Pancreatitis Complications: Therapeutic Management

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- Introduction
- Types of Complications
- Management of Complications
- Interesting ERCP Cases

Chronic pancreatitis

- Inflammatory condition that results in permanent structural changes in the pancreas, which can lead to impairment of exocrine and endocrine function.
- Clinical Manifestations:
  - chronic abdominal pain
  - exocrine dysfunction
  - endocrine dysfunction

Types of Complications

- Most Common
  - Pseudocyst formation
  - Mechanical obstruction of the duodenum and common bile duct
- Less Common
  - Pancreatic ascites or pleural effusion
  - Splenic vein thrombosis with portal hypertension
  - Pseudoaneurysm formation, particularly of the splenic artery

PSEUDOCYSTS

- Fluid collection >4 weeks old and surrounded by a defined wall
- Occur in 10%
- Etiology:
  - Ductal disruptions rather than from peripancreatic fluid accumulations that occur in the setting of acute pancreatitis
  - Necrosis of peripancreatic tissue can progress to liquefaction with subsequent organization

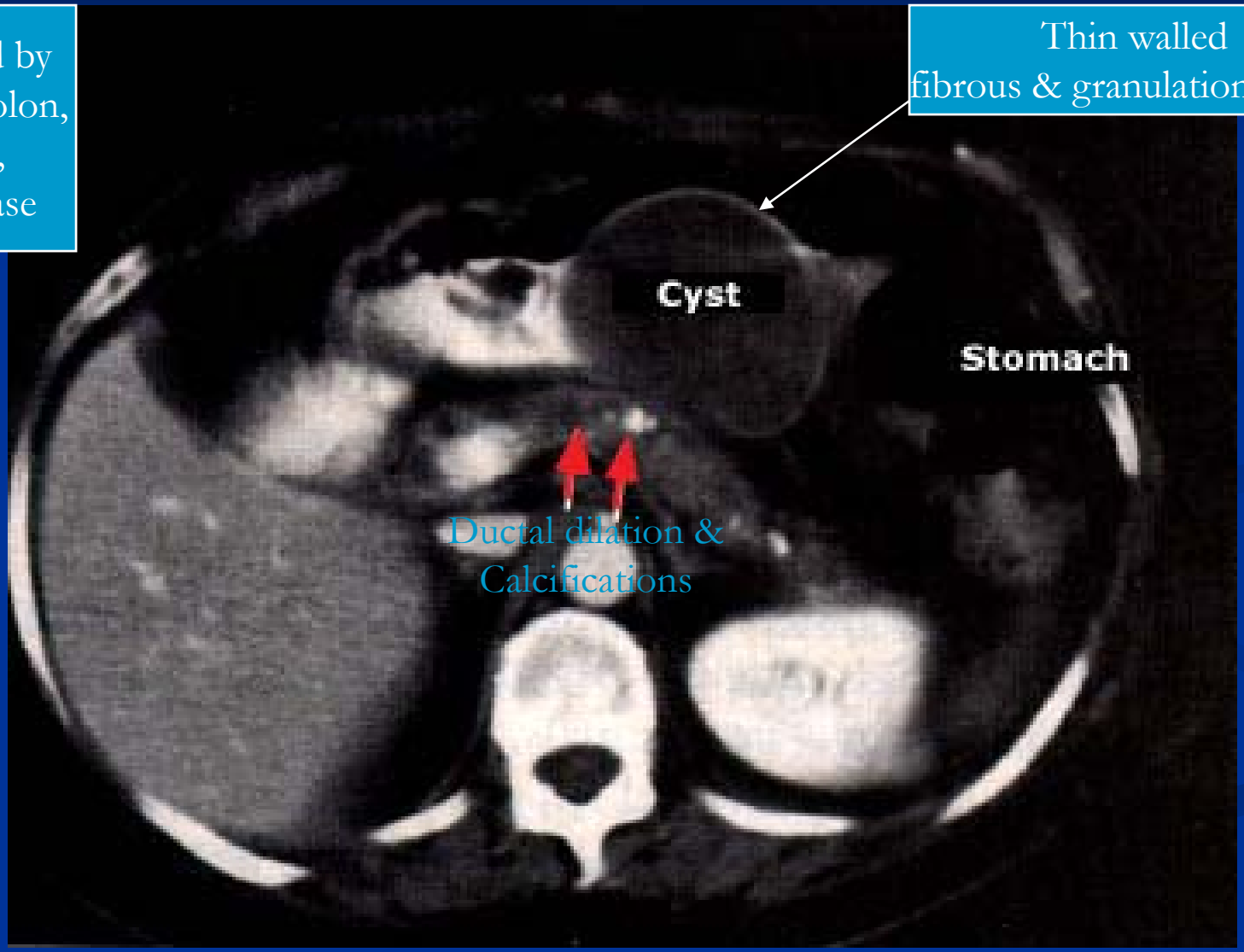
PSEUDOCYSTS

- Communicate with the pancreatic ductal system
- Contain high concentrations of digestive enzymes
- Types:
  - single or multiple
  - small or large
  - within or outside of the pancreas

PSEUDOCYSTS

Surrounded by transverse colon, stomach, & pancrease

Thin walled fibrous & granulation tissue



Lack of an epithelial lining distinguishes pseudocysts from true cystic lesions of the pancreas

COMPLICATIONS OF PSEUDOCYSTS

- Abdominal pain
- Duodenal or biliary obstruction
- Vascular occlusion
- Fistula formation into adjacent viscera, the pleural space, or pericardium
- Spontaneous infection with abscess formation
- Hemosuccus Pancreaticus
  - Digestion of an adjacent vessel can result in a pseudoaneurysm, which can produce a sudden expansion of the cyst or gastrointestinal bleeding due to bleeding into the pancreatic duct

DIAGNOSIS OF PSEUDOCYSTS

- Ultrasound
- CT scan
- Diagnosis is in question, it can be aspirated by EUS or CT-guidance
  - The amylase level in the cyst fluid will be elevated if there is communication with the pancreatic ductal system
    - However, an amylase level alone is not sufficient
