THE ACUTE ABDOMEN

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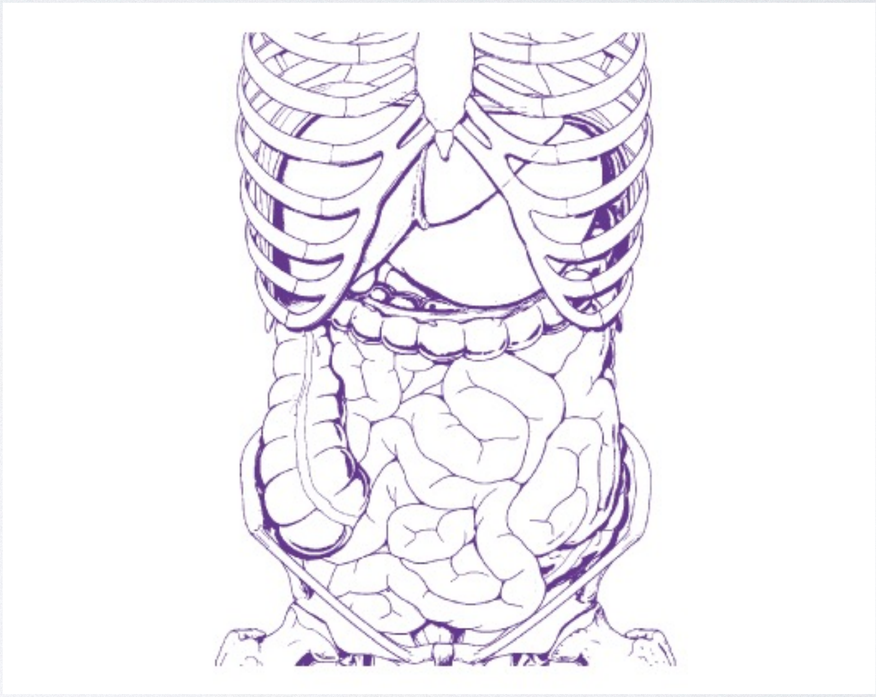
OUTLINE

- Basic Definition and Principles
- Clinical Diagnosis / DDx
  - Characterizing the pain
  - Other history to elicit
  - Broad differential
  - History & Physical / Labs / Imaging
  - Non-surgical causes of acute abdomen
- Clinical Management
- Decision to Operate
- Atypical presentations
- Take home message



BASIC DEFINITION AND PRINCIPLES

- Signs and symptoms of intra-abdominal disease that is *usually* best treated by surgery
- Despite improvements in labs and imaging, history and physical examination remains the mainstay of determining the correct diagnosis !
- Proper evaluation and management requires one to recognize:
  - 1. Does this patient need surgery ?
  - 2. Is it emergent, urgent, or can wait ?
- Remember medical "non-surgical" causes of abdominal pain

Medical Causes of Acute Abdomen

3 broad categories

Endocrine and Metabolic Causes
Uremia
Diabetic crisis
Addisonian crisis
Acute intermittent porphyria
Hereditary Mediterranean fever

Hematologic Causes
Sickle cell crisis
Acute leukemia
Other blood dyscrasias

Toxins and Drugs
Lead poisoning
Other heavy metal poisoning
Narcotic withdrawal
Black widow spider poisoning

Surgical Causes of Acute Abdomen

Hemorrhage
Solid organ trauma
Leaking or ruptured arterial aneurysm
Ruptured ectopic pregnancy
Bleeding gastrointestinal diverticulum
Arteriovenous malformation of gastrointestinal tract
Intestinal ulceration
Aortoduodenal fistula after aortic vascular graft
Hemorrhagic pancreatitis
Mallory-Weiss syndrome
Spontaneous rupture of spleen

Infection
Appendicitis
Cholecystitis
Meckel's diverticulitis
Hepatic abscess
Diverticular abscess
Psoas abscess

