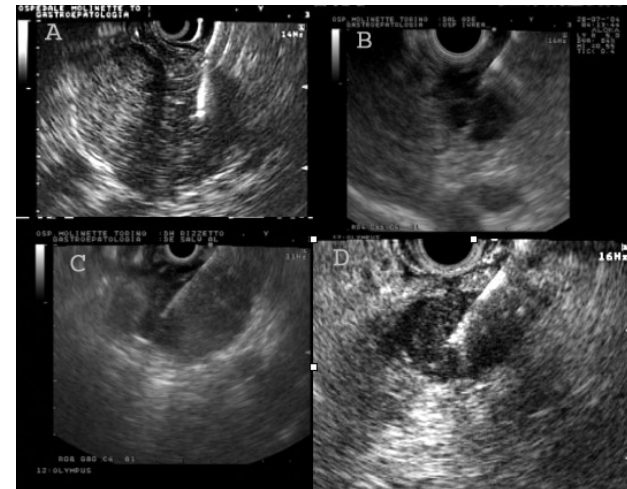
- Indications for antibiotic prophylaxis during ERCP
 - Biliary disorders in which complete biliary drainage will be difficult to achieve (hilar CCK)
 - Liver transplant recipients
 - Pancreatic pseudocyst drainage
 - Severe neutropenia or hematological malignancy

EUS-guided FNA (1)

- Prospective study with 52 patients undergoing EUS-FNA
 - LN
 - Pancreas (solid lesions)
- 266 passages in total
- Blood cultures + in 3 patients (5.8%)
- No clinical signs of infection

Low bacteremia risk

Levy et al, Gastrointest Endosc 2003



EUS-guided FNA (2)

- Retrospective study of 603 patients with pancreatic cysts undergoing EUS-guided FNA
- Complications in 13 patients (2.2%)
- Only 1 infection
- 543 patients had received antibiotics

Antibiotic prophylaxis in patients with cardiac risk factors

- Endoscopic procedures → bacteremia → endocarditis

but

- Clinical significance? Bacteremia everyday event during teethbrushing
- Selection of resistant bacteria
- Adverse effects of antibiotics

New guidelines

- Antibiotic prophylaxis is no longer recommended for the prevention of infective endocarditis in patients with cardiac risk factors who undergo diagnostic or therapeutic endoscopy
- ERCP
 - Biliary disorders where complete drainage will be difficult
 - Liver transplant recipients
 - Pancreatic pseudocysts
 - Severe neutropenia
- PEG
 - All patients

Ciprofloxacin or
Gentamycin or
According to flora

Co-amoxiclav or
Cefuroxime or
teicoplanin

New guidelines

- Variceal bleeding

- All patients with suspected variceal bleeding should have antibiotic prophylaxis

Pip-Tazo or
3d gen Cephalo

- EUS-FNA

- Antibiotic prophylaxis is indicated for cystic lesions or pseudocyst drainage, not solid lesions

Co-amoxyclav

- Severe neutropenia

- In patients undergoing high risk procedures with high bacteremia rates (variceal injection, oesophageal dilation, ERCP with biliary obstruction)

Treatment of infection with endoscopy

Cholangitis and ERCP

- Endoscopic biliary drainage is an established mode of treatment for cholangitis
 - EBS
 - Stone removal
 - Nasobiliary catheter or plastic stent insertion for further drainage
- RCT (41/41) comparison between surgery and endoscopy
 - Complication rate (66% for surg vs 34% for endo)
 - Mortality rate (32% for surg vs 10% for endo)

Lower morbidity and mortality rates than the previous surgical approach

Nasobiliary catheter

VS

Stent

TABLE 4. Comparison of ERCP-related complications between the ENBD group and the ERBD group

