

Management of Pancreatic Pseudocysts

C. Stefan Kénel-Pierre, MD

Kings County Hospital
Department of Surgery
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History

- 26M c PMHx of ETOH abuse, asthma
 - Admitted 5/12 for worsening abd pain, n/v x 3wks
 - No past surgical history
 - +Tobacco, marijuana use daily
- Prior admission KCH in 2/2012
 - Admitted to medical service for pancreatitis
 - Surgery not consulted
- Imaging 2/2012

Gantry: 0°

FoV: 389 mm

Time: ms

Slice: 5 mm

Pos: 160.5

FFS



F: B

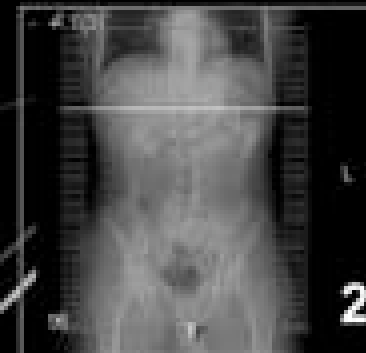
mA: 412

120 kV

Image no: 26

Image 26 of 96

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Laboratory Values

- CBC 10.3>17.7/55.1<441
- BMP 140/4.9/96/27/12/0.7<207
- LFTs 7.8/4.2/15/16/111/1.1
- Lactate 3.6
- Amylase 828 Lipase 775
- Ranson's Score (5/2012): 4

Contrast: CONTRAST

Gantry: 0°

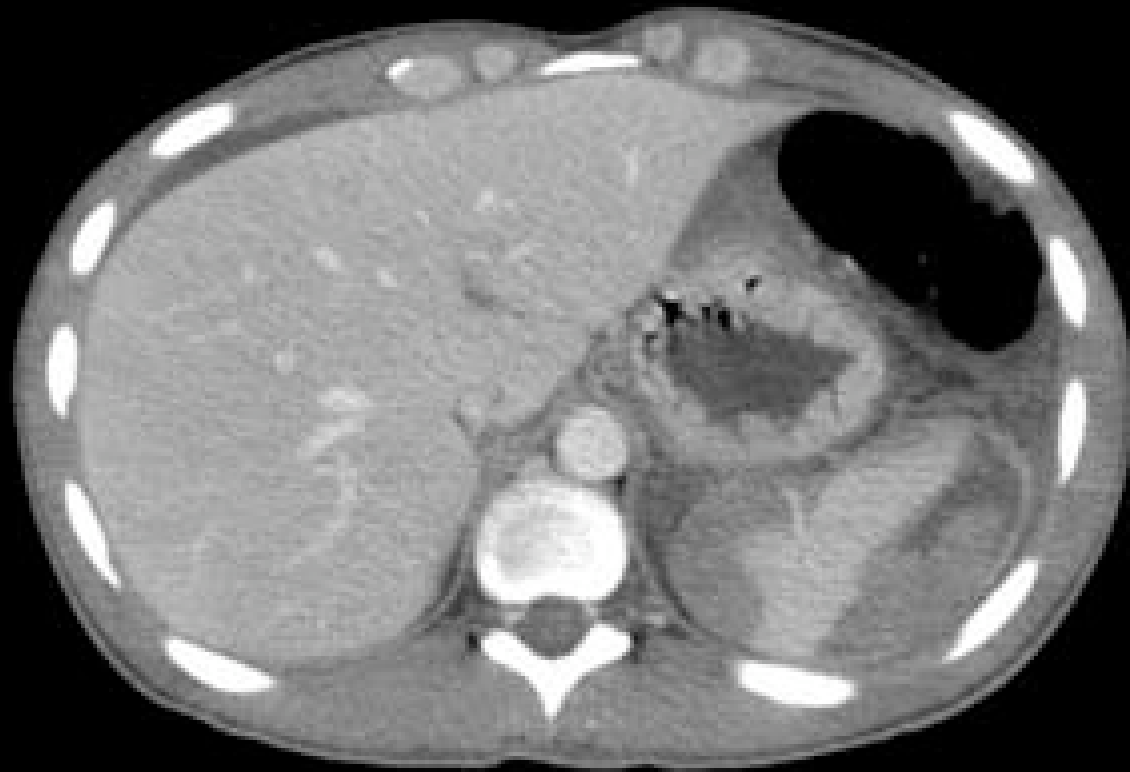
FoV: 375 mm

Time: ms

Slice: 5 mm

Pos: 44.4

FFS



F: B

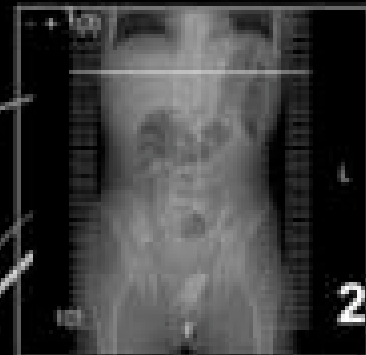
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120 kV