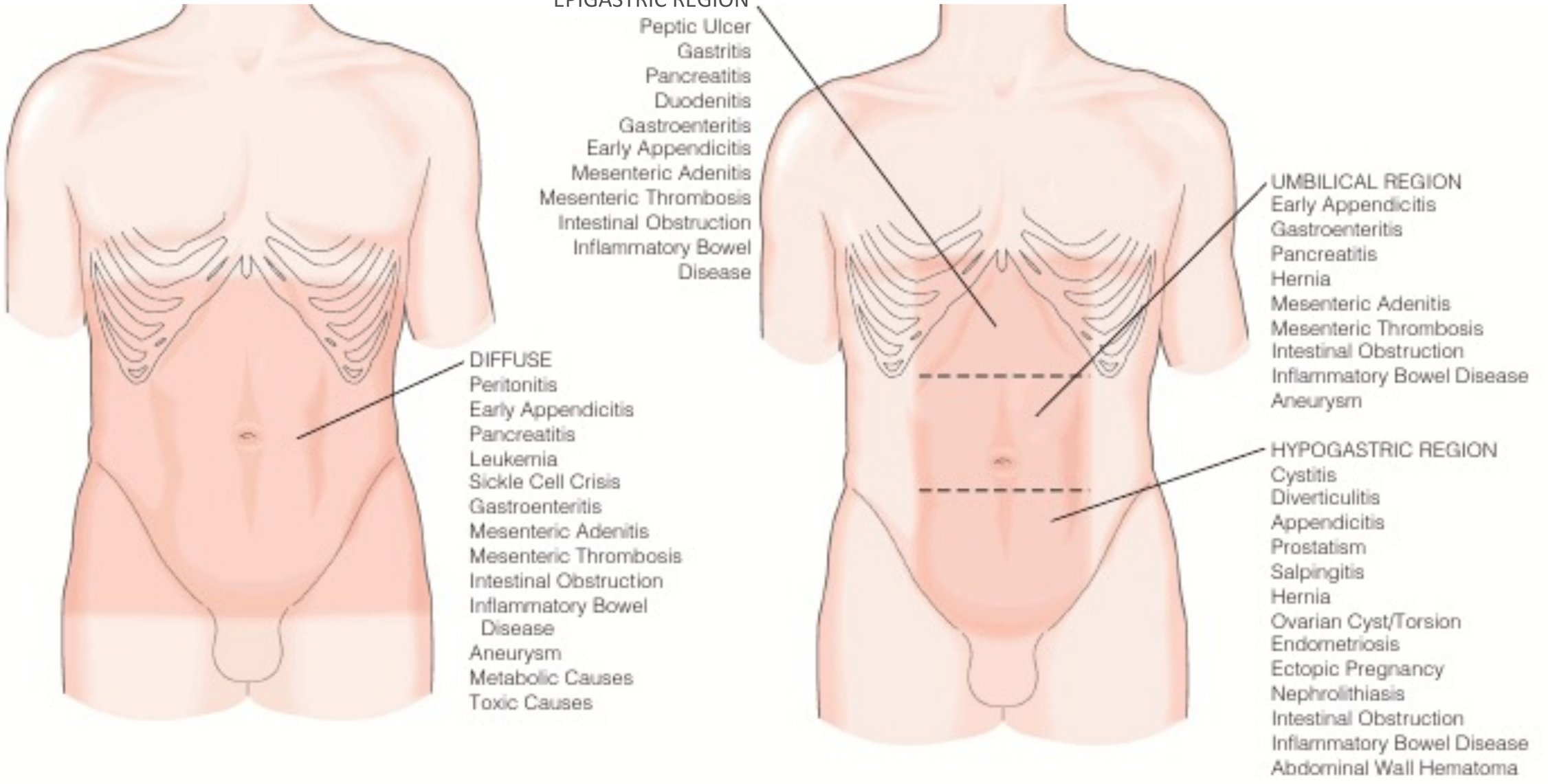
Perforation
Perforated gastrointestinal ulcer
Perforated gastrointestinal cancer
Boerhaave syndrome
Perforated diverticulum

Blockage
Adhesion induction small or large bowel obstruction
Sigmoid volvulus
Cecal volvulus
Incarcerated hernias
Inflammatory bowel disease
Gastrointestinal malignant neoplasm
Intussusception

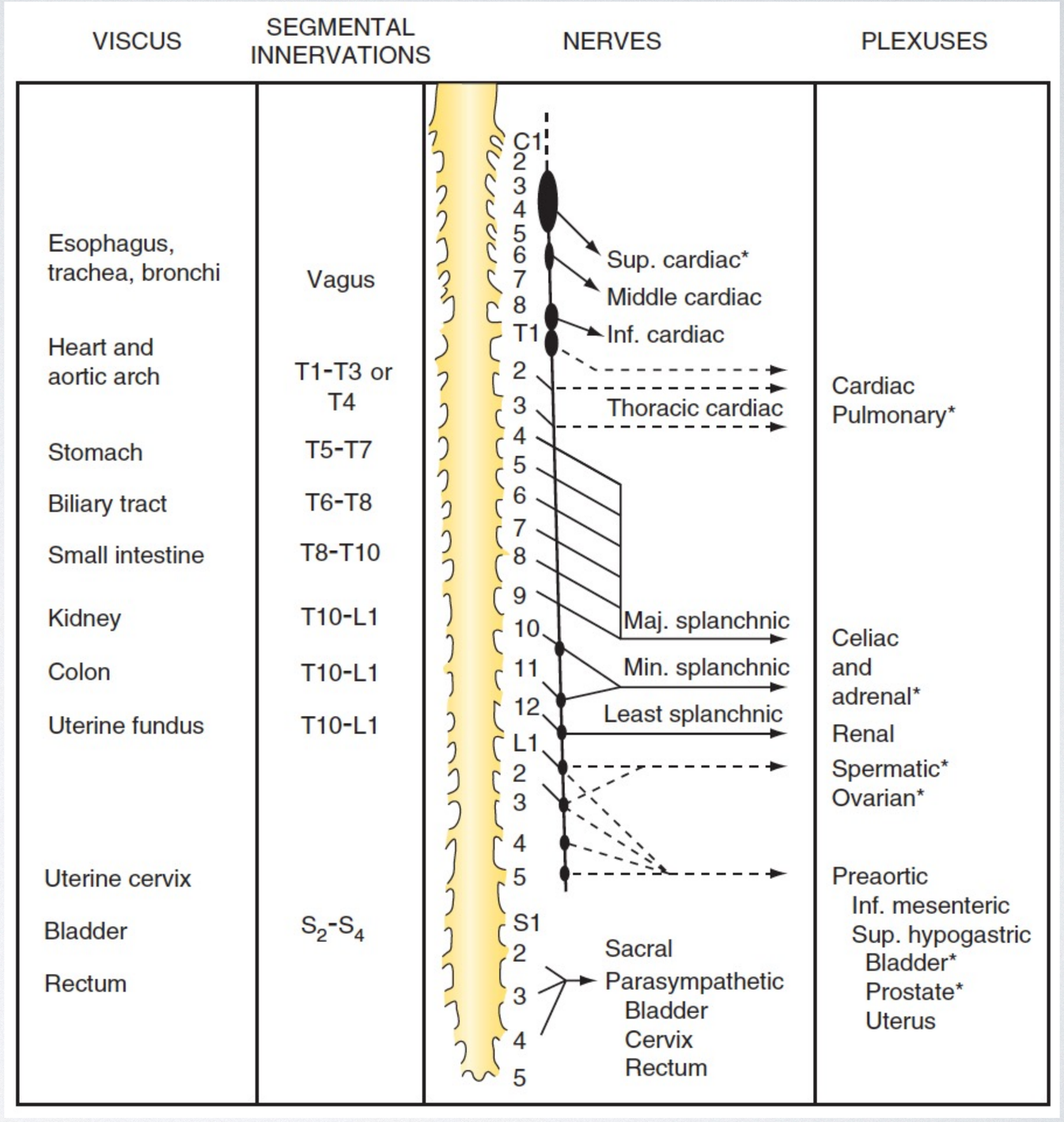
Ischemia
Buerger disease
Mesenteric thrombosis or embolism
Ovarian torsion
Ischemic colitis
Testicular torsion
Strangulated hernias