	ENBD group (n = 41)	ERBD group (n = 39)	P value
Total occurrence rate	31.7% (13/41)	38.5% (15/39)	.527
Oversedation	2.4% (1/41)	0.0% (0/39)	.326
Nonpancreatitis pain	2.4% (1/41)	0.0% (0/39)	.326
Bleeding (n = 8)	9.8% (4/41)	10.3% (4/39)	.941
Immediate bleeding	7.3% (3/41)	7.7% (3/39)	.949
Delayed bleeding	2.4% (1/41)	2.6% (1/39)	.971
Hyperamylasemia (n = 18)	12.2% (5/41)	33.3% (13/39)	.024
Symptomatic pancreatitis	0.0% (0/41)	5.1% (2/39)	.152
EST(-) (n = 25)	14.3% (2/14)	9.1% (1/11)	.692
EST(+) (n = 55)	11.1% (3/27)	42.9% (12/28)	.008

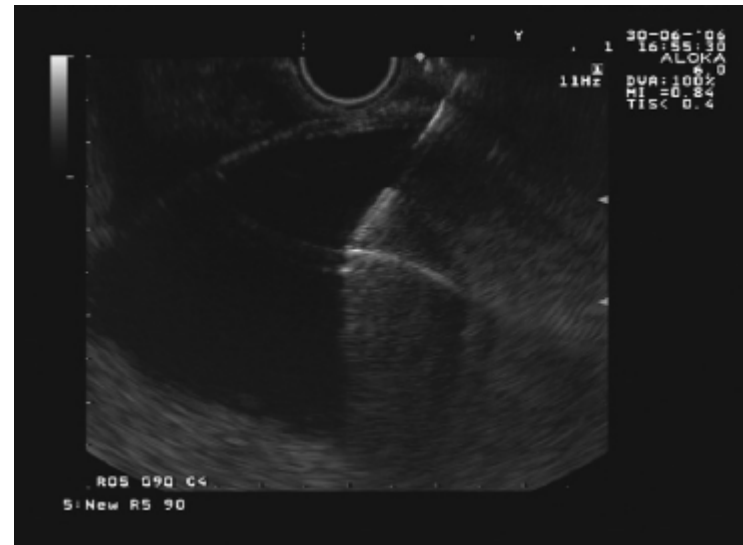
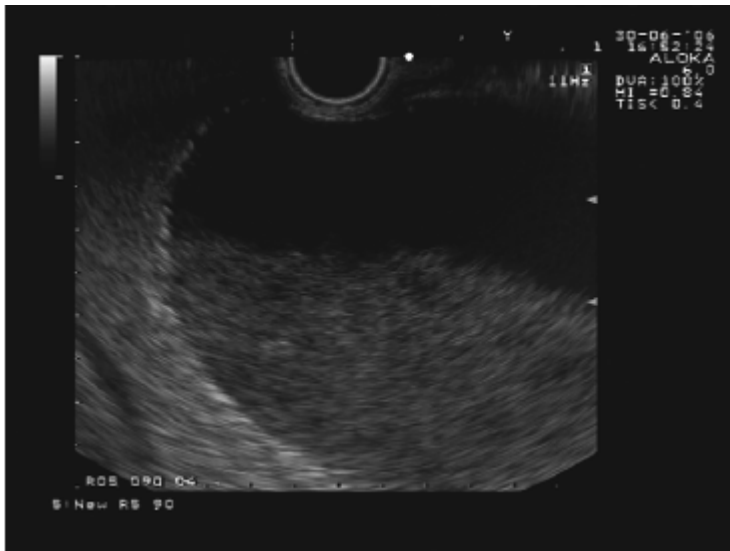
EST(-), Without EST ; EST(+), with EST.