    - It is also supported by the presence of pancreatic ascites or a pleural effusion that has a high amylase concentration (typically above 1000 IU/L)
- Differential Diagnosis: pancreatic cystic neoplasms

TREATMENT OF PSEUDOCYSTS

- Watchful waiting
- Radiological
  - Percutaneous catheter drainage
- Endoscopic
- Surgical

At present, no randomized comparative studies exist. Controversy exists concerning which techniques should be offered to the patient as initial therapy.

TREATMENT OF PSEUDOCYSTS

- Indications for endoscopic drainage
  - rapid enlargement
  - compression of surrounding structures
  - pain
  - signs of infection
- Size
  - It used to be thought that drainage was indicated if they become greater than 6 cm in diameter or persisted for more than six weeks.
  - Safely followed up to one year and up to 12 cm in size

Yeo, CJ, et al, Surg Gynecol Obstet 1990; 170:411.

ENDOSCOPIC DRAINAGE

- Preprocedural broad-spectrum prophylactic antibiotics
- Surgical backup
- Types:
  - Transmural puncture
  - Transpapillary stent placement

Mani, V, Cartwright, et al. Endoscopy 1997; 29:114.

Transmural Puncture

- Indications:
  - large, symptomatic pseudocysts
  - complete ductal obstruction, since transpapillary stent placement is not possible
- In the absence of an endoscopically visible bulge EUS can be used as a single-step method for pseudocyst drainage.

Transmural Puncture Procedure

- **Endoscopic needle localization** with a precurved biliary aspiration needle. 7 Fr catheter has a metal ball tip that contains a retractable needle which projects 8 mm when extended
- Side-viewing duodenoscope is maneuvered so that the puncture can be directed perpendicular to the area of maximal bulging
- Limited data suggest duodenal puncture is safer then gastric puncture

Howell, DA, et al. Gastrointest Endosc 1993; 39:693.

Transmural Puncture Procedure

- Following needle insertion, identification of the optimal site for puncture requires probing with repeated injection of small amounts of radio contrast.
  - If the pseudocyst lumen has not been entered, contrast will be seen extravasating into the wall or retroperitoneal space.
  - When free flow of contrast into the pseudocyst cavity is noted, aspirate to see whether clear fluid enters the catheter.