CLINICAL DIAGNOSIS

- Characterizing the **pain** is the key
  - Onset, duration, location, character
- Visceral pain → dull & poorly localized
  - i.e. distension, inflammation or ischemia
- Parietal pain → sharper, better localized
  - Inflammation of parietal peritoneum


EPIGASTRIC REGION
Peptic Ulcer
Gastritis
Pancreatitis
Duodenitis
Gastroenteritis
Early Appendicitis
Mesenteric Adenitis
Mesenteric Thrombosis
Intestinal Obstruction
Inflammatory Bowel Disease
UMBILICAL REGION
Early Appendicitis
Gastroenteritis
Pancreatitis
Hernia
Mesenteric Adenitis
Mesenteric Thrombosis
Intestinal Obstruction
Inflammatory Bowel Disease
Aneurysm
DIFFUSE
Peritonitis
Early Appendicitis
Pancreatitis
Leukemia
Sickle Cell Crisis
Gastroenteritis
Mesenteric Adenitis
Mesenteric Thrombosis
Intestinal Obstruction
Inflammatory Bowel Disease
Aneurysm
Metabolic Causes
Toxic Causes
HYPOGASTRIC REGION
Cystitis
Diverticulitis
Appendicitis
Prostatism
Salpingitis
Hernia
Ovarian Cyst/Torsion
Endometriosis
Ectopic Pregnancy
Nephrolithiasis
Intestinal Obstruction
Inflammatory Bowel Disease
Abdominal Wall Hematoma