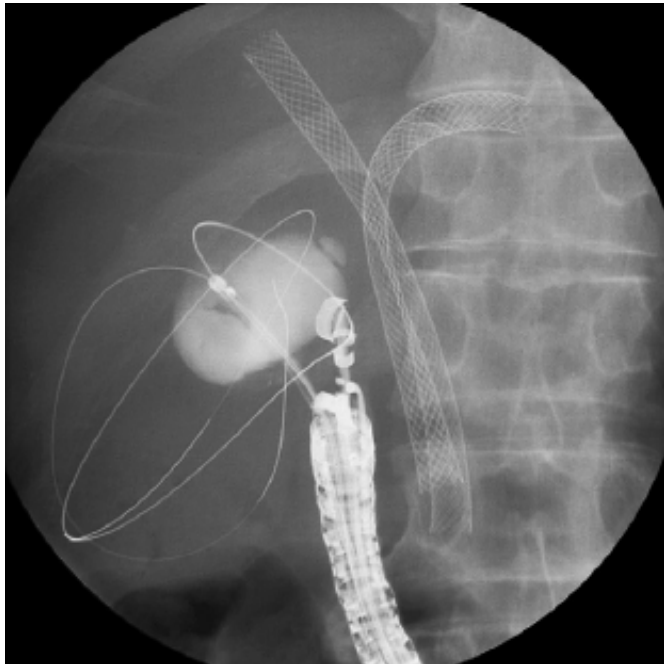
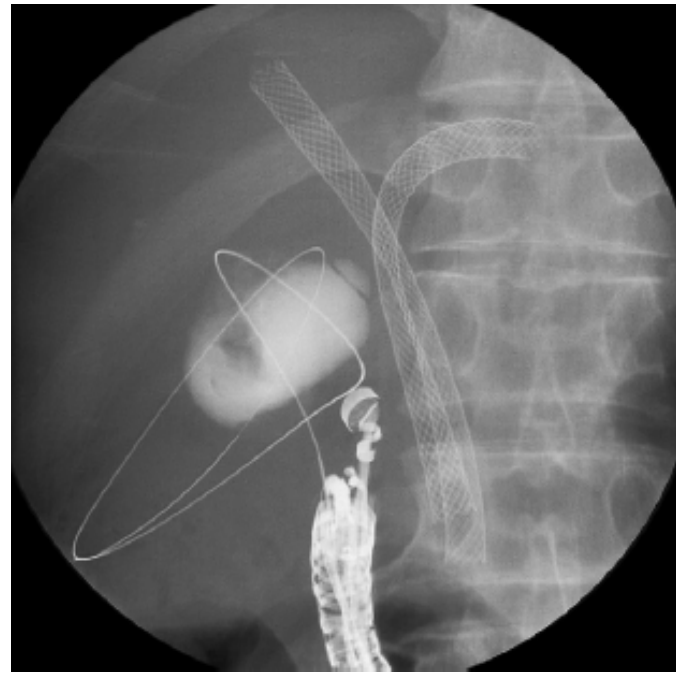
Cholangitis and ERCP: Risk factors

- Retrospective study (n=108) to predict mortality in patients undergoing urgent ERCP for acute cholangitis
- Multivariate analysis
 - Total bilirubin
 - PTT
 - Presence of a liver abscess

EUS-guided cholecystenterostomy

- Alternative method of gallbladder drainage in patients with cholecystitis and significant comorbidities
- Case series showing faisability



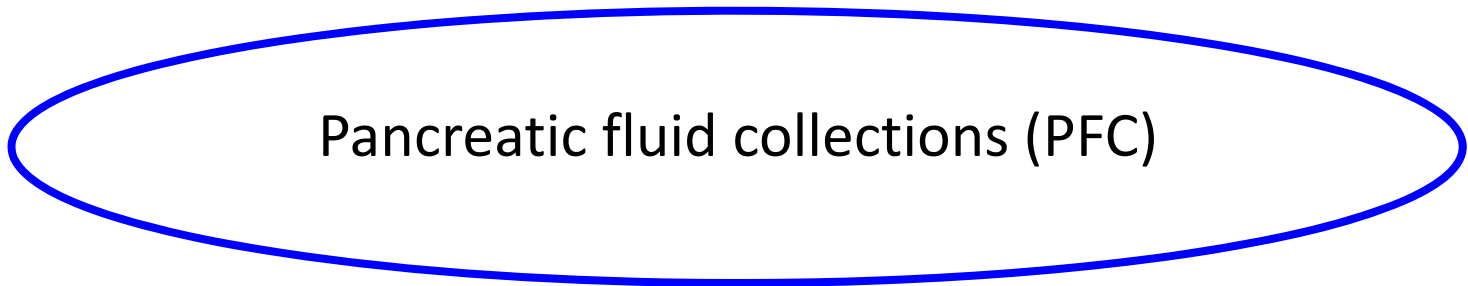


Kwan et al, Gastrointest Endosc 2007



Acute Pancreatitis

Chronic Pancreatitis



Pancreatic fluid collections (PFC)

