

Surgery Notes

Dr. Yasser AlDurazi Notes + GS notes

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Thyroid:

Thyroid history/midline neck swelling.

- When did you first notice the mass?
- Progression of the mass?
- Any other swellings?
- Any associated symptoms (ask about compression symptoms dyspnea, dysphagia, etc) and pain?
- Ask about hypothyroid and hyperthyroid symptoms
- Family history of thyroid diseases (thyroid cancer, Hashimoto's and Graves' disease)
- Radiation exposure
- Any medications?
- Ask about fever, night sweats and weight loss to exclude other ddx

Thyroid examination:

Neck

Inspection:

- Ask the patient to swallow and protrude the tongue, ask the patient the raise hands over the head and maintain it 2-3 minutes (with retrosternal mass there will obstruction to the SVC) "Pemberton's sign"

Palpation:

- Palpate the trachea for any deviation
- Palpate the mass (describe it)
- Palpate the lymph nodes

Auscultation for bruits with the BELL!

Percussion for retrosternal thyroid

Eyes:

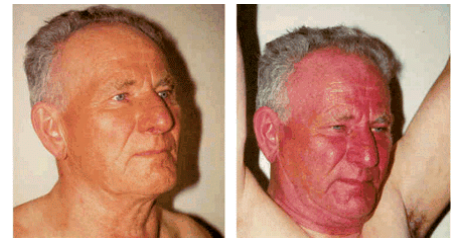
- Lid lag
- Exophthalmos
- Extraocular movement

Hands:

- Inspect for acropachy/palmar erythema
- Palpate the pulse, feel for warmth and sweating
- Ask the patient to close his eyes and extend his arms and put a paper to look for tremors
- Look for proximal muscle weakness "Graves"

Lower limbs:

- Look for pretibial myxedema
- Reflexes



NEVER order thyroid scan and uptake for patients with hypothyroidism ☺ Its only done for patients with hyperthyroidism!

Thyropoxidase antibodies are found in patients with Hashimoto's disease

You examined a thyroid nodule what do you do next?

- Check TSH
- Do ultrasound
- FNA

Next? CT if there were any obstructive symptoms

What are the causes of thyrotoxicosis?

- Grave's
- Toxic multinodular goiter
- Thyroiditis
- Exogenous thyroxine
- Struma Ovarii

How to describe the swelling?

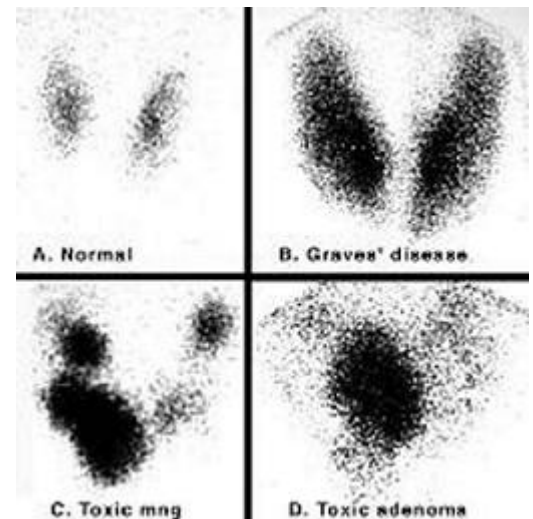
- Site, size, shape, consistency, mobility, tenderness, any pulsations and skin changes.

Approach to a thyroid nodule:

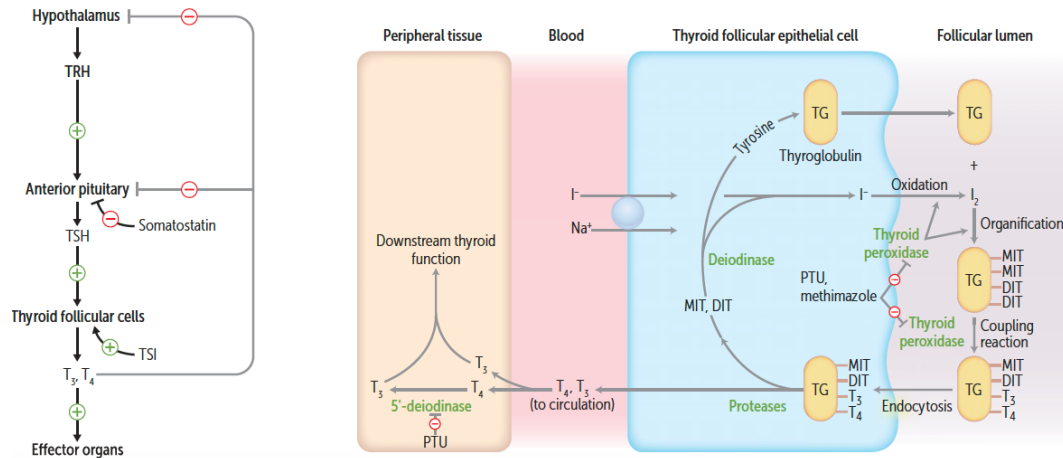
- 10-15% of thyroid nodules are malignant
- 1 cm nodule with no evidence of malignancy no FNA
- >1.5 cm biopsy

Results of FNAC:

-
- I - Non-diagnostic
 - II - Benign
 - III - Atypia
 - IV - Follicular neoplasm or suspicious for follicular neoplasm
 - V - Suspicious for malignancy
 - VI - Malignant
-



Thyroid hormone synthesis:



What causes exophthalmos in Graves' disease?

- Accumulation of hydrophilic glycosaminoglycans (hyaluronic acid and chondroitin sulfate)
- Infiltration of the retroorbital space by T cells
- Inflammatory edema and swelling of the extraocular muscles
- Fatty infiltration

How to diagnose Graves' disease?

- Clinical; exophthalmos (50%), hyperthyroidism, pretibial myxedema (10-15%) and thyroid bruits (50-90%)
- TSH and + antibodies (TSI)
- Increased uptake

Treatment options in Graves':

Medical:

- PTU, methimazole (inhibit thyroid peroxidase) (PTU in pregnancy)
- Beta blockers for symptomatic relief
- **Side effects:** agranulocytosis and hepatitis

Radioiodine ablative therapy:

- Ablation with I131
- **Drawbacks:** exacerbation of exophthalmos

Surgery:

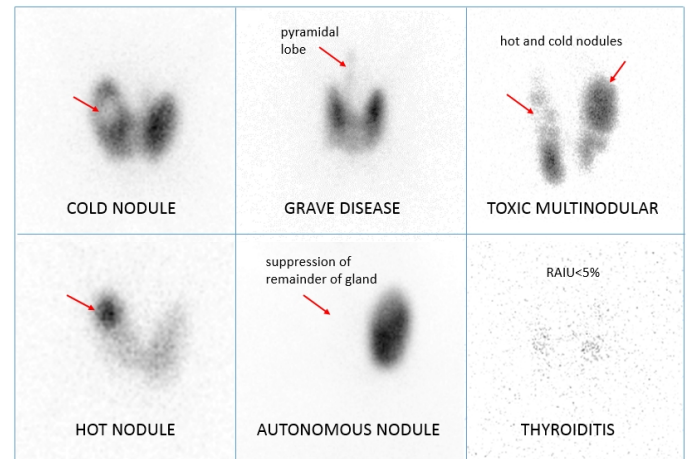
- For patients with failed medical therapy
- Poor candidates for radioablation (pregnancy, young patients and patients with large goiters)
- Compressive symptoms
- Cosmetic
- Suspicion of malignancy

Toxic multinodular goiter:

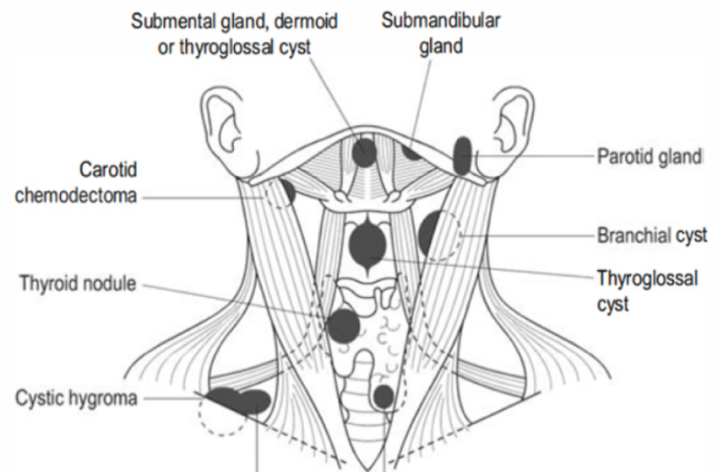
- **Nodular uptake with thyroid scan**
- **Subtotal thyroidectomy Rx**; radioablation has a high rate of failure
- **For a solitary nodule:** lobectomy

Secondary causes of thyrotoxicosis:

- Pituitary tumors
- Strauma ovarii
- Paraneoplastic syndrome
- Drugs: amiodarone

**What is your differential diagnosis for neck swellings?**

Neck Mass Differential Diagnosis	
Midline	<ul style="list-style-type: none"> • Thyroid swelling • Dermoid cyst • Ranula • Thyroglossal cyst
Anterior triangle	<ul style="list-style-type: none"> • Lymphadenopathy • Chemodectoma • Branchial cyst • Cold abscess (secondary to tuberculosis)
Posterior triangle	<ul style="list-style-type: none"> • Lymphadenopathy • Pharyngeal pouch • Cystic hygroma
Within sternocleidomastoid	<ul style="list-style-type: none"> • Sternocleidomastoid tumor



Thyroid Cancer

The most common type of thyroid cancer is Papillary 85% of all thyroid cancers

Type	%	Risk factors	Age group	Signs and symptoms	Diagnosis	Metastasis	Treatment
Papillary	85%	Radiation Tumor marker TG	30-40	Painless, dysphagia, dyspnea, hoarseness,	FNA / CT and MRI (psommoma bodies)	Lymphatic	Total thyroidectomy I131 ablation for any remnant thyroid tissue
Follicular	5-20% second most common	Dysmorphogenesis	40-50	Painless mass	FNA is useless we need to do a lobectomy to know if its benign or malignant	Hematogenous	Total thyroidectomy I131 ablation for any remnant thyroid tissue
Medullary	5-10%	MEN II Tumor marker calcitonin	50-60	Painful mass, palpable LN, dysphonia, dysphagia (PAINFUL) DIARRHEA	FNA, amyloid and check for calcitonin	Lymphatic and local to trachea and esophagus	Sporadic: total thyroidectomy Familial: TE with central neck node dissection don't do I131 and follow up to patient calcitonin
Anaplastic (undifferentiated)	1-5%	Prior thyroid cancer and iodine deficiency	60-70	Rapid enlargement, neck pain, hard fixed !	FNA	Local spread aggressive	Debulking of thyroid and adjacent structures and tracheostomy doxorubicin chemo!

MEN I	Parathyroid tumor Pituitary adenomas Pancreatic endocrine (ZES, Insulinomas, VIPomas, glucagonoma) 3P
MEN IIa	Pheochromocytoma, Parathyroid hyperplasia, Medullary thyroid cancer, Cutaneous lichen amyloidosis
MEN IIb	Medullary thyroid cancer Pheochromocytoma Neuromas/Ganglioneuromas

What are the complications of thyroid surgery?

Thyroidectomy:

- Recurrent laryngeal nerve injury resulting in hoarseness and if the injury was bilateral it will result in air way obstruction
- Superior laryngeal nerve injury resulting in monotonic voice
- Hypocalcemia can be transient caused by the manipulation of the parathyroid glands or permanent hypocalcemia caused accidental removal of the parathyroid glands; first sign of hypocalcemia will be paresthesia of face. Tests to do **chvostek sign** by tapping on the styloidmastoid foramen which will result in facial muscles twitching. **Trousseau sign**; inflate the BP cuff up to 200 mmHg this will elicit muscle spasm of the hand. To prevent the transient hypocalcemia, give Ca gluconate after the surgery.
- Thyroid storm in patients with hyperthyroidism
- Hypothyroidism

Wound complications:

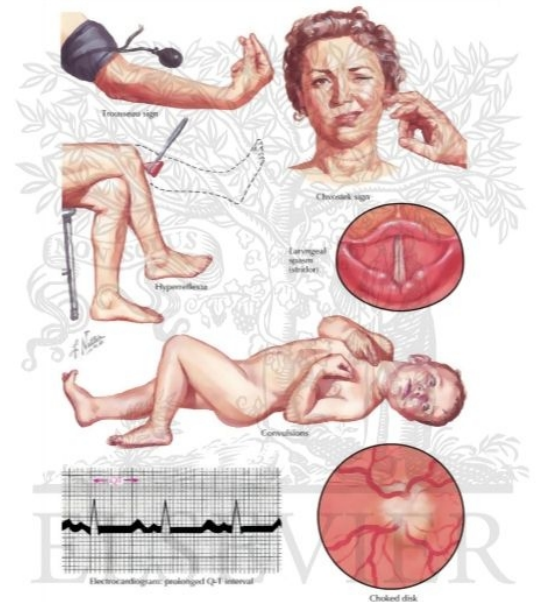
- Hematoma
- Seroma
- Infection

General complications:

- Anaphylaxis
- MI
- Pulmonary embolism
- Atelectasis
- Pneumonia
- UTI

Causes of Post-Op fever:

Day 1	• Atelectasis
Day 3	• UTI
Day 5	• Wound infection
Day 7	• DVT / PE



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You operated on a patient with graves disease for thyroidectomy several hours after the surgery the patient developed difficulty breathing, stridor and progressive swelling under the incision.

This is a wound hematoma this would require wound exploration and airway control. If airway control is unable to be obtained prior to operating room, the wound should be opened at the bedside. To prevent such complication a drain should be placed.

What is atelectasis?

It the collapse of the alveoli, it is the most common cause of post-op fever in the first 24 hours.

What keeps our alveoli open?

- Positive end expiratory pressure (this will be low resulting in the collapse)
- Surfactant

How to treat atelectasis?

- Chest physiotherapy
- Incentive spirometry
- Antibiotics broad spectrum

You induced anesthesia “succinylcholine” in a patient he then developed fever, muscle rigidity, tachycardia, hypotension. What is your diagnosis and what do you do next?

Malignant hyperthermia which is an autosomal dominant disease caused by ryanodine receptor defect resulting in an impaired reuptake of calcium by the sarcoplasmic reticulum in muscles.

Rx: antidote dantrolene (calcium channel blocker), hydrate and stop anesthesia.

Complications: rhabdomyolysis, death.

What is hungry bone syndrome?

Occurs after the correction of hyperparathyroidism (parathyroidectomy). Increased bone remodeling units will mineralize and balance will be towards synthesis of bones resulting in severe postoperative hypocalcemia that may lead to symptoms of tetany.

Acute abdomen:

RLQ pain:

- Appendicitis
- Cecal diverticulitis (not common)
- Meckels diverticulum
- Perforated duodenal ulcer (Valentino's sign)
- Gastroenteritis
- Mesenteric adenitis (usually after upper respiratory infection more in kids)
- Renal colic
- UTI
- Crohn's disease (terminal ileitis)
- Ovarian cyst rupture, ovarian torsion, PID and ectopic pregnancy in females

LLQ pain:

- Renal colic and UTI
- Sigmoid volvulus
- Diverticulitis (leukocytosis, fever and LLQ in old age)
- Colitis
- Ovarian cyst rupture, ovarian torsion, PID and ectopic pregnancy in females

RUQ pain:

- Inferior lobe pneumonia
- Hepatic tumors, abscess and hepatitis
- Biliary colic, cholangitis, cholecystitis
- Retrocaecal appendicitis

LUQ pain:

- Pneumonia
- Splenic infarction, abscess or rupture

Epigastric pain

- Pancreatitis
- Duodenal/gastric ulcer
- Gastritis

Diffuse abdominal pain:

- Bowel obstruction (vomiting and obstipation/constipation)
- Aortic aneurysm
- Enteritis
- Mesenteric ischemia

Medical causes:

- MI
- Sickle cell crisis
- Lead poisoning
- Mittelschmerz
- Shingles
- DKA or Addisonian crisis

- Porphyria

What investigations you will order in a patient with RUQ pain?