Image no: 20

Image 20 of 101

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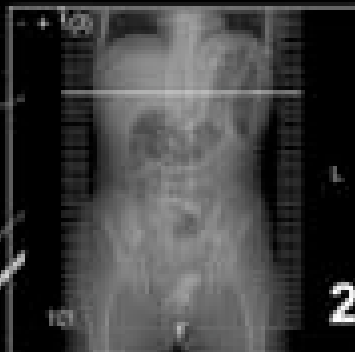


Gantry: 0°
FoV: 375 mm
Time: ms
Slice: 5 mm
Pos: 79.4
FFS



F: B
mA: 178
120 kV
Image no: 27
Image 27 of 101

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Hospital Course

- Admitted to SICU 5/17
- Aggressive resuscitation, NPO
- Nasojejunal tube placed for feeds 5/24
- MRCP to delineate anatomy:
 - Trilobulated pseudocyst 3.2 x 3.8 cm
 - Increase in size of perisplenic collection
 - Suspected direct communication

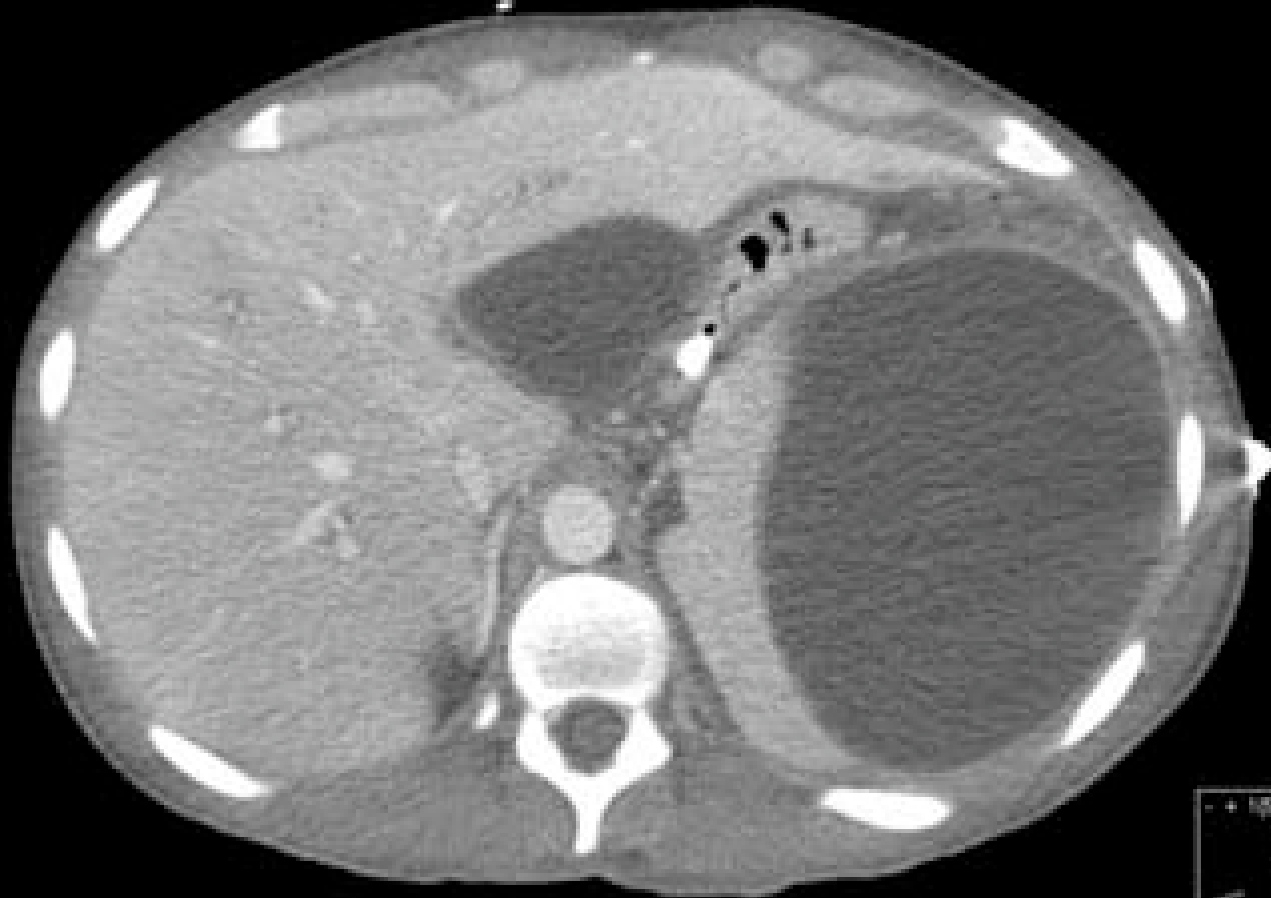
Hospital Course

- Return to SICU: recurrent pancreatitis, sepsis
- 5/29: CBC 24>11.6/34<313
- Lipase 3250 Amylase 3302
- Multidisciplinary Conference 5/31:
 - Octreotide, NPO
 - Repeat Imaging
 - Possible ERCP

Hospital Course

- 6/1: Fever 104.8; ABx, GNR in blood
 - Intermittent fevers not improving
 - Concern for secondary infection of pseudocyst
-
- IR consulted for sampling to rule out infection

Gantry: 0°
FoV: 354 mm
Time: ms
Slice: 5 mm
Pos: 253.4
FFS



F: B
mA: 211
120 kV
Image no: 19
Image 19 of 98

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Contrast:

Gantry: 0°

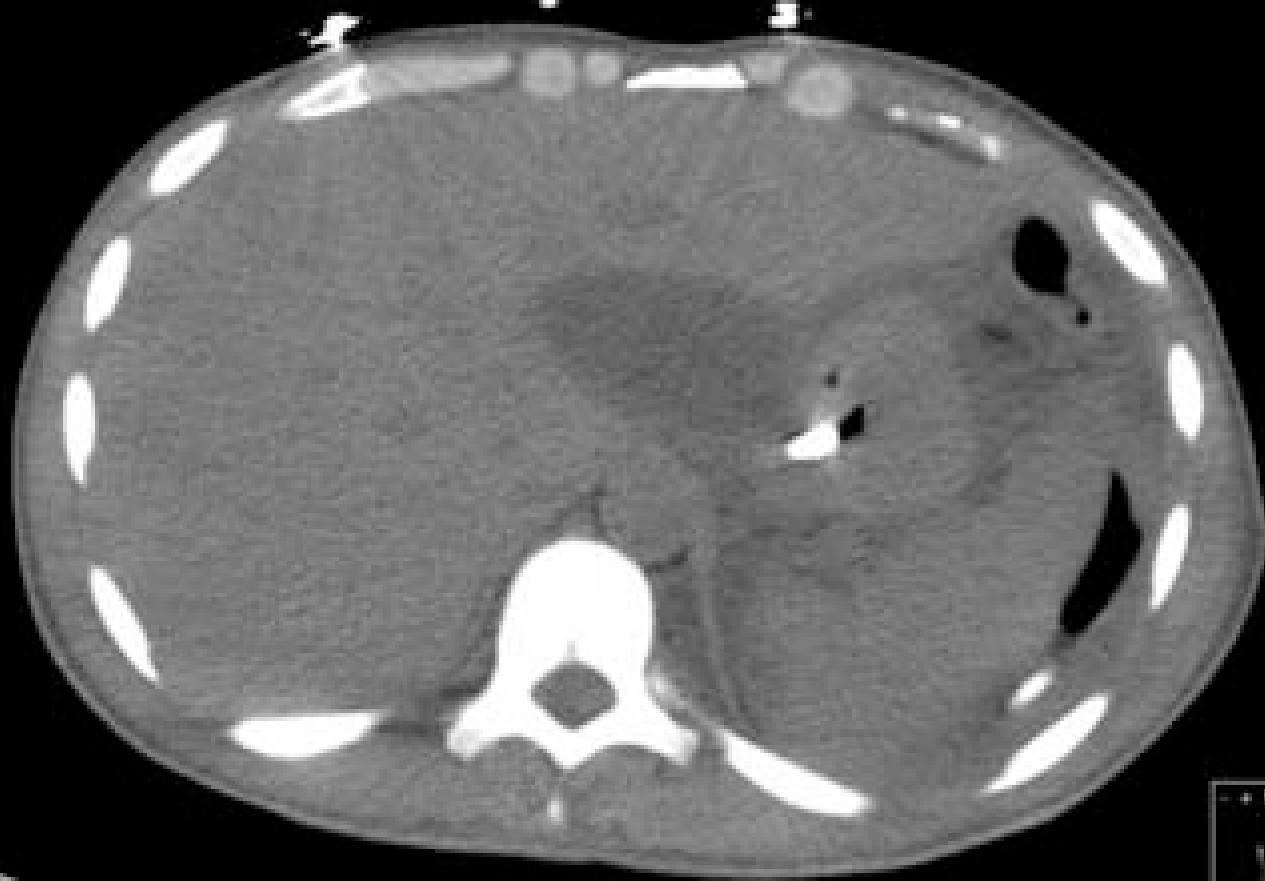
FoV: 343 mm

Time: ms

Slice: 5 mm

Pos: 132.7

FFS



F: B

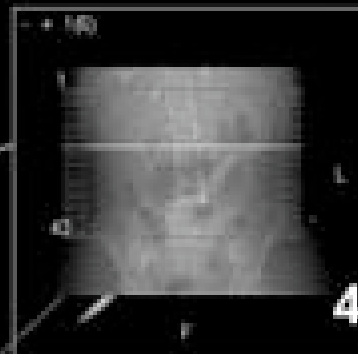
mA: 283

120 kV

Image no: 17

Image 17 of 48

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Hospital Course

- 1300mL of purulent fluid drained – *Klebsiella*
- Improved clinical status
- Repeat CT 6/16: re-accumulation of fluid
- GI recs outpatient ERCP/cystgastrostomy
- Discharged home 6/17

Hospital Course

- Returns 6/29 with abd pain, fever to 102
- 7/1: Transferred to SICU for worsening exam
- IR drainage of ruptured pseudocyst
- No improvement with IR drainage
- 7/4: Exploratory laparotomy/ext drainage
 - Unable to visualize anatomy
 - Sump drains placed

Gantry: 0

FoV: 479 mm

Time: 600 ms

Slice: 2.5 mm

Pos: -132.25

FFS



F: STANDARD

mA: 323

120 kV

Image no: 53

Image 53 of 132

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Hospital Course

- Tolerated procedure
- Postop complicated by *S. maltophilia* PNA
- Extubated POD#6, NJ tube feeds started
- Drains progressively removed
- Transferred to floor 7/17 with three drains

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QUESTIONS?

What is a Pseudocyst?

- Many fluid collections following pancreatitis
- Capsule of pseudocyst not lined by epithelium
- Atlanta Criteria 1992, *Bradley et al.*
 - Acute peripancreatic fluid collection
 - Pancreatic necrosis