48 H → Acute fluid collections (AFC)

48 H → Pancreatic necrosis

4-6 w → Pseudocysts

4-6 w → Abscess

4-6 w → Organized liquefied necrosis

→ Pseudocysts

AFC → Spontaneous regression

Pseudocysts → Spontaneous regression in 30-50%
→ Pain, adjacent organ compression



Abscess → Sepsis



Liquefied necrosis → Pain, adjacent organ compression
→ Sepsis



Endoscopic transmural drainage

Endoscopic transmural drainage

- Creating a communication between the stomach or the duodenum and the PFC
- EUS guidance
- Placement of a nasocystic catheter or stent (or both)
- Results
 - Technical success 82%-97%
 - Recurrence rate 9%-15%

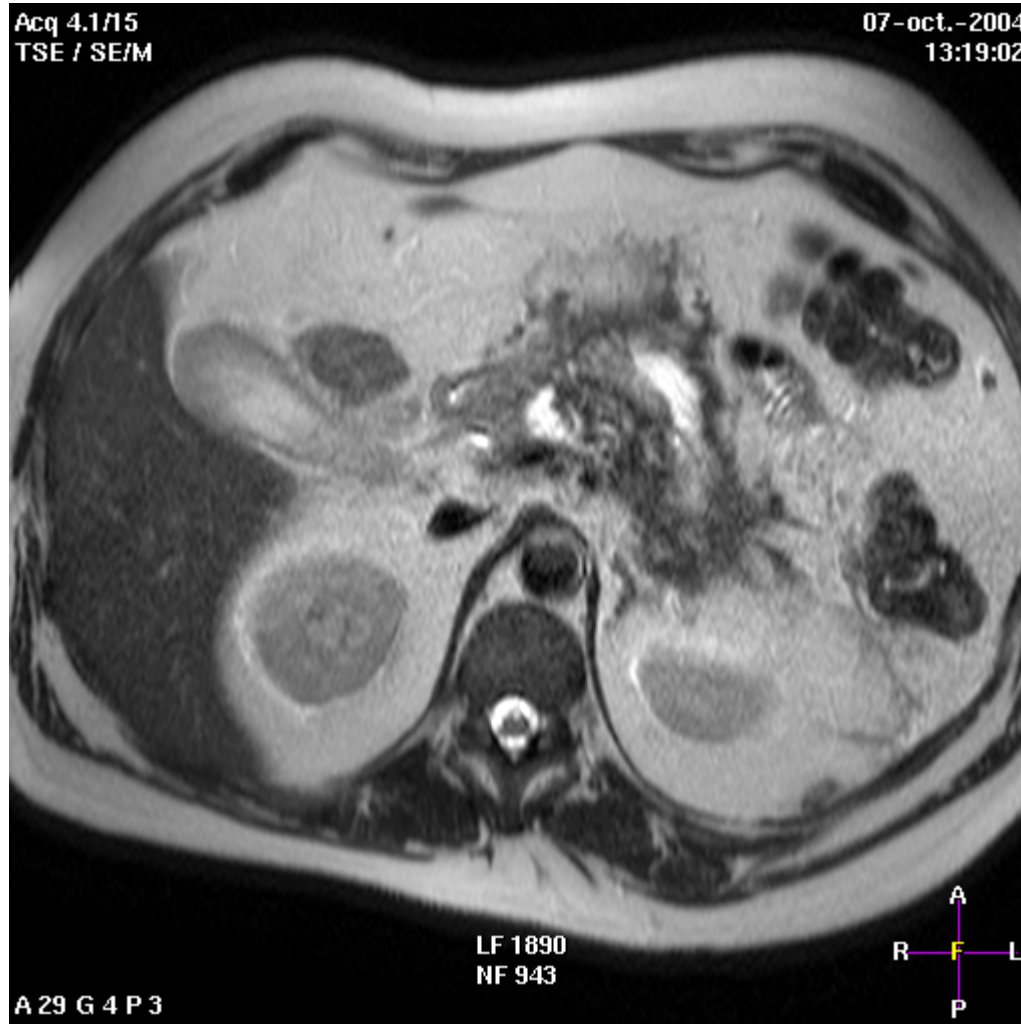
Baron et al, GIE 2002

Sanchez et al, GIE 2002

Cahen et al, Endoscopy 2005

Hookey et al, Gastrointest Endosc 2006

A 44 year-old man with severe AP, MPD rupture and PFC



T2 axial plane

Transmural drainage under EUS guidance by cystogastrostomy



PFC resolution after drainage



T2 axial plane

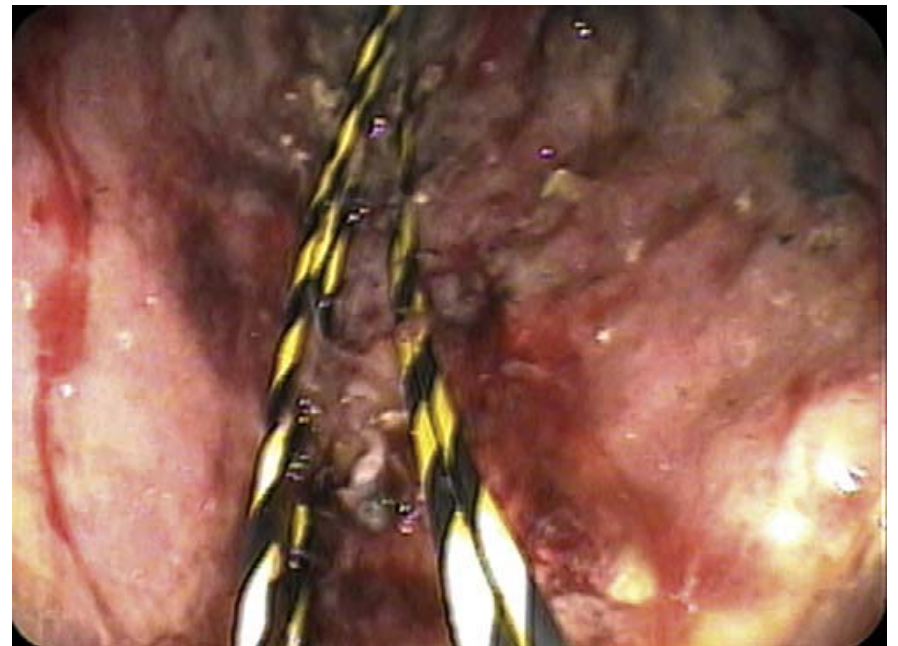
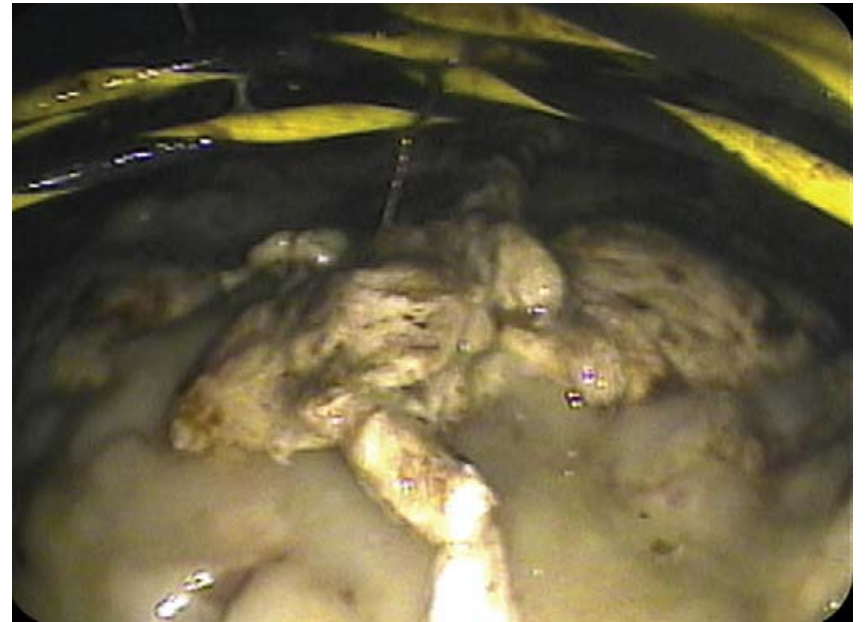
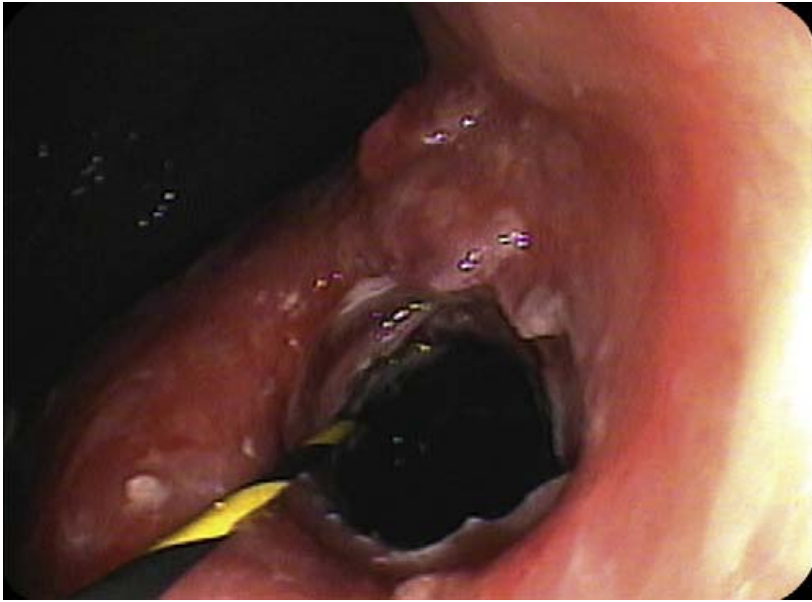
EUS-guided or not?