- CBC
- LFT
- Amylase and lipase
- Urinalysis
- U/S

Which tumors that can result in jaundice?

- Hepatocellular carcinoma
- Cholangiocarcinoma
- Ampullary carcinoma
- Pancreatic cancer

What is your differential diagnosis for an anterior abdominal mass?

- Mesenchymal cyst
- Gastric cancer
- Leiomyosarcoma
- Gastrointestinal stromal tumor

Hepatobiliary System:

What is the function of gallbladder?

Storage and concentration of bile

What are the components of bile?

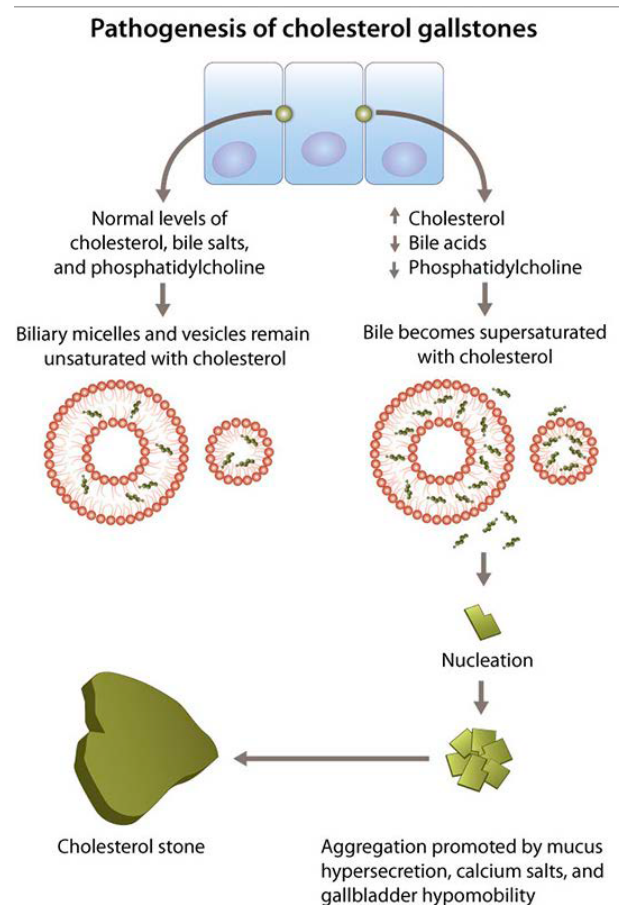
Bile acids, lethicin, bilirubin, cholesterol and 90% is water


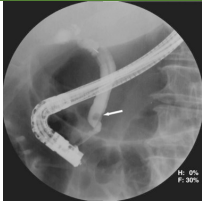

Consequences of gallstones:

- Asymptomatic
- Obstructive jaundice
- Ascending cholangitis
- Pancreatitis
- Biliary colic
- Cholecystitis
- Gallstone ileus “pneumobilia”
- Gallbladder mucocele > empyema
- Mirizzi syndrome (compression on the common hepatic duct)

Indications of cholecystectomy:

- Immunocompromised patients (post-transplant)
- Pediatrics
- Porcelain gallbladder “increased risk of cholangiocarcinoma”
- SCD/Thalassemia
- Bariatric surgery
- Single 2 cm stone



Disease	Cholecystitis	Choledocholithiasis	Cholangitis
	Obstruction of the cystic duct by gallstone	Common bile duct obstruction by gallstone	Ascending bacterial infection of the biliary system associated with CBD obstruction
Signs and Symptoms	RUQ pain, fever, nausea, vomiting and positive Murphy's sign	Epigastric pain, jaundice, recurrent attacks of acute pancreatitis	Charcot's triad: fever, jaundice and RUQ pain. Reynold's pentad: charcot's + CNS symptoms and septic shock
Diagnosis	-Labs: increased WBC -U/S: gallbladder wall >4 mm, pericholecystic fluid and stone in the gallbladder. -HIDA scan: non-filling of the gallbladder (if U/S not diagnostic)	-Labs: increased bilirubin, alk phos direct bilirubin -ERCP	-Lab: increased bilirubin, alk phos direct bilirubin -U/S: dilatation of common and intrahepatic bile ducts -ERCP -Blood culture
Treatment	Cholecystectomy	ERCP	ERCP/PTC/T-tube
Imaging			

Clinical Vignette:

A 30 years old female presented to the A&E with a history of pain radiating to the tip of shoulder, nausea and vomiting, RUQ tender with positive murphy sign.

Acute cholecystitis

Next step:

- CBC with differential diagnosis 15k WBC
- Amylase and lipase (-)
- LFT and bilirubin normal
- Electrolytes

Radiology: U/S will show thick walls > 5 mm, edema, stone, pericholecystic fluid.

Rx: IV fluids, NPO, analgesia (Tramadol or Pethidine with buscopan), Antibiotics (ceftriaxone and Flagyl)

When do we admit the patient for cholecystectomy? Wait until 6 weeks, ask the patient to avoid fatty food etc then do it.

A 40-year-old male presented to the A&E with a history of nausea, vomiting and epigastric pain radiating to the back. WBC were high, lipase and amylase were high. U/S showed a stone in the gallbladder and dilated common bile duct.

Acute pancreatitis

Rx: IV hydration, NPO, analgesia “antibiotics are not indicated in pancreatitis”

Next for the stone in the CBD do ERCP to remove the stone then do cholecystectomy.

A 60 year old female presented to the A&E with a history of RUQ pain, fever, jaundice, and her blood pressure was 80/40. WBC levels were high, increased bilirubin, alkaline phosphatase and LFT.

Ascending cholangitis with reynold’s pentad (charcots triad + shock + altered mental status)

Rx: U/S is the initial study; dilation of the common and intrahepatic ducts along with gallstones, thick edematous gallbladder wall.

Definitive rx: ERCP + antibiotics

Patient presented to you with a history of increased pain, fever and palpable tender mass below the liver.

Gallbladder empyema, do U/S guided drainage with antibiotics.

Geriatric patient presented to you with a history of vomiting, abdominal distention and pain with constipation. Patient has history of previous gallstones.

Gallstone ileus

Investigations: CXR, abdominal Xray supine and erect (air in the biliary tree)

Confirm it with CT scan

Rx: laproscopic removal of the stone with cholecystectomy.

Patient presented with a 3 day history of RUQ pain with nausea, vomiting and positive Murphy’s sign. WBC levels were slightly elevated, U/S showed no stones.

Acalculous cholecystitis

Diagnosis: HIDA scan

Rx: admit, NPO, Antibiotics + cholecystectomy

It presents in 10% of cases of cholecystitis. Risk factors: ICU patients, trauma, burns, sepsis and TPN.

What are the complications of laparoscopic cholecystectomy?

- Injury to the common bile duct (diagnosed with ERCP)
- Injury to the liver
- Injury to the blood vessels
- Trocar site hernia

What are the causes of peritonitis?

Classification:

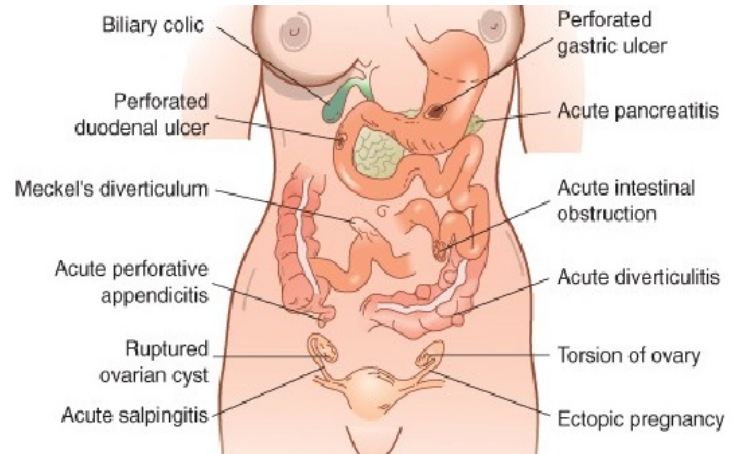
Localized: appendicitis, diverticulitis, cholecystitis, salpingitis

Generalized:

- **Chemical:** perforation of stomach, small bowel or gallbladder
- **Bacterial:** intra-abdominal abscess, fecal contaminated due to bowel perforation, trauma, surgical spillage or anastomotic leak after bowel surgery

OR

- **Primary:** spontaneous bacterial peritonitis or secondary to peritoneal dialysis
- **Secondary:** caused by a perforated viscus
- **Tertiary:** complication after a surgery (abscess)



What are the causes of air under diaphragm?