Sensory innervation of the viscera



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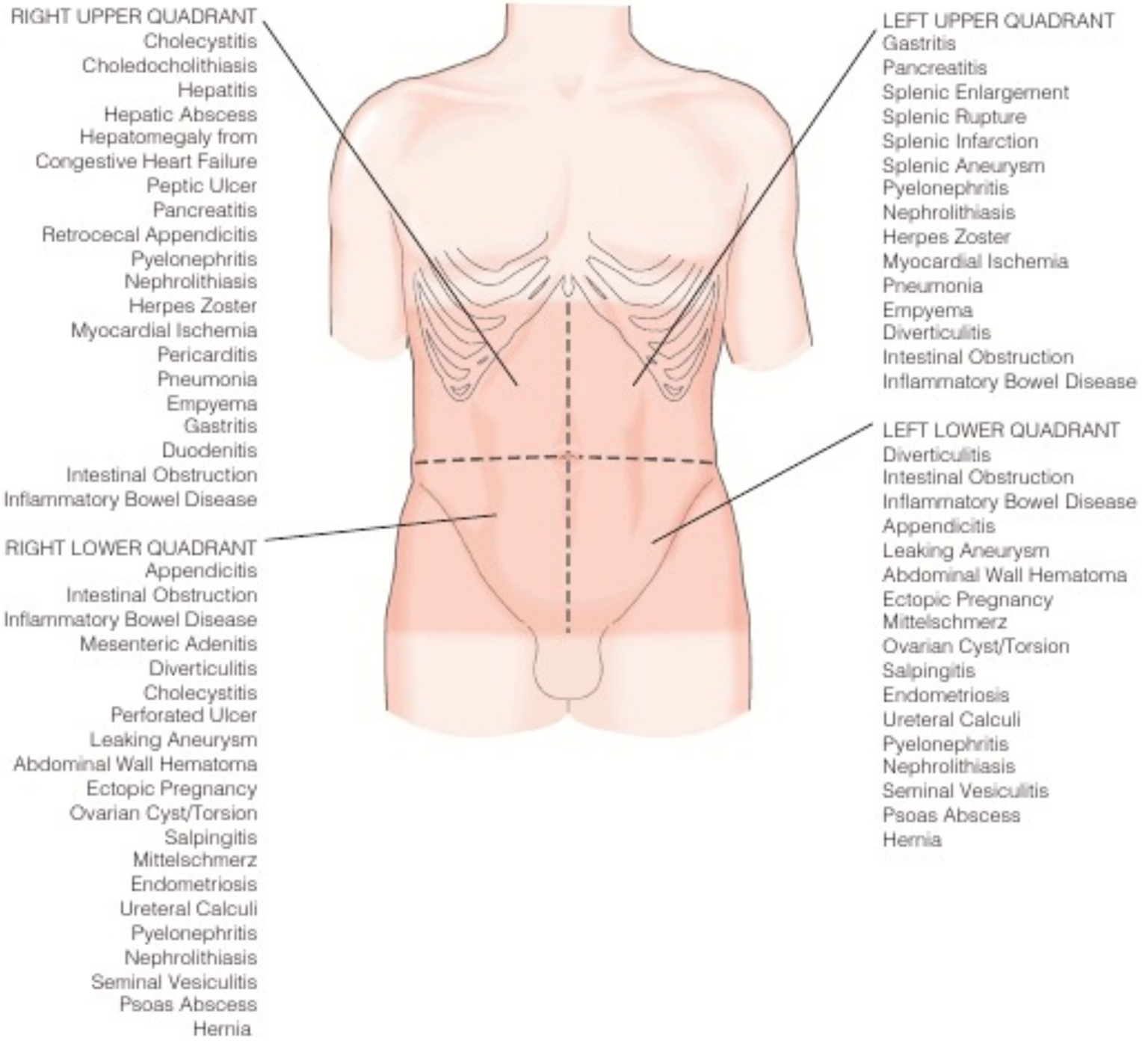
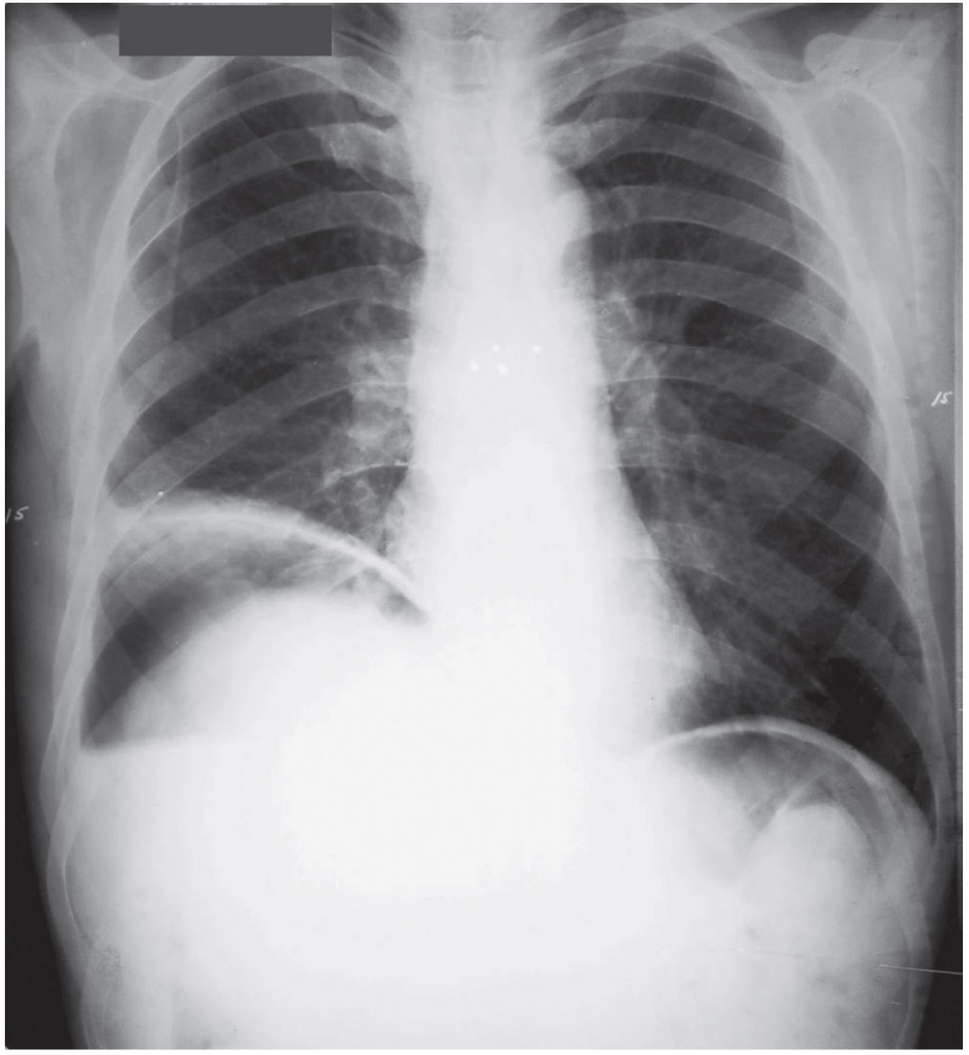
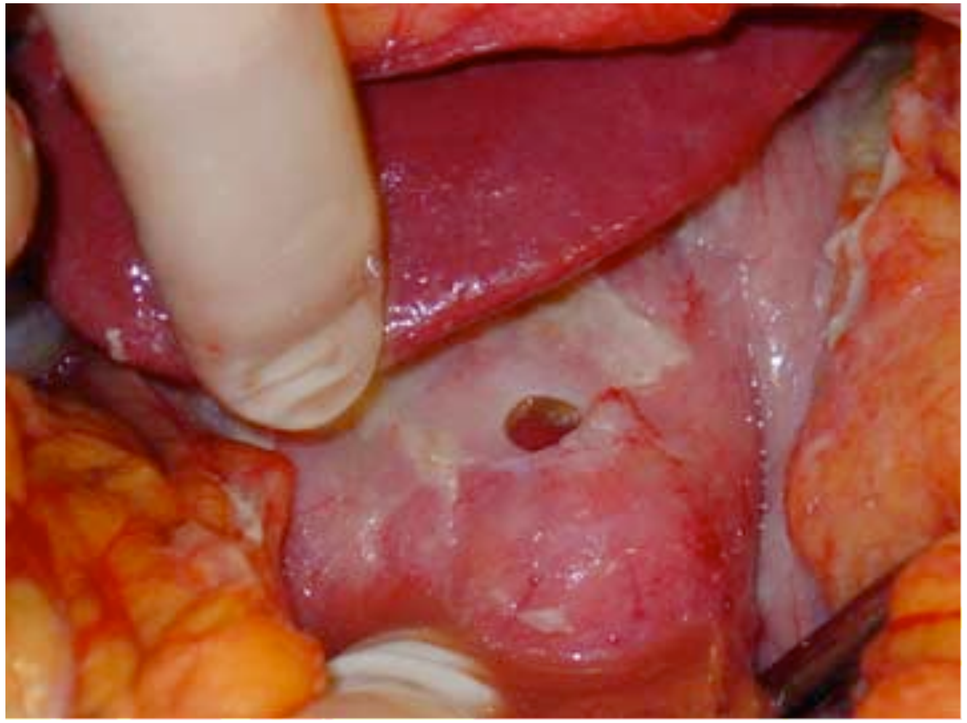