- Only one comparative study
- 53 consecutive patients with PFC → EUS-guided drainage if conventional drainage failed
- Results:
 - Conventional drainage failed in 43% (absence of luminal compression, bleeding, difficult scope positioning)
 - All failed patients were successfully drained with EUS

If available EUS-guided drainage should be preferred

Endoscopic necrosectomy

- Endoscopic transluminal retroperitoneal debridement for solid infected necrosis in severe acute pancreatitis
- NOTES application
- Technique
 - Access by EUS or endoscopic guidance
 - Insertion of 2 or more stents and irrigation catheters
 - Balloon dilation in the next session (15-20mm) to permit introduction of a gastroscope
 - Sessions of debris and necrotic material removal with snares, baskets...until viable structures were seen



Endoscopic necrosectomy

- Multicenter study with long term follow-up
- 93 patients
- SAP (30% alcoholic -46%biliary)
- Sepsis present in 71%
- Long term clinical success: 68%
- Recurrence: 10%
- Complication rate: 26%
 - Bleeding
 - Perforation of the necrosis in the abdominal cavity
 - Fistula formation
 - Air embolism
- Mortality: 7.5%

Conclusion

- Preventive antibiotics limited in selected indications
- No more prevention for patients with cardiac risk factors
- Endoscopic drainage plays an important role for treatment of infection
 - Biliary drainage
 - Pancreatic pseudocysts
 - Necrosectomy