- Perforation
- Post laproscopic/laparotomy
- Typhoid (Causing small bowel perforation)
- Abscess under diaphragm (*C. perfringens*)
- Penetration of the diaphragm

Obstructive Jaundice:

What is jaundice? Yellowish discoloration of the skin and mucus membranes with hyperbilirubinemia >3 g/dL

Causes of hyperbilirubinemia:

- **Pre-hepatic:** any cause of hemolysis (SCD, G6PD, spherocytosis)
- **Hepatic:** hepatitis, cirrhosis, enzymes deficiency
- **Post-hepatic:** obstructive jaundice

What are the causes of obstructive jaundice?**Proximal**

- Cholangiocarcinoma
- Lymphodynopathy
- Cholangiocarcinoma
- Sclerosing cholangitis
- Gallstones
- Parasite
- Post surgical stricture

Distal

- Choledocholithiasis
- Pancreatic cancer
- Pseudocyst
- Pancreatitis

What is Courvoisier's sign?

Jaundice with a palpable non-tender gallbladder seen in patients with pancreatic head cancer

What is your ddx of palpable gallbladder?

- Pancreatic cancer (non-tender)
- Gallbladder empyema (tender)

History taking in patient with jaundice?

Make sure to cover all the points below

- The onset, duration and progression
- Change in stool/urine color
- RUQ pain
- Itching? (patient PBC have pruritus followed by jaundice)
- Flu like symptoms and fever (hepatitis)
- History of any hemolytic anemia
- Weight loss and anorexia (cancer)
- Use of any medication
- Parenteral exposure to IV drugs or transfusion
- Tattoos and sexual history
- Recent travel

What investigation you will order in a patient with jaundice?

- CBC
- Liver function test

Liver cell necrosis:

ALT	Specific enzyme for liver necrosis ALT>AST; viral hepatitis
AST	AST>ALT; indicates alcoholic hepatitis

Cholestasis:

GGT	Intrahepatic or extra-hepatic obstruction to bile flow
ALP	Synthesized by the bile duct epithelium

- Serum albumin, PT, BUN, ammonia

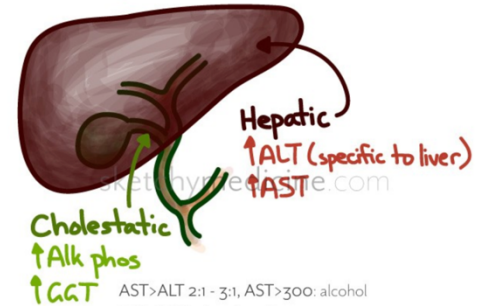
Random tests:

Serum IgM	Patients with PBC
Anti-mitochondrial antibody	PBC
Anti-smooth muscle antibody	Autoimmune hepatitis
ANA	Autoimmune hepatitis
a-fetoprotein	Hepatocellular carcinoma

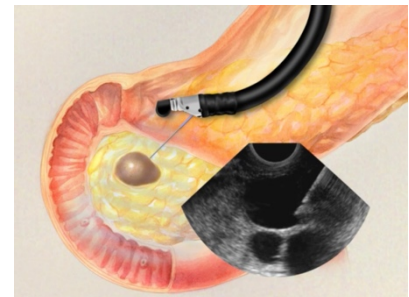
Others investigations:

- U/S
- CT scan
- Percutaneous trans-hepatic cholangiogram (good for proximal biliary tree)
- ERCP (distal part of bile duct)
- Endoscopic U/S guided biopsy (for pancreatic cancer)

Liver Enzymes



AST>ALT 2:1 - 3:1, AST>300: alcohol
 ALT>AST in fatty liver disease
 ALT>AST by 1000x: acute viral hepatitis, ischemia, toxins, autoimmune, Wilson's disease
 *AST can also come from muscle
 *ALP has 5 minor sources (liver, bile duct, kidney, bone, placenta)



Endoscopic U/S

Pancreatitis:

What is the function of the pancreas?

It has an endocrine and exocrine function

Endocrine:

- Insulin produced by the beta cells
- Glucagon by alfa cells
- Somatostatin by delta cells
- VIP

Exocrine:

- Lipase, amylase, trypsin, phospholipase, protease
- These enzymes are all secreted in the inactive zymogen and they get activated by enterokinase in the duodenum.
- If they got activated before this will result in the auto-digestion of the pancreas

Acute pancreatitis:

It is the inflammation of the pancreas caused by parenchymal auto-digestion by proteolytic enzymes.

Extra-abdominal symptoms of acute pancreatitis

- Shock
- ARDS
- Uveitis
- Pleural effusion

What are the causes of acute pancreatitis?

- Alcohol
- Gallstones
- hypercalcemia, hyperlipidemia
- Drug induced (Azathioprine, cimetidine, steroids, metronidazole, methyldopa, valporic acid, sulfasalazine, TMP-SMX, thiazides)
- ERCP (in 5%)
- Scorpion venom (Tityus trinitatis)
- Infections (CMV, EBV, Coksakivirus and mumps)
- Trauma
- Congenital (divisum)
- Autoimmune
- Idiopathic

A 40 years old male presented to the A&E with a history of sudden epigastric pain radiating to the shoulder after a fatty meal

Ddx:

- Acute cholecystitis
- Acute pancreatitis
- PUD/Gastritis
- Inferior wall MI
- Lower lobe pneumonia

The patient had high lipase and amylase

What to do next?

- Admit
- Hydrate
- NPO
- NG tube
- Analgesia

Lipase is more sensitive and specific to acute pancreatitis than amylase (found in salivary glands, small bowel, ovaries, testes and skeletal muscles)

- High amylase/lipase does not reflect the severity of pancreatitis
- For us to diagnose acute pancreatitis amylase levels should be x 3-4 the upper limits
- Other lab test is CRP after 48 hrs if >150 this indicates a poor prognosis
- CT scan is the diagnostic test of choice in acute pancreatitis (will show edematous gland)

What are the complications of acute pancreatitis?

- Pseudocyst
- Pancreatic necrosis
- Pancreatic abscess
- Phlegmon
- Pseudoaneurysm of the splenic artery

What is chronic pancreatitis:

Irreversible parenchymal fibrosis, destruction and calcification leading to the loss of the endocrine and exocrine function of the pancreas.

What is the most causes of chronic pancreatitis?

Alcohol

How will patients with chronic pancreatitis present?

- Recurrent constant epigastric and or back pain
- Malabsorption, steatorrhea
- Type 1 diabetes

Ranson's Criteria

At admission

1. Age > 55
2. WBC > 16
3. Glu > 200
4. AST > 250
5. LDH > 350

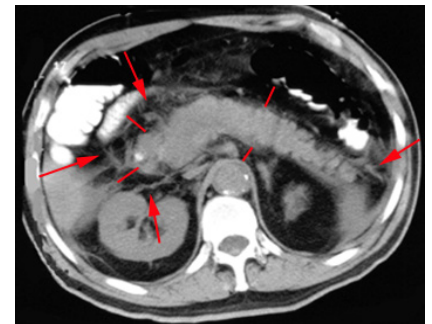
At 48 hrs out

1. Ca < 8
2. HCT fall > 10%
3. PO2 < 60
4. BUN increase > 5
5. Base deficit > 4 mEq/L
6. Sequestration of fluids > 6L

Criteria Met	Mortality
0-2	2%
3-4	15%
5-6	40%
7-8	100%

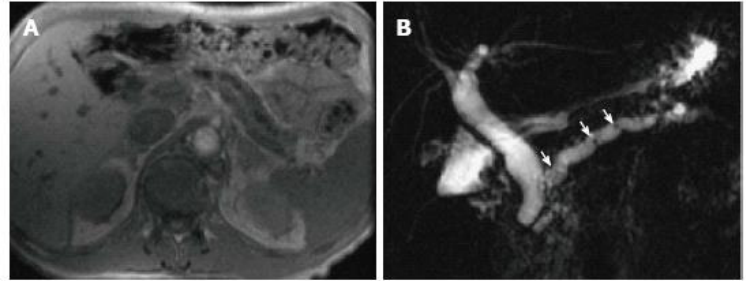


LEGAL & C-HOBBS



How to diagnose patients with chronic pancreatitis?