CASE

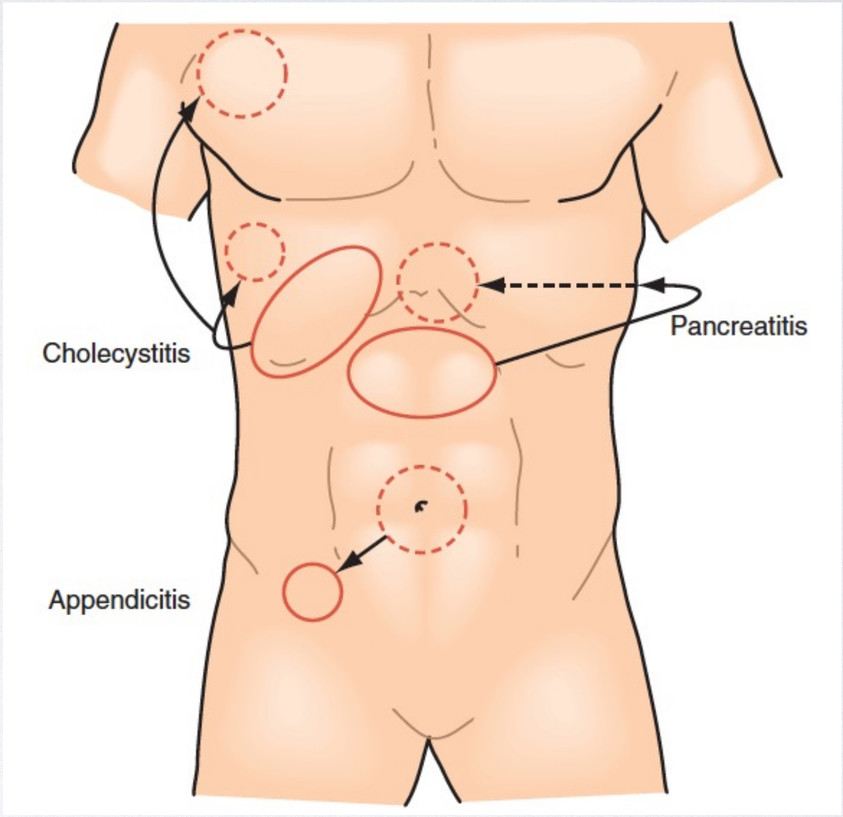
- 83 yo F presented to the ED
- Progressive weakness & functional decline over past 5 days
- Initially vague abdominal complaints
- Past Medical History: Arthritis
- P/E generalized tenderness maximum over RUQ





CLINICAL DIAGNOSIS

- "Referred pain"
  - Biliary disease → R shoulder or back
  - Sub-left diaphragm abscess → L shoulder
  - Above diaphragm(lungs) → Neck/shoulder
  - Acute onset & unrelenting pain = bad



- Pain which resolves *usually* is not acutely surgical

OTHER HISTORY

- GI symptoms
  - Nausea, emesis (? bilious or bloody)
  - Constipation, obstipation (last BM or flatus)
  - Diarrhea (? bloody)
- Change in symptoms with eating? Loss of appetite?
- NSAID use (perforated Duodenal Ulcer)
- Jaundice, acholic stools, dark urine

OTHER HISTORY

- Drinking history (pancreas)
- Prior surgeries (adhesions→ SBO, ?still have gallbladder & appendix)
- History of hernias
- Urine output (dehydrated)
- Constituational Symptoms
  - Fevers/chills
- Sexual/mesnstrual history

THINK **BROAD** CATEGORIES

- Inflammation
- Obstruction
- Ischemia
- Perforation (any of above can end here)
  - Offended organ becomes distended
  - Lymphatic/venous obstruction due to ↑pressure
  - Arterial pressure exceeded → ischemia
  - Prolonged ischemia → perforation

Inflammation versus Obstruction

Organ	Lesion
Stomach	Gastric Ulcer Duodenal Ulcer
Biliary Tract	Acute chol'y +/- choledocholithiasis
Pancreas	Acute, recurrent, or chronic pancreatitis
Small Intestine	Crohn's disease Meckel's diverticulum
Large Intestine	Appendicitis Diverticulitis

Location	Lesion
Small Bowel Obstruction	**A**dhesions **B**ulges **C**ancer **C**rohn's disease Gallstone ileus Intussusception Volvulus
Large Bowel Obstruction	Malignancy Volvulus: cecal or sigmoid Diverticulitis

ISCHEMIA / PERFORATION

- Acute mesenteric ischemia
  - Usually acute occlusion of the SMA from thrombus or embolism
- Chronic mesenteric ischemia
  - Typically smoker, vasculopathy with severe atherosclerotic vessel disease
- Ischemic colitis
- Any inflammation, obstructive, or ischemic process can progress to perforation
- Ruptured abdominal aortic aneurysm