 - Pancreatic Pseudocyst
 - Pancreatic Abscess

Revised Atlanta Criteria

- Acute Peripancreatic Fluid Collection
 - Fluid collections without definable wall
 - Common manifestation of acute pancreatitis
 - Seen in 30-50% of cases within 48h of disease
 - Majority located in lesser sac
 - Usually sterile
 - Most resolve spontaneously
 - Intervention if clinically suspect infection

Revised Atlanta Criteria

- Post Necrotic Pancreatic Fluid Collection
 - Containing fluid, necrosis +/- loculation
 - Associated with necrotizing pancreatitis

Revised Atlanta Criteria

- Pancreatic Pseudocyst
 - Fluid collection encapsulated by fibrous wall
 - Occuring >4 weeks after symptom onset
 - Most resolve spontaneously, particularly <4cm
 - Older indications for drainage:
 - size greater than 6cm
 - Symptomatic
 - Persistence beyond 6 weeks

Revised Atlanta Criteria

- Walled-Off Pancreatic Collection
 - Necrotic collection persisting beyond 4 weeks
 - May be infected or sterile
 - MRI, EUS may help identify solid component

Incidence of Pseudocysts

- Seen in 5% of patients with acute pancreatitis
- Up to 40% with chronic pancreatitis
- More common in alcoholic pancreatitis

Pathophysiology

- Occur secondary to ductal disruption
 - Acute Pancreatitis
 - Chronic Pancreatitis
 - Trauma
- Pancreatic duct injury may not always resolve
 - Pseudocysts +/- ductal communication

Why Not Treat All Pseudocysts?