Transmural Puncture Procedure

- Bloody fluid: a pseudoaneurysm, or puncture of a blood vessel in the wall, unrecognized portal or splenic vein thrombosis, may be a varix.
- If bloody pseudocyst fluid is confirmed, consider EUS to assist in puncture localization and evaluate for the presence of perigastric varices.
  - EUS guided tattoo
    - particularly for lesions in the tail of the pancreas
    - Disadvantage of the EUS scope is the oblique view compared to the side-view of the duodenoscope

Transmural Puncture Procedure

- Needle-knife with blended cut on the bulge creates the cystenterostomy
- Subsequent placement of a 450 cm long flexible guidewire through the remaining 5 Fr catheter
  - hydrophilic angled wire, minimize the potential for perforation of the opposite wall
    - (Tracer Metro, Wilson-Cook, Jagwire, or Boston Scientific)

Transmural Puncture Procedure

- The 5 Fr catheter is exchanged over the guidewire for an 8 mm or 10 mm hydrostatic balloon (Maxforce, Microvasive, or Quantum, Wilson-Cook) to dilate the cystenterostomy.
- Two or more 10 Fr, double-pigtailed soft stents, (Hobbs) using a guide catheter and pusher tube system.

Transmural Puncture Procedure

- Seldinger technique
- Involved the use of a 19 or 18 gauge needle to perform cyst puncture
- 18 gauge needle permitted threading of a 0.035 inch guidewire into the cavity in a one-step procedure
- 19 gauge needle permitted threading of a 0.018 inch guidewire followed by exchange for a 5 Fr catheter through which the 0.035 inch guidewire is threaded
- Tract dilation with an 8 mm balloon preceded stent placement

Transmural Puncture Procedure

- The Seldinger technique and the needle-knife technique had comparable rates of success
- Seldinger technique trend toward lower complications of bleeding and perforation (16 versus 7 percent)
- Needle-Wire Oasis System (Cook Endoscopy, Inc)
  - alternative technique
  - one-step drainage procedure
  - disadvantage is uses straight stents

Fockens, et al. Gastrointest Endosc 1997; 46:412.

Transmural Puncture Procedure

- CT scan or follow-up EUS in four to six weeks and, if there is complete collapse, the stents are removed
- Pseudocysts have not resolved in four to six weeks
  - Repeat dilation and stent replacement in an attempt to achieve complete pseudocyst collapse and drainage

Transmural Puncture Procedure

- If the retrieved fluid is turbid, contains debris, or if the patient has known pancreatic necrosis
  - Dilation to extend the cystenterostomy, allowing placement of up to four stents
  - Placement of a 7 or 8.5 Fr nasobiliary drain permits pseudocyst lavage with sterile normal saline.
  - Necrosis persists, diligent endoscopic lavage and necrosectomy is required to achieve resolution
  - require multiple endoscopic sessions

Transpapillary Stent Placement

- Indications:
  - relatively small pseudocysts in communication with the main pancreatic duct
- Reduces the incidence of bleeding
- Increased risk of infection

Transpapillary Stent Placement

- Biliary sphincterotomy
  - perform to avoid the theoretical risk of transient biliary obstruction due to pancreatic sphincterotomy
- Deep entry into the pancreatic duct is achieved with a hydrophilic guidewire maneuvered either into the pseudocyst or across the leak toward the pancreatic tail

Transpapillary Stent Placement

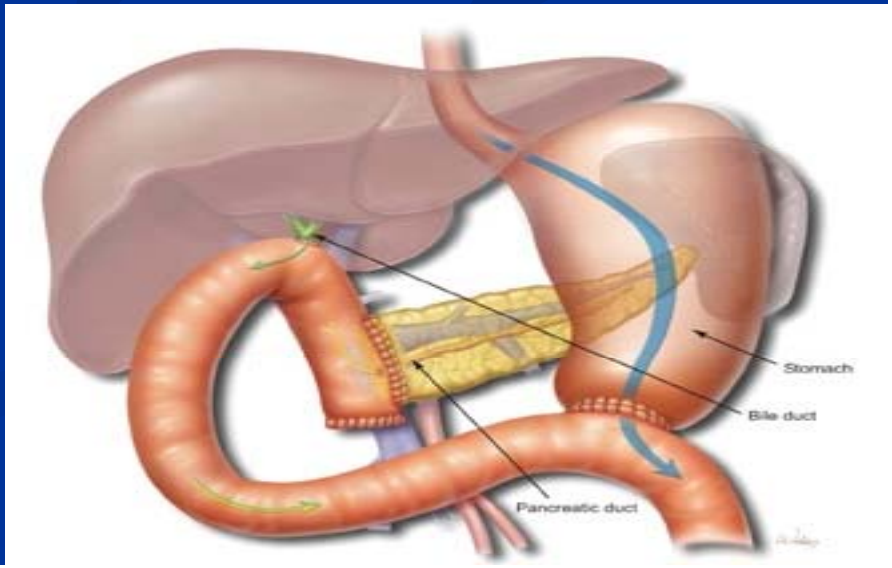
- Pancreatic sphincterotomy
  - cut to a length of 5 to 10 mm
- Dilation with either a hard plastic dilator or hydrostatic balloon
- Stent placement (7F or 8.5F)
  - The stent is removed after pseudocyst resolution is achieved; however, it is important to address pancreatic ductal obstruction caused by strictures or stones to reduce pseudocyst recurrence.