GYN Etiologies

Organ	Lesion
Ovary	Ruptured graafian follicle Torsion of ovary Tubo-ovarian abscess (TOA)
Fallopian tube	Ectopic pregnancy Acute salpingitis Pyosalpinx
Uterus	Uterine rupture Endometritis

Aaron sign	Pain or pressure in epigastrium or anterior chest with persistent firm pressure applied to McBurney point	Acute appendicitis
Bassler sign	Sharp pain created by compressing appendix between abdominal wall and iliacus	Chronic appendicitis
Blumberg sign	Transient abdominal wall rebound tenderness	Peritoneal inflammation
Carnett sign	Loss of abdominal tenderness when abdominal wall muscles are contracted	Intra-abdominal source of abdominal pain
Chandelier sign	Extreme lower abdominal and pelvic pain with movement of cervix	Pelvic inflammatory disease
Charcot sign	Intermittent right upper abdominal pain, jaundice, and fever	Choledocholithiasis
Claybrook sign	Accentuation of breath and cardiac sounds through abdominal wall	Ruptured abdominal viscus
Courvoisier sign	Palpable gallbladder in presence of jaundice	Periampullary tumor
Cruveilhier sign	Varicose veins at umbilicus (caput medusae)	Portal hypertension
Cullen sign	Periumbilical bruising	Hemoperitoneum
Danforth sign	Shoulder pain on inspiration	Hemoperitoneum
Fothergill sign	Abdominal wall mass that does not cross midline and remains palpable when rectus is contracted	Rectus muscle hematomas
Grey Turner sign	Local areas of discoloration around umbilicus and flanks	Acute hemorrhagic pancreatitis
Iliopsoas sign	Elevation and extension of leg against resistance create pain	Appendicitis with retrocecal abscess
Kehr sign	Left shoulder pain when supine and pressure placed on left upper abdomen	Hemoperitoneum (especially from splenic origin)
Mannkopf sign	Increased pulse when painful abdomen is palpated	Absent if malingering
Murphy sign	Pain caused by inspiration while applying pressure to right upper abdomen	Acute cholecystitis
Obturator sign	Flexion with external rotation of right thigh while supine creates hypogastric pain	Pelvic abscess or inflammatory mass in pelvis
Ransohoff sign	Yellow discoloration of umbilical region	Ruptured common bile duct
Rovsing sign	Pain at McBurney point when compressing the left lower abdomen	Acute appendicitis
ten Horn sign	Pain caused by gentle traction of right testicle	Acute appendicitis

Labs & Imaging

Test	Reason
CBC w diff	Left shift can be very telling
BMP	N/V, lytes, acidosis, dehydration
Amylase	Pancreatitis, perf DU, bowel ischemia
LFT	Jaundice,hepatitis
UA	GU- UTI, stone, hematuria
Beta-hCG	Ectopic

Test	Reason
KUB Flat & Upright	SBO/LBO, free air, stones
Ultrasound	Chol'y, jaundice GYN pathology
CT scan Diagnostic accuracy	Anatomic dx Case not straightforward
Diagnostic Laparoscopy	Anatomic dx Case not straightforward

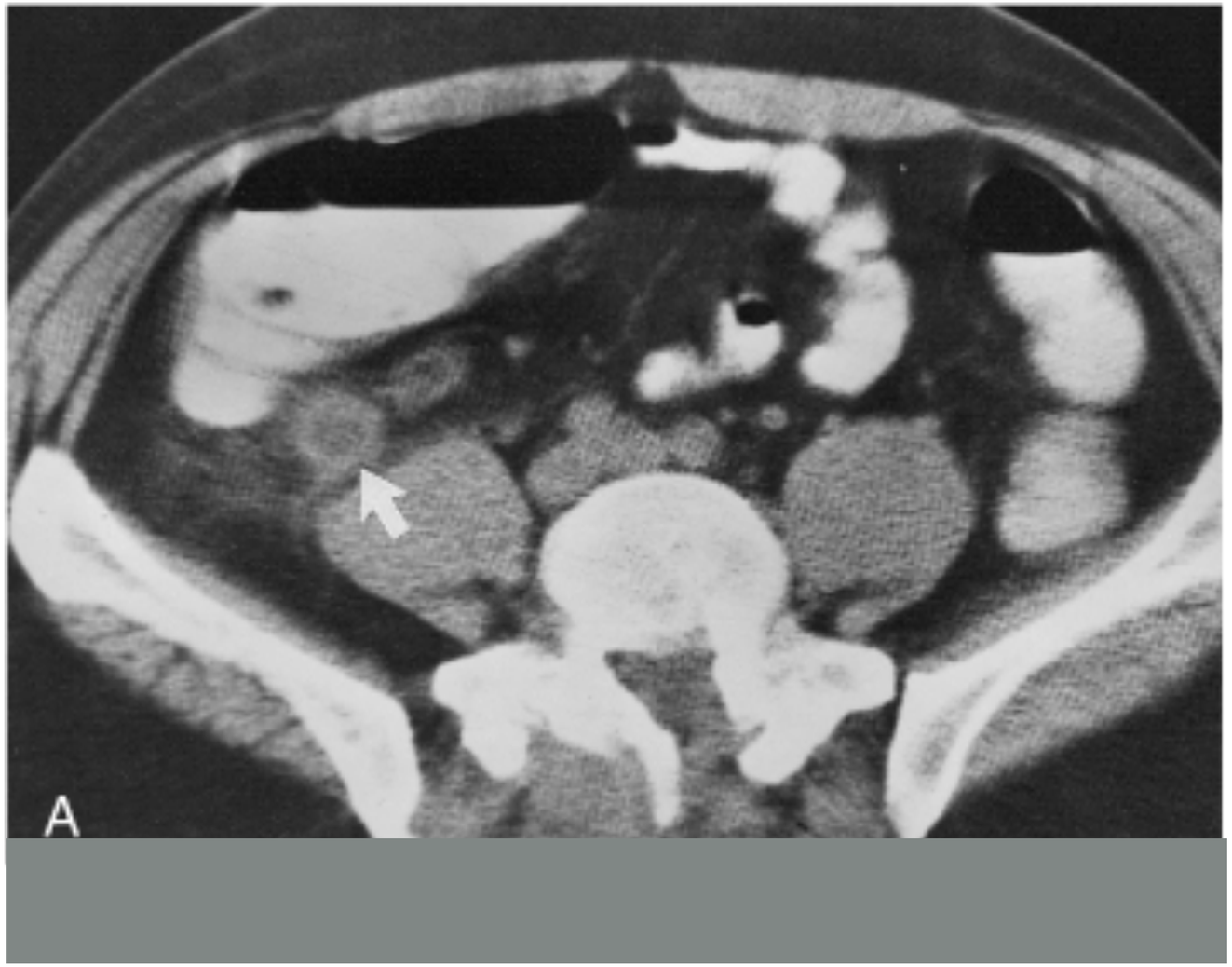
CLINICAL FINDINGS ASSOCIATED WITH SURGICAL DISEASES IN THE SETTING OF ACUTE ABDOMINAL PAIN

