Clinical-Radiologic-Pathologic Conference

"Bubbles in the belly"

Conference Objective

- Discuss and correlate pertinent findings in the history and physical examination
- Correlate clinical history with the patient's CT scan findings

Clinical Scenario: History

- 50 year old man
- Most pressing problem: inability to pass gas

Clinical Scenario: History

- For 8 months, the caliber of his stools was decreasing, he was constipated, with loss of appetite and is losing weight.
- No abdominal pain
- No melena or hematochezia
- No diarrhea
- 3 years ago, he had an exploratory laparotomy for a probable mucinous cystadenoma

CAN'T PASS GAS

MECHANICAL OBSTRUCTION

- esophagogastric
- intestinal
  - intraluminal
    - neoplastic
    - non-neoplastic
  - extraluminal
    - neoplastic
    - non-neoplastic

METABOLIC, FUNCTIONAL

-systemic diseases

-inflammatory process

-electrolyte imbalance

-elderly

CAN'T PASS GAS

MECHANICAL OBSTRUCTION

- esophagogastric
- intestinal
  - intraluminal
    - neoplastic
    - non-neoplastic
  - extraluminal
    - neoplastic
    - non-neoplastic

METABOLIC,FUNCTIONAL

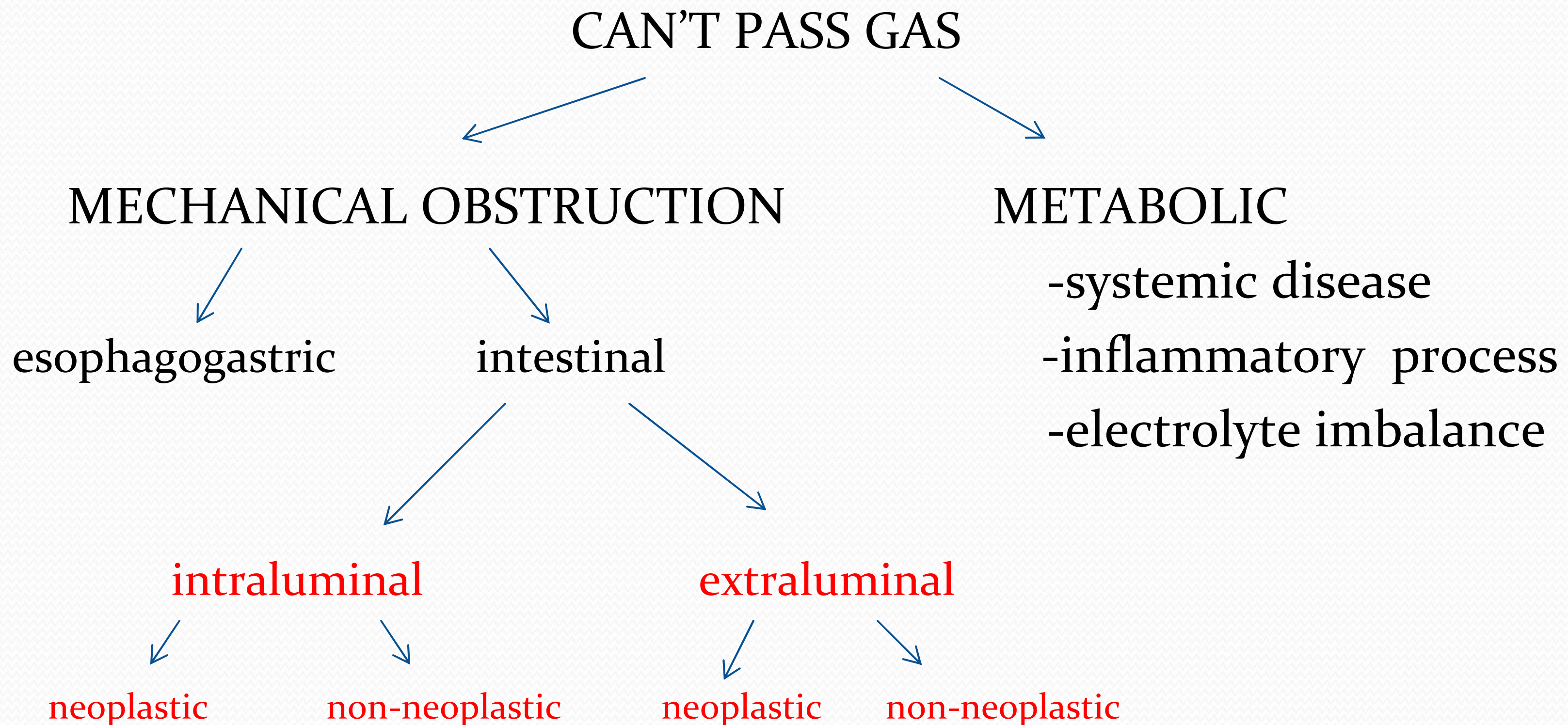
-systemic disease

-inflammatory process

-electrolyte imbalance

-elderly

Clinical Scenario



Anatomic Considerations

- Main structures in the abdominal cavity:
  - Peritoneum-composed of a layer of mesothelial cells covering a layer of connective tissue.