- Up to 40% will resolve spontaneously
- Asymptomatic & smaller (<6 cm) pseudocysts
- First 6 weeks, follow by ultrasound
- Follow by CT at 3-6 month intervals

Indications for Drainage

- Overall size greater than 6cm
- Persistence over 6 weeks
- Infection
- Compression of major vessels/viscera
- Pancreaticopleural fistula
- Chronic pancreatitis with duct abnormalities

Techniques of Intervention

- Percutaneous drainage
- Endoscopic drainage
- Open surgical drainage
- Laparoscopic drainage

Pre-procedural Studies

- CT Abd/Pelv with thin cuts through pancreas
- ERCP
 - Need to delineate duct anatomy
 - 80% of pseudocysts have pancreatic duct stricture
- Rule out Neoplasm
 - IPMN
 - Cystic adenocarcinoma

Percutaneous Drainage

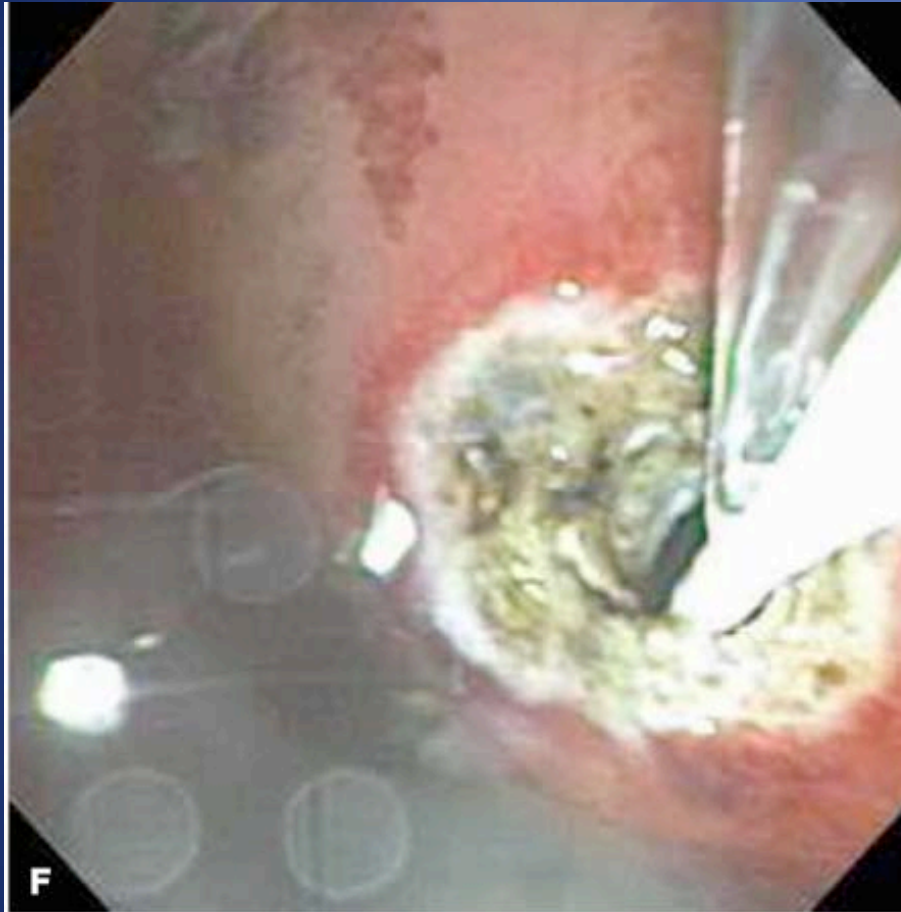
- Emergent treatment in infected pseudocysts
- High surgical risk patients
- Immature cysts
- Best in solitary pseudocyst
- Appropriate anatomy required
- *Risks secondary infection, fistula, recurrence*

Endoscopic Techniques

- Transmural approach
- Transpapillary approach
- Use of endoscopic ultrasound minimizes risks