Physical Examination and Laboratory Findings
• Abdominal compartment pressures >30 mm Hg • Worsening distention after gastric decompression • Involuntary guarding or rebound tenderness • Gastrointestinal hemorrhage requiring >4 units of blood without stabilization • Unexplained systemic sepsis • Signs of hypoperfusion (acidosis, pain out of proportion to examination findings, rising liver function test results)

Radiographic Findings
• Massive dilation of intestine • Progressive dilation of stationary loop of intestine (sentinel loop) • Pneumoperitoneum • Extravasation of contrast material from bowel lumen • Vascular occlusion on angiography • Fat stranding or thickened bowel wall with systemic sepsis

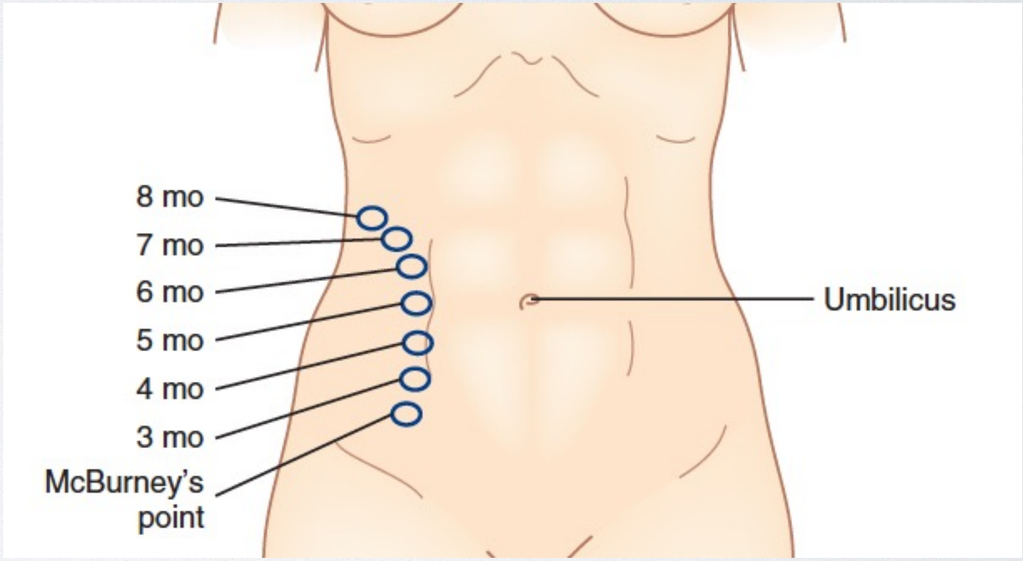
Diagnostic Peritoneal Lavage (1000 mL)
• >250 white blood cells per milliliter of aspirate • >300,000 red blood cells per milliliter of aspirate • Bilirubin level higher than plasma level (bile leak) within aspirate • Presence of particulate matter (stool) • Creatinine level higher than plasma level in aspirate (urine leak)

- 19 year old man with periumbilical pain that shifted to RLQ
- On exam febrile, sick and tender RLQ
- CT scan
- What is the diagnosis?



THE ATYPICAL PATIENT

- **Pregnancy** (physiological changes, management concerns) U/S
- **Pediatrics** (Common is common, congenital causes, conservative) U/S
- **The Critically ill** (ICU setting) CT
- **Immunocompromised** (Not only HIV) CT
- **Morbid obesity** (atypical, late) D/L