    -the parietal peritoneum covers the abdominal wall and the visceral peritoneum covers the bowel surfaces.

    -In non-pathologic states, the peritoneal cavity contains only small amount of fluid

Anatomic Considerations

- Main structures in the abdominal cavity:
  - Omentum-are also folds of peritoneum.

    - The greater omentum drapes inferiorly from the stomach and duodenum, covering the small bowel anteriorly to merge with the transverse mesocolon.

    - It contains variable amounts of fat and serves to limit the spread of infectious diseases

    - the lesser omentum connects also the stomach and small intestine to the liver and contains blood vessels, nerves and lymph nodes

Anatomic Considerations

- Main structures in the abdominal cavity
  - Mesentery-fanshaped, double peritoneal fold that suspends the ileum and jejunum
    -it contains blood vessels, nerves, lymphatic vessels and lymph nodes
  - Liver
  - Spleen
  - Stomach
  - Small intestines
  - Large intestines
  - Pancreas
  - Urinary bladder

Non-neoplastic

INFECTIOUS/INFLAMMATORY

- Intraperitoneal infections generally arise when the normal anatomic barrier is disrupted
  - Acute or chronic inflammation in the abdominal cavity can cause disruption of GI motility
  - Inciting events: ruptured appendicitis, ruptured ulcer, diverticulitis, weakened bowel wall from ischemia, tumor or inflammatory bowel disease, pancreatitis
  - Presents with acute signs of inflammation like fever, abdominal pain; if left untreated can lead to abcess formation
  - No inciting event-spontaneous bacterial peritonitis, common in liver cirrhosis

Non-neoplastic

- Tuberculous infections may have less acute signs and symptoms but patients generally have known pulmonary tuberculosis (~40% have known PTB)
- Intraabdominal tuberculosis may cause complex, loculated, fluid collection

2. Pseudocysts- following an attack of pancreatitis
3. Hematomas-no history of trauma
4. Post-op adhesions

- Patient:
  - Hx of surgery three years ago
  - No known recent inciting event
  - No history of trauma
  - No signs and symptoms of inflammation like fever and abdominal pain
  - No known PTB
  - Doesn’t seem to be immunocompromised as seen in cirrhotics, alcoholics and IV drug users

Neoplastic

- Solid or cystic

Neoplastic

Peritoneum	Patient
1. Primary-peritoneal mesothelioma -middle aged men, asbestos exposure, vague abdominal pain, aggressive, extremely poor prognosis (death in a year from presentation) 2. Secondary –tumor metastasis from another site /peritoneal carcinomatosis, usually from colon and stomach -nodular implants can form plaques and caking	-no asbestos exposure, no abdominal discomfort ; 8 months since start of recent symptoms, on presentation would have a full blown disease with more florid signs and symptoms of wide spread disease

Neoplastic

Omentum and Mesentery	Patient
1. Primary – rare, 70% benign mesenchymal: leiomyomas, lipomas, neurofibromas -usually are localized and remain so for long periods if tumor is low grade, may arise near bowels loops and cause intestinal obstruction -usually circumscribed, solitary 2. Secondary –metastasis and lymphomas are more often seen than primary tumors	-rare, but possible -lymphomatous involvement of the mesentery often seen with known case of NHL

Neoplastic

Intraabdominal organs	Patient
Malignant tumors	
-CA of the liver and pancreas behave aggresively and do not really present with chronic intestinal obstructive symptoms,; severe or vague abdominal pain is more common and jaundice may be seen in advanced stage	-no jaundice, abdominal pain, s/sx of gastric outlet obstruction
-gastric CA will often present with gastric outlet obstruction and bleeding from the tumor	
-colonrectal CA: constipation or diarrhea, decreased caliber of stools, weight loss and anorexia, abdominal pain and hematochezia	-present in patient except for diarrhea, abdominal pain and hematochezia

Neoplastic

Omentum/Mesentery	Patient
1. Cystic lymphangiomas-benign cystic tumors in the mesentery, it is a congenital malformation of lymphatic vessels, more common in men, can grow very large and cause intestinal obstruction	-very rare
2. Cystic teratomas-benign tumors that contain elements from the three germ cell layers	-generally a disease of females, pediatric patients

Neoplastic-cystic masses

Peritoneum	Patient
1. Primary-cystic mesothelioma -rare and benign -not asbestos associated -unilocular or multilocular -no metastic potential but can recur (27-50%)	-a disease almost exclusively of women -presents with abdominal pain
2. Secondary-pseudomyxoma peritonei -mucinous material seen as peritoneal seedings may occur due to rupture of cystadenoma or cystadenocarcinoma most commonly from the appendix -–can become loculated forming cystic masses, insinuates in between organs causing gradual abdominal distension and compression of bowel loops	-Positive history of surgery for mucinous cystadenoma manifesting as increased abdominal girth and multiple abdominal masses

- recap

Clinical Scenario:

Physical Examination

- Inspection: An asthenic man with a distended abdomen
- Auscultation: Normal bowel sounds

Clinical Scenario

- Symmetrical abdominal distention are usually seen in obesity, free fluid or gas