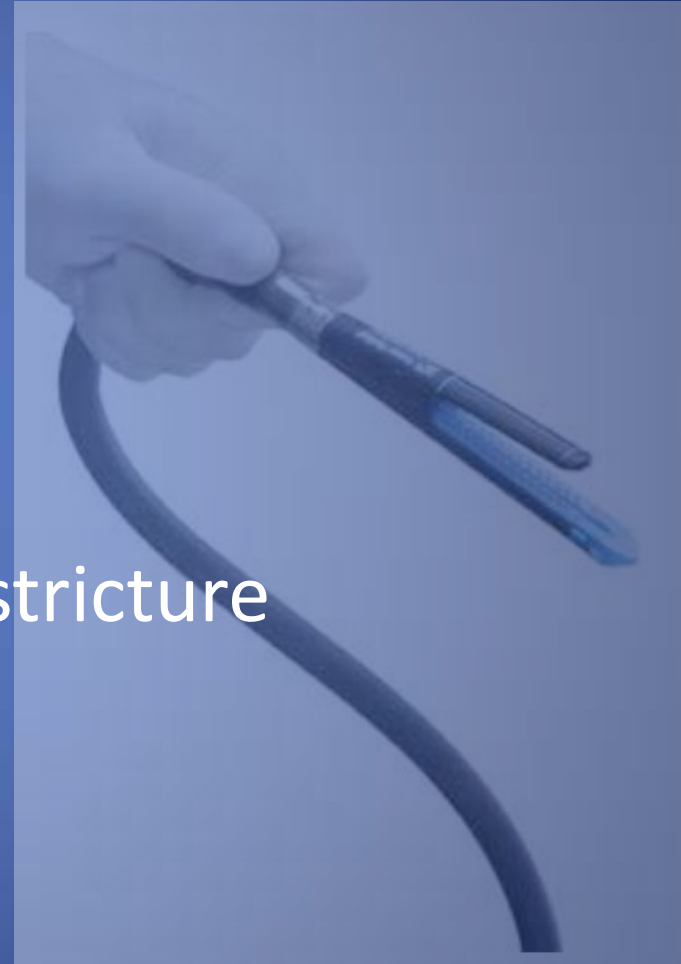
When compared to surgical techniques

- Less invasive, less expensive
- Lower risk of external pancreatic fistula



Guidelines for Endoscopy

- Well-developed cyst wall
- Pseudocyst Wall < 1 cm
- Nonacute pseudocyst
- Noninfected Pseudocyst
- Pancreatic ductal disruption/stricture





Complications

- Bleeding
- Perforation
- Infection of pseudocyst
- Post-procedure pancreatitis
- Recurrence of pseudocyst
- Stent migration/occlusion

Surgical Techniques

- Open drainage
 - “Gold standard”
 - Back-up management to endoscopy
 - Recurrent pseudocyst, CBD/duodenal stenosis
- Laparoscopic
 - Intragastric pseudocyst-gastrostomy
 - Anterior transgastric pseudocyst-gastrostomy
 - Lesser sac approach
 - Pseudocyst-jejunostomy