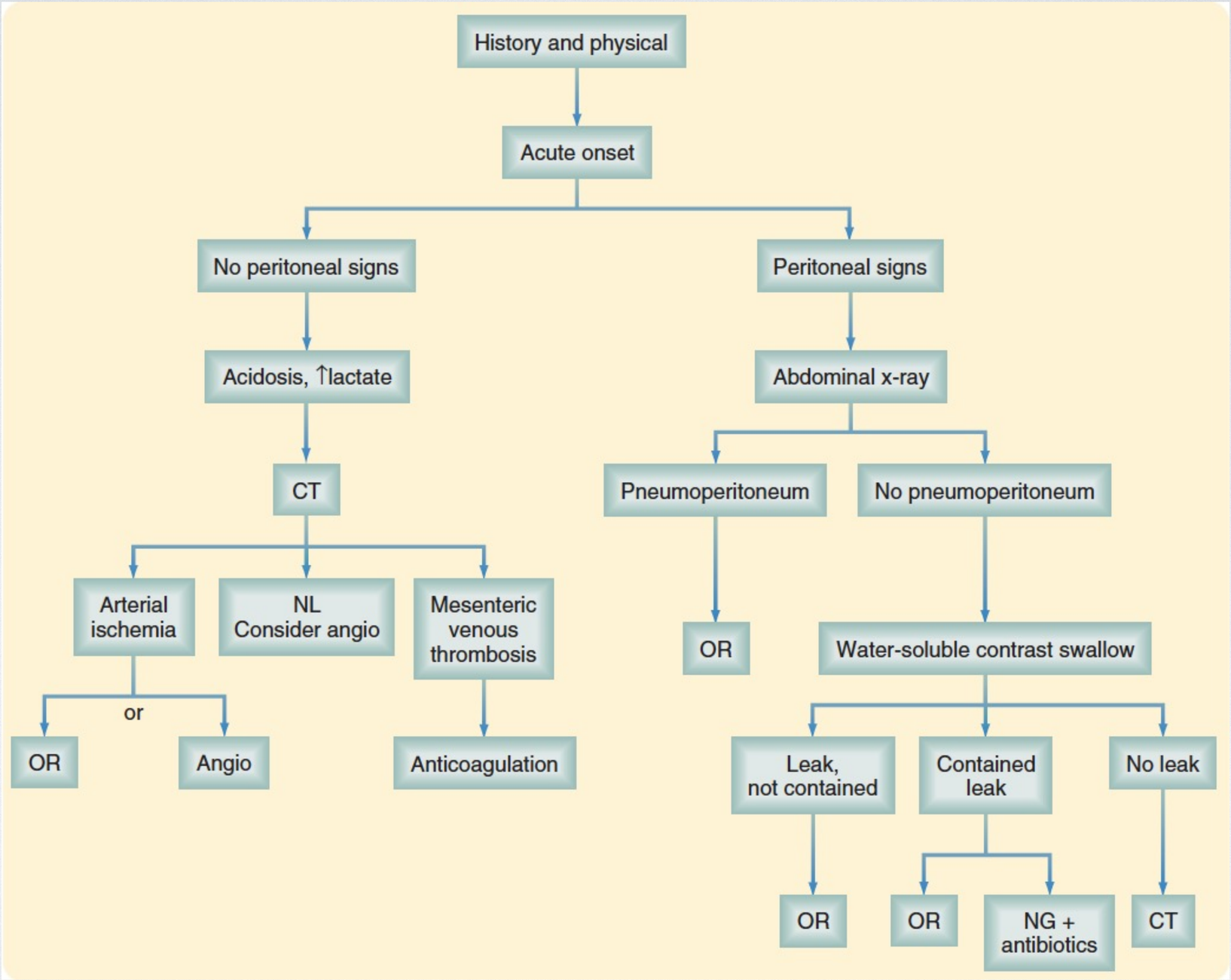


SPECIAL CIRCUMSTANCES

- Situations making diagnosis difficult
  - Stroke or spinal cord injury
  - Influence of drugs or alcohol
- Severity of disease can be masked by:
  - Steroids
  - Immunosuppression (i.e. AIDS)
- Threshold to operate must be even lower !

EMERGENCY OR!!!

- Peritonitis
  - Tenderness w/ rebound, involuntary guarding
- "Unstable" (hemodynamically, or septic)
  - Tachycardic, hypotensive, white count
- Intestinal ischemia, including
  - Strangulation
  - Closed loop obstruction
- Pneumoperitoneum
- Complete or "high grade" obstruction


History and physical
Acute onset
No peritoneal signs
Peritoneal signs
Acidosis, ↑lactate
Abdominal x-ray
CT
Pneumoperitoneum
No pneumoperitoneum
Arterial ischemia
NL Consider angio
Mesenteric venous thrombosis
OR
Water-soluble contrast swallow
or
OR
Angio
Anticoagulation
Leak, not contained
Contained leak
No leak
OR
OR
NG + antibiotics
CT

- Failure to thoroughly examine and document findings
- Failure to perform a rectal or vaginal examination when appropriate
- Failure to evaluate for hernias, including the scrotal region
- Failure to conduct a pregnancy test or to consider pregnancy in the diagnosis
- Failure to reassess the patient frequently while developing a differential diagnosis
- Failure to reconsider an established diagnosis when the clinical situation changes
- Failure to recognize immune compromise and to appreciate its masking effect on the historical and examination findings
- Allowing a normal laboratory value to dissuade a diagnosis when there is cause for clinical concern
- Failure to consult colleagues when appropriate
- Failure to take age- and situation-specific diagnoses into consideration
- Failure to make specific and concrete follow-up arrangements when monitoring a clinical situation on an outpatient basis
- Hesitancy to go to the operating room without a firm diagnosis when the clinical situation suggests surgical disease

TAKE HOME POINTS

- Careful history (pain, other GI symptoms)
- Remember DDx in **broad** categories
- Narrow DDx based on hx, exam, labs, imaging
- Always perform ABCs, **Resuscitate** before diagnosis
- Don't forget GYN/medical causes, special situations
- Common things are common in acute abdomen

?