SURGICAL DRAINAGE OF PSEUDOCYSTS

- Gold standard of pancreatic pseudocyst management
- Pseudocysts that persisted beyond six weeks rarely resolved and had a complication rate of nearly 50 percent during continued observation
- >13 weeks, no further resolution seen
  - complication rates rise higher
- Operative intervention is recommended following an observation period of six weeks to ensure that spontaneous resolution did not occur and to allow time for the pseudocyst wall to mature
  - This permits direct suturing of a cystenterostomy
  - Approach has received wide surgical acceptance

SURGICAL DRAINAGE OF PSEUDOCYSTS

- Cystgastrostomy, cystenterostomy (direct drainage or via a Roux limb), or resection
  - substantial morbidity and mortality
- Cystjejunostomy
  - Pancreatic pseudocysts that are not in close proximity to the stomach
- Laparoscopically



BILE DUCT OR DUODENAL OBSTRUCTION

- Seen in patients with dilated pancreatic ducts; they are due to either inflammation and fibrosis in the head of the pancreas or to a pseudocyst
- Bile Duct Obstruction or Stricture
  - pain
  - abnormal liver function tests (including hyperbilirubinemia)
- Duodenal obstruction
  - Postprandial pain
  - early satiety

TREATMENT OF BILE DUCT OR DUODENAL OBSTRUCTION

- Endoscopic Drainage of Cyst
- Endoscopic biliary stenting benign bile duct strictures
  - requires several stent changes
  - importance of decompression is underscored by the observation that it can reverse secondary biliary fibrosis associated with bile duct obstruction
- Surgical
  - gastrojejunostomy
  - choledochoenterostomy

PANCREATIC ASCITES AND PLEURAL EFFUSION

- Occurs following disruption of the pancreatic duct, leading to fistula formation in the abdomen or chest, or rupture of a pseudocyst with tracking of pancreatic juice into the peritoneal cavity or pleural space
- Diagnosis: Analysis of fluid obtained at paracentesis or thoracentesis.
  - amylase concentration in the fluid is very high, typically >1000 IU/L

TREATMENT OF PANCREATIC ASCITES AND PLEURAL EFFUSION

- Nonoperative therapies
  - repeated aspiration
  - diuretics
  - octreotride (a long-acting somatostatin analogue)
  - parenteral nutrition to decrease pancreatic secretion
- If ductal disruption is present, endoscopically-placed stents are effective in the short-term.

SPLENIC VEIN THROMBOSIS

- Inflammation of the splenic vein that courses along the posterior surface of the pancreas leading to thrombosis
- Gastric varices as a result of associated portal hypertension
- Splenectomy is usually curative for patients who develop bleeding from gastric varices

PSEUDOANEURYSMS

- Rare complication
- Affected vessels are in close proximity to the pancreas, including the splenic, hepatic, gastroduodenal, and pancreaticoduodenal arteries

DIAGNOSIS & TREATMENT OF PSEUDOANEURYSMS

- Diagnosis
  - CT scan (with and without contrast)
  - MRI
  - Doppler ultrasound can show blood flow within the pseudoaneurysm
  - Mesenteric angiography
- Treatment
  - Embolization

INTERESTING ERCP CASES

45 y/o WM s/p OLT for NASH Cirrhosis, presents with RUQ pain and fevers.

68 y/o WM with pancreatic head mass with obstructive jaundice.

24 y/o WM s/p OLT for AIH.

42 y/o WF with abdominal pain.