- Fecal fat analysis
- Pancreatic calcification on Xray
- ERCP or MRCP will show chain of lake pattern – areas of dilatation and stenosis
- CT: shows glands enlargement/atrophy and calcifications



How to treat patients with chronic pancreatitis?

- non-surgical: enzyme replacement therapy & insulin
- surgical: celiac plexus block for pain relief/ pancreaticojejunostomy

What are the complications of chronic pancreatitis?

- Pancreatic abscess
- Pancreatic fistula
- Hemorrhagic pancreatitis
- Pancreatic cancer

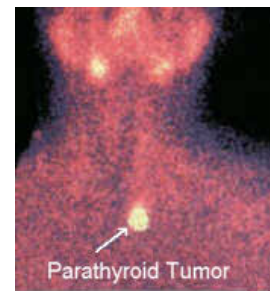
Cases:

A 40 yo female presented with an epigastric pain of 2 days' duration radiating to the back with high lipase and amylase. Ultrasound showed a stone in the common bile duct.

This is a case of biliary pancreatitis, treat the patient just like the treatment of any pancreatitis with ERCP and laparoscopic cholecystectomy after 6 weeks.

A 40 yo female presented with a severe epigastric pain radiating to the back with nausea and vomiting, U/S showed bulky head of pancreas. The patient had several attacks of such pain before she also has recurrent kidney stones.

Check the patient Ca⁺ levels, if the levels were high then check for the PTH levels (hyperparathyroidism). To confirm hyperparathyroidism do U/S and sestamibi scan. She probably had the recurrent attacks of pancreatitis due to hypercalcemia which is caused by primary hyperparathyroidism.



Sestamibi scan

A 50 year old alcoholic male presented with severe epigastric radiating to the back with high lipase and amylase. Normal U/S, CT showed dilated head of pancreas, Ca⁺ normal. You stabilized the patient and at night the patient was very disoriented.

Delirium tremens due to alcohol withdrawal. Treat the patient with thiamin and benzodiazepines to prevent Wernicke encephalopathy which is caused by thiamin deficiency.

A 40 year old female presented with epigastric pain radiating to back. BMI is 38, U/S and Ca⁺ were normal. What do you have to order next?

Lipid profile DON'T FORGET IT!

A 40-year-old female presented with epigastric pain high lipase amylase all tests were negative (U/S, Ca+, lipids)

You have to rule out autoimmune pancreatitis with an endoscopic U/S guided biopsy (with show lymphocytic infiltration) treat her with steroids if you confirmed the diagnosis.

A 9 year old male presents with on and off epigastric pain radiating to the back.

Congenital pancreatitis (divisum) diagnosis with MRCP

A 30 year old female had a history of acute pancreatitis 2 months ago and now she presents with a mass and early satiety.

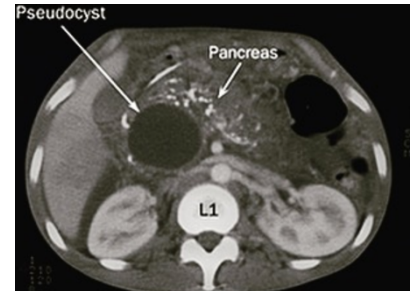
Pancreatic pseudocyst; it's a collection of pancreatic fluid surrounded by a wall with no epithelium. Diagnosed with CT scan, in most patients the pseudocyst will resolve spontaneously within 6 weeks

Approach to pancreatic pseudocysts:

If symptomatic: do U/S or CT guided external drainage OR cyst gastrostomy or cystjejunostomy (Roux-en-Y cyst jejunostomy)

If asymptomatic: > 6 cm treat as mentioned above if <5 cm can resolve on its own

*external drainage is not recommend it can create a pancreatic cutaneous fistula



A patient presented with alcoholic pancreatitis and was shifted to ICU, CT scan showed pancreatic necrosis, his WBC counts were high and he had fever.

This is a case of necrotizing pancreatitis, treat the patient with broad spectrum antibiotic then do a CT guided aspiration of pancreatic fluid and send for culture. If the patient developed an abscess as a complication of necrotizing pancreatitis wait for 2-3 weeks to see the area of demarcation and then resect the affected area.

Acute pancreatitis	Chronic pancreatitis
Onset: severe epigastric pain radiating to back with nausea vomiting	Recurrent episodes of epigastric pain, weight loss, diabetes and steatorrhea
Causes: GET SMASHED Gallstones(40%), ethanol(30%), tumors, scorpion stings, mycoplasma or mumps, autoimmune, surgery or trauma, hyperlipidemia or hypercalcemia, embolic or ischemia and drugs	Alcohol (70%), pancreatic divisum
Labs: high amylase and lipase x 3-4	Low fecal elastase
<p>Colon cutoff sign and sentinel loop</p>	<p>Pancreatic calcifications ERCP: chain of lakes</p>

What is the mechanism of hypotension in pancreatitis?

Inflammation and cytokine storm cause endothelial injury and increased permeability in the peripancreatic vasculature, leading to fluid leakage into the retroperitoneal space. The cytokine storm also causes massive vasodilation.

Colon Cancer and Polyps:**What are the types of colonic polyps?**

Benign: inflammatory, lymphoid, hyperplastic, hamartomatous

Pre-malignant: adenomatous (tubular, tubulovillous and villous"40% risk of malignancy")

How would a patient with colonic polyps present?

- Asymptomatic
- Melena/hematochezia
- Mucus
- Changes in bowel habits
- Large bowel obstruction

Diagnosis is made with **colonoscopy** ofc

Rx: colonoscopic resection

What are the risk factors of colon cancer?

- Age
- Family history of colon cancer or FAP
- Low fiber diet, high fat diet
- IBD esp UC (risk increases 1-2% every year after 2 years of the disease)

Signs and symptoms of colon cancer:

It will depend on the location

- Right side: occult bleeding, melena and anemia
- Left side: altered bowel habits, rectal bleeding, large bowel obstruction (patient will present earlier than right sided cancer)
- Both will have anorexia and weight loss

How to diagnose colorectal cancer?

- Colonoscopy
- Chest, abdomen and pelvis CT (Staging)
- Bone scan (staging)
- CEA is a tumor marker used for follow up after treatment not diagnosis

A 50-year-old man presented with a history of PR bleeding of 2 weeks PMH of hypertension. What will you ask?

- Quantity of blood
- Color? Dark or fresh
- Timing of bleeding? beginning of stool or at the end
- Altered bowel habits
- Weight loss, anorexia?
- Signs and symptoms of anemia?
- Family history of colorectal cancer? (ask about all the risk factors)

Metastasis of colon cancer: liver, bones and lungs

Dukes staging of colorectal cancer

A	Tumor confined to submucosa	5 years survival 90-95%
B	Invasion to the muscle wall	85%
C	Invasion to serosa C1: no lymph nodes spread C2: lymph nodes spread	30%
D	Distant metastasis (liver, lung and bones)	<1%

Colon cancer staging:

Stage I	T1/T2
Stage II	T3/T4
Stage III	Any T/N1/N2
Stage Vi	Any T any N M1

Screening for colorectal cancer:

Recommended screening in adults with average risk, beginning at the age of 50 until age 75.

- Colonoscopy every 10 years
- Flexible sigmoidoscopy every 5 years + FOBT every 3 years
- Fecal occult blood test x annually

Screening in patients with a first degree family member with colorectal cancer:

These patients should begin screening at age of 40 or 10 years prior to the onset of colorectal cancer in the first degree relative. They should continue screening every 5 years after.

Surgery based on tumor location:

Cecum:

- Right hemicolectomy
- Resection of the ileum, cecum ascending colon and part of transverse colon & divide the ileocolic artery.