Intragastric Approach

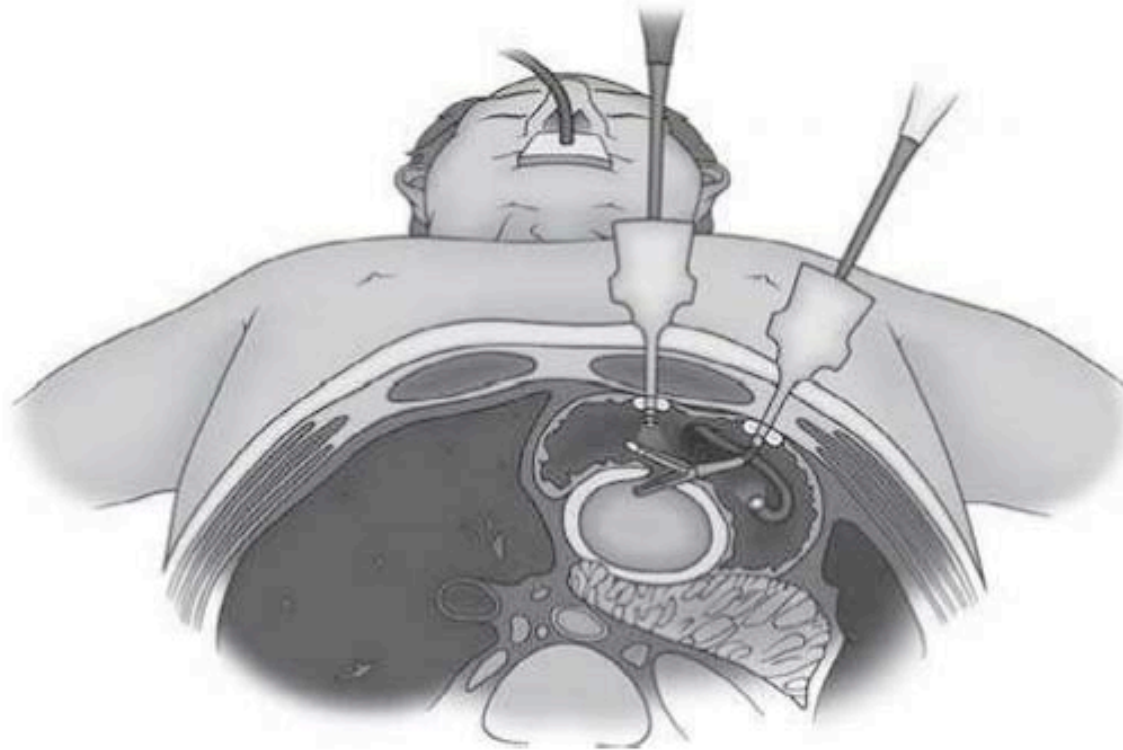


Fig. 6. Intragastric approach to pancreatic pseudocyst drainage. (From Rosen MJ, Heniford BT. Endoluminal gastric surgery: the modern era of minimally invasive surgery. *Surg Clin North Am* 2005 Oct; 85(5):989–1007.)

Open Surgical Options

- External Drainage
 - Free rupture; grossly infected
- Internal Drainage
 - Mature pseudocysts (>1cm)
 - Pancreatic duct stricture/leak
- Pancreatic/Pseudocyst Resection
 - Located body/tail with possible malignancy
 - Pancreatic pseudoaneurysms

So Many Options...

- Percutaneous
- Laparoscopy
- Endoscopy
- Open Surgery

Study

- Examines success rates of different modalities
 - Both primary and overall
- Retrospective study
- N = 83 patients
- March 1999 to August 2007

Table 1 Patient demographic data, etiology of pancreatitis, and pseudocyst size (nonsignificant difference)

	Endo	Lap	Open
No. of patients	45	16	22
Age (years)	51.8 \pm 1.9	46.5 \pm 3.6	52.0 \pm 3.8
M:F	1.4 \pm 1	1.7 \pm 1	1 \pm 1.2
BMI (kg/m ²)	27.4 \pm 1.1	29.2 \pm 1.8	28.6 \pm 1.5
Gallstone pancreatitis (%)	51.7	50.0	59.1
Pseudocyst size (cm)	9.1 \pm 0.4	10.4 \pm 0.5	9.5 \pm 0.8

Endo endoscopic pancreatic cystgastrostomy, *Lap* laparoscopic pancreatic cystgastrostomy, *BMI* body mass index

Table 2 Success rates for pancreatic cystgastrostomy by method

	Endo (n = 45) (%)	Lap (n = 16) (%)	Open (n = 22) (%)	p value
Primary success	35.5	87.5	81.2	<0.01
Overall success	84.6	93.8	90.0	NS

Endo endoscopic, *Lap* laparoscopic, *NS* nonsignificant difference

Conclusions

- Laparoscopic and Open Surgery are best
- Endoscopic intervention is an option
 - Particularly with repeat endoscopic drainage
- Future directions: Endoscopy and NOTES
- Need for further study; randomized CT

Summary

- Pseudocyst management is multidisciplinary
- Important to determine ductal relationship
- Observation is an option as most regress
- Imaging CT/EUS/MRI provides key information
- Must rule out neoplasm prior to intervention

Question 1

Which of the following is the most important determinant of the need for drainage of a pancreatic pseudocyst?

- a. Pseudocyst Symptoms
- b. Pseudocyst Size
- c. Pseudocyst Duration
- d. Associated Chronic Pancreatitis
- e. Patient Age

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Which of the following is the most important determinant of the need for drainage of a pancreatic pseudocyst?

a. Pseudocyst Symptoms

b. Pseudocyst Size

c. Pseudocyst Duration

d. Associated Chronic Pancreatitis

e. Patient Age

Question 2

Which of the following is an absolute contraindication to endoscopic drainage of the pancreatic pseudocyst?