- Asymmetrical distention may result from hernias, solid or cystic tumors, enlarged abdominal organs or loculated fluid

Clinical Scenario

- Palpation:

  There is a palpable mass which is soft, non tender and irregular in shape from the hypogastrium to the pelvic area

Clinical Scenario

palpable abdominal mass

solid

-are usually firm or hard
seen with tumors, enlarged
organs

cystic

-true cysts or tumors, pseudocysts
and loculated fluid are usually soft
and irregular

Clinical Scenario

- DIFFERENTIALS FOR SOFT, NON-TENDER, IRREGULARLY-SHAPED INTRAABDOMINAL MASSES:
  1. Cystic lymphangiomas
  2. Cystic mesotheliomas
  3. Cystic teratomas
  4. Mucinous cystadenomas
  5. Mucinous cystadenocarcinomas
  6. Loculated fluid or ascites – pseudomyxoma peritonei

Clinical Scenario

- DIFFERENTIALS FOR SOFT, NON-TENDER, IRREGULARLY-SHAPED INTRAABDOMINAL MASSES:
  1. Hernias
  2. Tuberculous lesions with cystic component

Summary of Clinical Findings

- Symptomatology- 8 months of intestinal obstruction without signs of direct mucosal damage and obvious discomfort like abdominal pain even when he “failed to pass gas” for one week
- Physical exam-asthenic, not in distress or in pain, abdomen distended with a soft, non tender, irregular shaped mass occupying almost the entire abdominal cavity
- Prior history of explore lap for mucinous cystadenoma

- NATURAL HISTORY AND CLINICAL BEHAVIOR OF MUCINOUS CYSTADENOMAS
  - These are benign, cystic tumors
  - The most common site for both males and females is the appendix (63%)
  - They can also originate from the pancreas or GI tract
  - Uncommon

Mucinous Cystadenoma

- Age: 18-87 years old, majority (70%) are above 45 years old
- Gender: Female predominance (68% vs 32%)

Higa et al, Cancer, 1973
46 cases of mucinous cystadenomas

Mucinous Cystadenocarcinomas

- Histologically, mucinous cystadenoma have a malignant counterpart – mucinous cystadenocarcinoma
- Malignant but low grade

Pingpank et al, Principles of Cancer

Mucinous cystadenomas and Mucinous Cystadenocarcinomas

- Very difficult to distinguish clinically, grossly or radiographically

Mucinous cystadenomas and Mucinous cystadenocarcinomas

cystic tumors are formed due to obstruction of the appendicular lumen

slow progressive growth and dilatation with continued mucin production

may eventually rupture (pressure-burst phenomenon)

release of mucin in the intraperitoneal cavity adhering to intraabdominal organs and structures

Pseudomyxoma peritonei

- 50% will have malignant cells on cytologic examination (meaning they come from a ruptured mucinous cystadenocarcinoma)
- This mucinous material are minimally invasive and would layer rather than penetrate tissues.
- Slow, progressive accumulation

Pseudomyxoma peritonei

- Ronnet et al (De Vita): 65 patients treated with maximum debulking followed with intraperitoneal and systemic chemotherapy
- Van Ruth et al (De Vita): 62 patients treated with debulking and hyperthermic intraperitoneal and systemic chemotherapy

Pseudomyxoma peritonei

- General conclusions of the authors:
  - Aggressive surgical debulking is the primary treatment and completeness of the surgery influences outcome, risk of recurrence is high with residual disease
  - Chemotherapy has no clear benefit
  - Even if present, whether positive or negative for malignant cells, lymphnode involvement or liver metastasis is usually absent

Pseudomyxoma peritonei

- The clinical course is unpredictable
- Follow up of up to 18 years from initial surgery were reported
- Survival can be long but clinical course is characterized by multiple recurrences and re –accumulation and therefore multiple laparotomies are often necessary
- Symptoms of recurrence or re-accumulation are abdominal distention, intestinal obstruction, weight loss and loss of appetite
- Mortality and morbidity are due to physiologic effects of the volume of the mucinous material, malnutrition and complications of mutiple surgeries

Typical CT Findings

- Intraperitoneal tumor collections appearing like multiloculated cystic masses that have low attenuation on CT, sometimes confused with free ascitic fluid
- Presence of septations that enhance with contrast administration and a scalloped hepatic margins will help distinguish these
- May rarely calcify

Patient’s CT scan findings

- Multiple, septated fluid collections in the abdominopelvic cavity.
- Septations show enhancement after contrast administration
- These cystic lesions exert mass effect on the interspersed gastrointestinal tract
- No enlarged lymph nodes

Conclusion

- The slow and seemingly compensated intestinal obstruction in a 50 year old adult male, with a previous history of surgery 3 years ago for mucinous cystadenoma, probably of the appendix, presenting with abdominal distension and a soft, non tender, irregularly shaped mass and with findings of multiloculated fluid collections with septations on CT scan

Clinico-Radiologic Diagnosis

- Recurrent pseudomyxoma peritonei probably from mucinous cystadenoma versus mucinous cystadenocarcinoma , s/p debulking
- Intestinal obstruction, secondary
- Malnutrition

Thank You