Ascending colon:

- Right hemicolectomy

Hepatic flexure:

- Extended right hemicolectomy
- Resect up to 2/3 of the transverse colon & divide the ileocolic, right colic, right branch of middle colic artery.

Descending colon:

- Left hemicolectomy & divide the left colic artery

Sigmoid:

- Sigmoid colectomy and divide the sigmoid branches

Rectum:

- Upper third: anterior resection diversion ileostomy (temporary)
- Middle third: low anterior resection with diversion ileostomy (temporary)
- Lower third: abdominoperineal resection (remove anus, rectum and part of the sigmoid) with permanent colostomy

Tumor markers

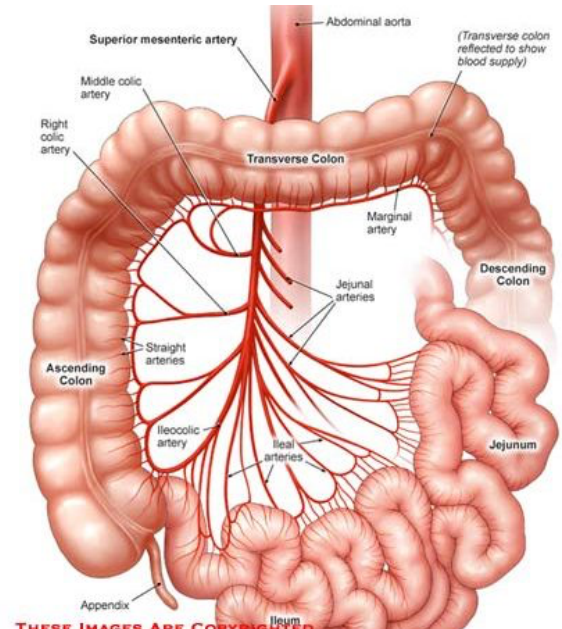
CA-15-3 Estrogen and progesterone receptors	Breast cancer
CA-19-9	Pancreatic cancer
CEA	Colon cancer
a-fetoprotein	HCC

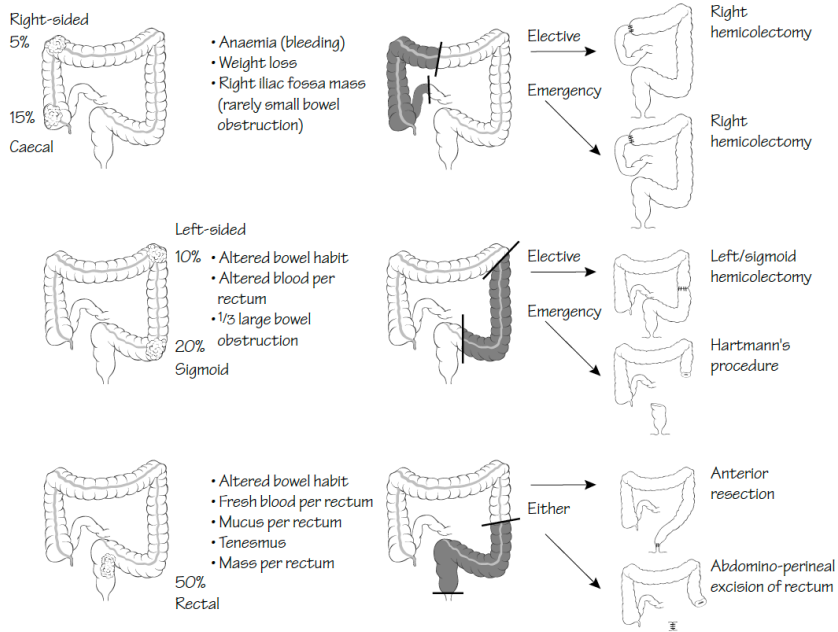
Familial adenomatous polyposis:

Its AD, patient will have hundreds of polyps its caused by abnormal gene on chromosome 5, APC gene rx: total colectomy

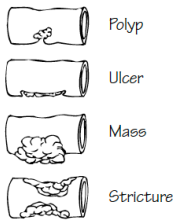
Gardner syndrome: FAP + osteomas, epidermal cysts and fibromatosis

Turcot's syndrome: FAP + gliomas and CNS neoplasms

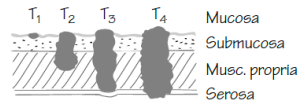
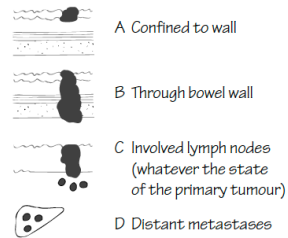




TYPES



DUKE'S STAGE



*always consider colon cancer in old patients with unexplained microcytic anemia.

Anus:

What is a fistula?

Abnormal opening and connection between two epithelized hollow spaces.

What are the types of fistula?

- Perianal
- Enterocutaneous fistula (in IBD)
- Enterovesical fistula
- Enteroenteric fistula
- Enterovaginal fistula
- Tracheoesophageal fistula (congenital)
- AV fistula

A 31 yo male with history of Crohn disease presents with severe rectal pain that has progressively increased last night. P/E demonstrates a small, erythematous, well defined, fluctuant, subcutaneous mass near the anal orifice.

Anorectal abscess is the most likely diagnosis. It is a collection of pus surrounded by a cavity caused by an infection arising in the cryptoglandular epithelium lining the anal canal Rx: incision and drainage with antibiotics

S. aureus commonly causes abscess.

A 25 yo female with history of IBS with constipation presents with severe pain with passing stool. She notes that the pain is so severe and is afraid to have a bowel movement. The stools are hard and covered with blood streaks.

The most likely diagnosis is an anal fissure

What is anal fissure?

Painful tears in the anal mucosa below the dentate line induced by constipation or excessive diarrhea. Patients will present with painful defecation, bright red PR bleeding, laceration on 6 and 12 o'clock position. Patients with chronic anal fissure will have hypertrophy of the surrounding skin and sentinel pile or skin tag.

What are the options for treating anal fissures?

- Sitz bath
- Topical nitroglycerin or CCB or injection of botulinum toxin into the anal sphincter
- Fiber supplements
- Bulking agents
- Lateral internal sphincterotomy or dilation for chronic cases

Upper & Lower GI Bleeding:

Rectal bleeding history:

- Onset
- Color
- Amount
- Pain?
- With stool or after
- Meds (aspirin, NSAIDS, warfarin)
- Weight loss or loss of appetite
- Symptoms of anemia
- Ask about IBD, diverticulosis and other risks

How will you manage a patient with massive PR bleeding?

- ABC
- 2 IV lines; Ringer lactate
- NGT
- blood cross-match
- Foley catheter

What do you do next?

- Endoscopy + colonoscopy

What is a lower GI bleeding?

Any bleeding distal to the ligament of Treitz (between the duodenum and jejunum)

What are the symptoms of lower GI bleeding?

- Hematochezia
- Melena
- Anemia
- Shock

What are the causes of lower GI bleeding?

Rectal causes:

- Fissures
- Hemorrhoids
- Solitary rectal ulcer
- Anal tumor
- Trauma

Other:

- Most common: diverticulosis and vascular ectasia (massive lower GI bleeding)
- Colon cancer and polyps
- Ischemic colitis

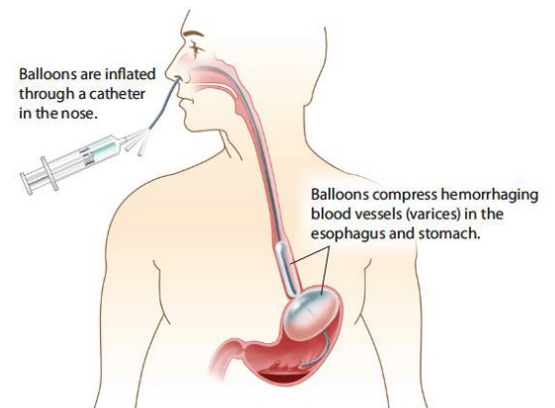
- IBD
- Meckel's diverticulum
- Infectious colitis
- Small bowel tumor
- Radiation enteritis
- Meds: aspirin, warfarin and clopidogrel

What are the causes of upper GI bleeding?