- a. Pancreatic Ascites/Pleural Effusion
- b. Duodenal/Biliary Obstruction
- c. Fistula formation into adjacent viscera
- d. Pseudoaneurysm
- e. Spontaneous Infection

Question 2

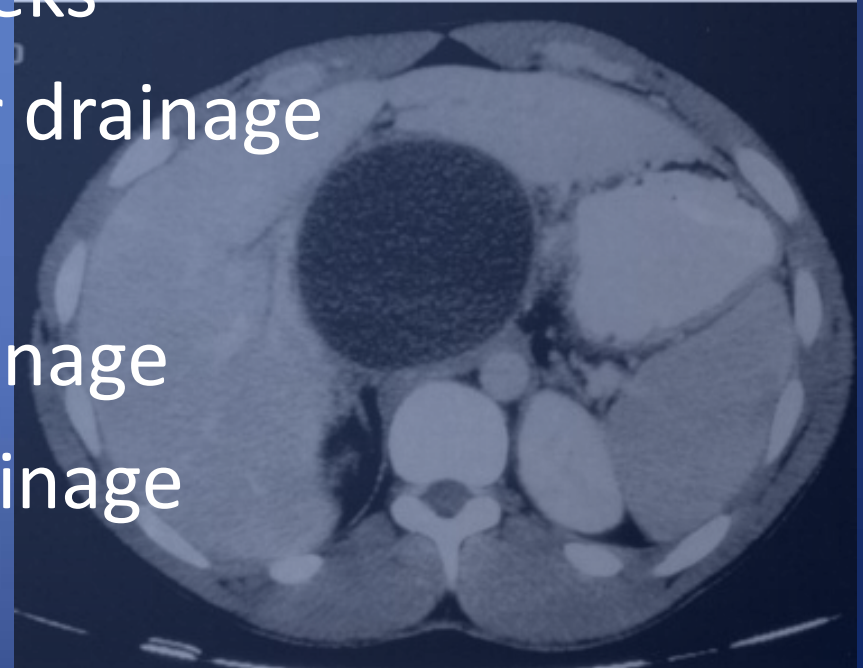
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Question 3

A patient with chronic pancreatitis is unable to eat because of persistent postprandial pain. CT is performed. What is the recommended treatment?

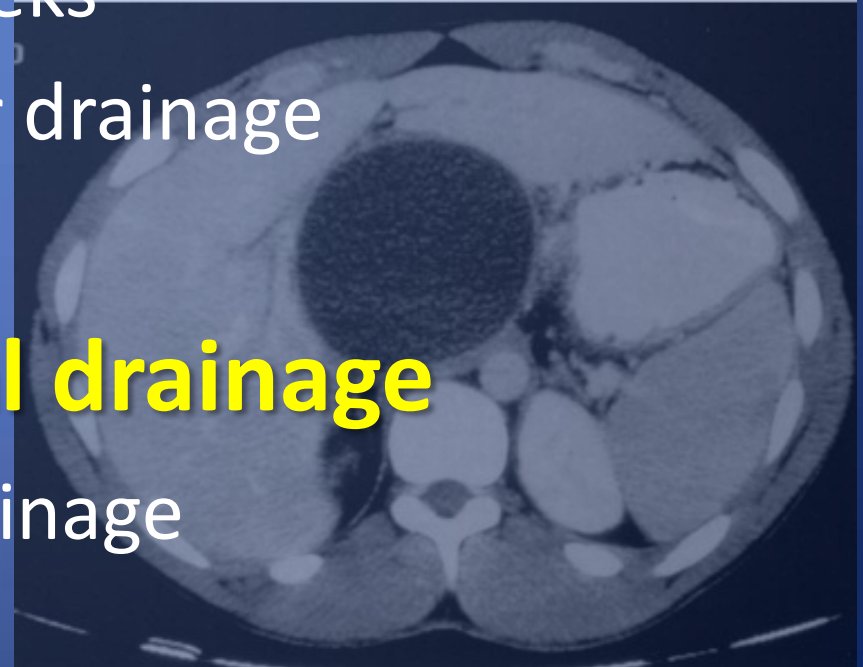
- a. Nothing by mouth and total parenteral nutrition for 4 to 6 weeks
- b. Percutaneous catheter drainage
- c. Endoscopic drainage
- d. Operative internal drainage
- e. Operative external drainage



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References

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