- Duodenal or gastric ulcer
- Acute gastritis
- Esophageal varices
- Mallory-Weiss tear
- Gastric cancer
- Boerhaave's syndrome
- Aortoenteric fistula
- Dieulafoy's ulcer (submucosal dilated large arterioles)
- GIST
- AV malformation

How will you manage a patient with an upper GI bleeding?

- Same as above plus bedside gastroscopy
- If variceal bleeding; octerotide + band ligation OR injection of epinephrine OR sclerotherapy if bleeding continued, consider balloon (Sengstaken-Blakemore tube) IF STILL the patient is bleeding then go for esophageal devascularization and transection.



Case:

A 70 year old male presented with upper GI bleeding, the patient is taking NSAIDs. His Hb was 5 g/dl

- ABC, start 2 IV lines, blood cross-match, transfuse 1-2 units (his Hb is below 7)
- Do bedside endoscope you saw an ulcer
 - If shallow (low risk of rebleeding)
 - Clot (5-10% risk)
 - Visible blood vessel (up to 50%)
- Rx: clipping, epinephrine, cauterization

The patient rebled what to do next?

- Endoscopy again same rx if bleeding was not controlled with the above measures surgical options (oversew/distal gastrectomy)
- If the patient cant undergo surgery then the other option would be embolization by intervention radiology of the gastroduodenal artery

A 15 year old male presents to the A&E with history of bleeding for few days, his Hb was 5 g/dL

Investigations to identify the bleeding site?

1. Colonoscopy + PT/PTT (if normal then next)
2. Tagged RBC scan >0.5mL/min
3. Angiography >1 ml/min
If normal then:
4. Capsule endoscopy (swallow for 24 hours)
5. Meckl's scan
6. Retrograde antroscopy
7. Last option > laproscopic opening

Upper Vs Lower GI Bleeding		
	Upper	Lower
Location	Proximal to ligament of Treitz	Distal to ligament of Treitz
Common causes	Gastritis, PUD, varices	Vascular ectasia, diverticulosis, colon cancer, colitis, IBD, hemorrhoids
Stool	Tarry, black stool (melena)	Red blood in stool (hematochezia)
NG aspirate	Positive for blood	Negative for blood

Hernia:

What is the definition of hernia?

It's a protrusion of a viscus through an abnormal opening in the wall of a cavity in which its contained.

Types of hernia:

Internal:

- Diaphragmatic hernia
- Brainstem herniation
- Internal bowel herniation

External:

- Inguinal hernia
- Femoral
- Obturator
- Lumbar
- Spigelian hernia
- Umbilical
- Incisional
- Richter's hernia
- Littre's hernia
- Maydl's hernia
- Epigastric hernia

What is the cardinal sign of hernia?

Cough impulse

Causes of hernia:

Congenital: patent process vaginalis, collagen vascular disease " Ehlers-Danlos syndrome" and prematurity

Acquired: chronic constipation, chronic cough, ascites, pregnancy, lifting heavy objects, BPH, weakness in the abdominal wall, previous surgery, trauma.

Hernia history:

- When did you first notice the lump?
- Ask about the progression of size?
- Any other swellings?
- Associated symptoms?
- Ask the patient about the cause? And ask about each risk factor from above.

Complications of hernia:

- Incarceration
- Strangulation
- Obstruction

What is the inguinal canal?

It's a 4 cm fibrous canal extending from the deep ring to the superficial ring and the boundaries are:

Anterior: aponeurosis of the medial 2/3 external oblique and lateral 1/3 internal oblique muscle

Posterior: medially conjoint tendon laterally transversals fascia

Roof: arching fibers of transverse muscle and internal oblique

Floor: inguinal ligament and lacunar ligament

Contents of the inguinal canal:

- **Females:** round ligament and ilioinguinal nerve
- **Males:** spermatic cord and ilioinguinal nerve

Hasselbach's triangle:

- **Medially:** lateral edge of the rectus abdominis
- **Laterally:** inferior epigastric vessels
- **Inferiorly:** inguinal ligament

The 3 rule of spermatic cord:

What are the 3 nerves in spermatic cord?

- Genital branch of the genitofemoral
- Cremasteric nerve
- Sympathetic nerve fibers

What are the 3 arteries ?

- Testicular artery
- Artery to vas
- Artery to cremasteric

What are the 3 veins?

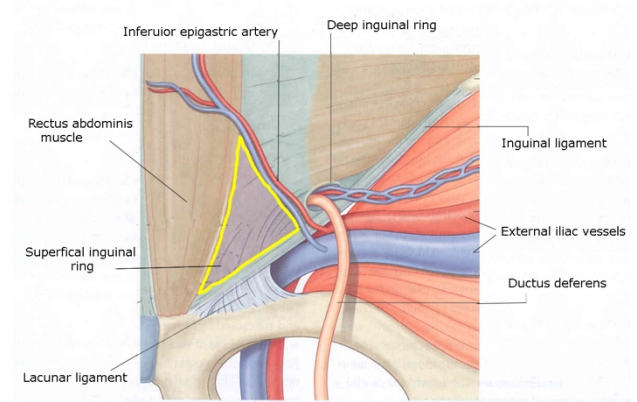
- Pampiniform plexus
- Cremasteric vein
- Vein of vas

What are the 3 structures passing in the inguinal canal?

- Lymphatics
- Vas deferens
- Pampniform plexus

What is the conjoint tendon?

Formed by the lower part of the common aponeurosis of the internal oblique and transverses abdominis muscle and its inserted into the pubic tubercle and crest



How to differentiate between inguinal hernia and femoral hernia?

Relation to the pubic tubercle, femoral hernia will be below and lateral while inguinal hernias will be above and medial.

What is Richter's hernia?

When only part of the intestine wall circumference in the hernia it may strangulate with no obstruction, seen in femoral and obturator hernia.

What is Maydl's hernia?

W type of intestinal loop herniates and may strangulate with the gangrenous part being inside the abdomen without the noticing of the gangrenous part

What are the complications after hernia surgery?

- **General:** hematoma, seroma, wound infection and dehiscence
- **Specific:** scrotal hematoma, injury to testicular artery, injury to ilioinguinal nerve, chronic pain due to entrapment of ilioinguinal nerve and recurrence

What is the difference between herniorrhaphy and herniotomy?

- Herniorrhaphy is the repair of wall while herniotomy is the excision of the sac with no repair of wall, its usually done in pediatric patients.

Explain how mesh is useful in the management of hernia?

- It increases the fibroblast activity and hence will strengthen the muscles.

What are types of mesh?

- Mersilene mesh
- Prolene mesh

What are the principles of management in patients with hernia?

- Open tissue repair "tension repair": Bassini, Shouldice, MacVay (femoral hernia)
- Tension free repair: using a prosthetic mesh (Lichtenstein's repair) has least recurrence rate
- Laproscopic repair

When do we repair the hernia laproscopically?

Bilateral or recurrent

Why are femoral hernias more prone to incarceration?

Bowel entering a femoral hernia passes down the narrow femoral canal because of the femoral ring which is very rigid. Thus the fixed neck of femoral hernia is at a higher risk of incarceration than other types.

What is the ring occlusion test?

We occlude the deep inguinal ring and then ask the patient to cough if the mass is not seen medial to the deep ring then this is indirect hernia (positive occlusion test) IF we occluded the deep ring and expansile impulse on cough is seen medial to the deep ring then its direct inguinal hernia (negative occlusion test)

What is the difference between epigastric hernia and other hernias?

Protrusion of subcutaneous fat in the opening of the hernia

What is your differential diagnosis for groin swellings?

Malformation	Undescended testicle, varicocele, hydrocele, hernias, saphena varix
Infectious/inflammatory	Lymphadenopathy, abscess, lymphogranuloma venereum
Neoplastic	Lymphoma, lipoma, metastatic cancer
Traumatic	Hematoma, femoral aneurysm or pseudoaneurysm

Indirect hernia	Direct hernia
Pass through inguinal canal	Bulge from the posterior wall of the inguinal canal
Caused by patent processus vaginalis	caused by weakness of abdominal wall
Can descend into the scrotum	Can not descend into the scrotum
Lateral to the inferior epigastric vessels	Medial to the inferior epigastric vessels
The defect is not palpable	The defect may be felt in the abdominal wall
Common in children and young adults	Common in old age
+ occlusion test	Negative occlusion test

Umbilical hernia:

Prevalent in in pediatric population and common with congenital hypothyroidism. In children most are asymptomatic and close spontaneously with no intervention (indications for surgery: child age >4 years, defect size >2cm in diameter, strangulation or progressive enlargement after 1-2 years of age). In adults, umbilical hernias are associated with increased intra-abdominal pressure (pregnancy, ascites and weight gain).

Epigastric hernia:

This is usually a small protrusion through the linea alba in the upper part of the abdomen. Often the hernia consists of extraperitoneal fat only but it may contain the omentum or small bowel. This type of hernia can be extremely painful because of the trapping and ischemia of the extraperitoneal fat. Rx: simple suture of the defect with non-absorbable sutures.

Clinical vignettes.

You've done a surgery on a 70 year old male in the morning and at night he complained of pain in the suprapubic area. What do you suspect.

Urinary retention, can be secondary to BPH

Rx: catheter

Patient came to your clinic weeks after surgical repair of hernia complaining of loss of sensation in the medial thigh and lateral scrotum.

Injury to the ilioinguinal nerve

Post-surgical patient came with chronic pain after hernia repair.

Entrapment of the ilioinguinal nerve "chronic pain syndrome" Rx: cut the nerve

A 30-year-old male patient complained of severe testicular pain after hernia repair what do you suspect?

Injury to the testicular artery, do duplex ultrasound to confirm your diagnosis if no perfusion was detected do orchiectomy to save the other testicle because antibodies can be formed against it if the affected testicle was not removed.

Breast Cancer:

What are symptoms of a patient with breast cancer?

- Pain
- Swelling
- Nipple discharge
- Skin changes
- Dimpling/nipple retraction
- Asymptomatic

The most common presentation of breast cancer is a painless lump

When do we start screening for breast cancer?

- Breast self examination at the age of 20 should be performed monthly days following the menstrual cycle
- Clinical or physician breast examination
- Screening mammography > at the age of 40 annually (craniocaudal and mediolateral)

What are the abnormal findings in a mammogram?

- Stellate, mass and microcalcifications

When to screen in a high risk patient?

5 years earlier from the diagnosis of a family member

A 30 year old patient presented breast pain. What questions you will ask?

- Relation of pain to menstrual cycle
- All the characters of pain
- Any discharge
- Ask about risk factors of breast cancer

Any patient presenting with a breast mass do the triple assessment:

- History/physical examination
- Mamo or U/S
- FNA

What is your ddx of breast pain?

- Fibrocystic disease
- Inflammatory breast cancer
- Advanced breast cancer
- Mastitis
- Breast abscess
- Fat necrosis

What is your ddx of a breast lump?

- Fibroadenoma (mobile, smooth and circular)
- Fibrocystic disease (tender, bilateral and fluctuate with menstrual cycle)
- Abscess
- Galactocele
- Cancer
- Chronic granulomatous mastitis

Ddx of bloody nipple discharge?

- Intraductal papilloma
- Paget's disease
- Fibrocystic disease
- Intraductal carcinoma

Yellow/green:

- Abscess
- Fibrocystic disease
- Duct ectasia
- Galactocele

White/milky:

- Hyperprolactinemia

What are the skin changes seen in breast cancer?

- Dimpling
- Peau d'orange
- Redness of skin
- Fungating lesion (T4)

What are the genes related to breast cancer?

- BRCA 1 and BRCA 2
- K-167
- B10 and B51

Only 5-10% of all breast cancers are associated with an inherited mutation

What are the risk factors of breast cancer?

- Age
- Early menarche and late menopause
- Nulliparity or first pregnancy >30
- Obesity
- Atypical hyperplasia
- OCP or HRT
- Smoking
- Gender
- Genetic predisposition

FNAC results in breast cancer:

- C1: inadequate
- C2: benign
- C3: atypical
- C4: suspicious
- C5: malignant

Where does breast cancer metastasize?

- 2B 2L
- brain, bone, liver, lungs and adrenals.

Staging:

- CT abdomen and chest
- Bone scan

Treatment:

Stage I, II: simple mastectomy + chemotherapy OR lumpectomy with radiation + chemo

Stage III: mastectomy with axillary lymph node dissection

Stage IV: systemic and palliative treatment

Complications of axillary lymph node dissection:

- Injury to long thoracic nerve (winged scapula)
- Loss of sensation
- Seroma

TNM classification of breast cancer:

T0: No tumor	N0: no regional lymph nodes metastasis	M0: no distant metastasis
TIS: CIS	N1: metastasis to level I,II axillary LN ipsilateral movable	M1: distant metastasis
T1: < 2 cm	N2: metastasis to ipsilateral LN fixed level I and II	
T2: 2-5 cm	N3: metastasis ipsilateral infraclavicular LN or supraclavicular LN	
T3: > 5 cm		
T4: metastasis		

What is Mondor's disease?

Its superficial thrombophlebitis of lateral thoracic vein the patient will present with acute pain in the axilla or superior aspect of lateral breast. Confirm the diagnosis with an ultrasound.



Sentinel lymph node biopsy:

We inject a radioactive substance and blue dye to locate the position of the sentinel lymph nodes. We use a device that detects radioactivity to find the sentinel node, once its located we make a small incision and remove the node. Its then send to pathology if malignant cells if sentinel node is positive axillary dissection is completed if sentinel node is negative axillary dissection is not performed.

What is the tumor marker of breast cancer?

CA-125 and CA-15-3 (not specific)

What is your treatment for fibrocystic disease?

Initial: NSAIDS, vitamin E and warm compression and avoid caffeine and tobacco

Next: primrose oil (3-6 months)

Severe: danazole and tamoxifen

What is the treatment for fibroadenoma?

Observe if asymptomatic size < 2 cm. If > 2m surgical excision.

A patient with had no lump no pain they only found microcalcifications she found to have what to do next?

Take a stereotactic breast biopsy and send for pathology

Carcinoid tumor:

Its is a malignant tumor of the **enterochromaffin** cells that most commonly occur in the appendix followed by the small intestines and rectum

Signs and symptoms:

- Slow growing so usually asymptomatic at first and usually found incidentally
- Symptomatic: **vague abdominal pain** is the most common symptom
- Intermitted obstruction in 25% of patients
- **Rectal bleeding (rectal carcinods)**, pain and weight loss

Carcinoid syndrome only found in 10% of total patients with a carcinoid tumor

- Due to the production of serotonin, bradykinin or tryptophan by the tumor and exposure of the body to these products
- Cutaneous **flushing, sweating, watery diarrhea, wheezing, dypnea**.(niacin deficiency)

Diagnosis:

- Most are found incidentally with radiographic studies, appendectomy or surgery for intestinal obstruction
- If the patient had carcinoid tumor
 - **5HIAA** (hydroxyindolacetic acid) in 24 hour urine collection
 - **plasma chormogranin**
 - **pentagastrin** (in patients with high 5HAA there will be more cutaneous flushing)

Treatment:

-Medical: serotonin antagonists or somatostatic analogs (octerotide) for symptoms of carcinoid syndrome

Surgery:

- appendix carcinoid < 2 cm appendectomy
- base of appendix carcinoid >2cm right hemicolectomy
- small intestines carcinoid; resect the tumor with mesenteric lymph nodes

Diabetic Foot and Ulcers:**Ulcer history taking:**

- Onset
- Progression
- First time or not?
- Pain
- Discharge or foul smell
- History of any trauma or insect bite
- Claudication/rest pain
- Ask about (diabetes, HT, dyslipidemia and smoking)
- Occupation

Diabetic foot can be secondary to:

- Neuropathy (present over pressure area, painless)
- Ischemia (tip of toes, painful)
- Infection (pus and discharge, +/- fever)

Examination of an ulcer:

- **Inspect:** site, size, depth, edge, margins, base, discharge, changes in the surrounding skin
- Inspection of the foot: cracks or dryness “secondary to autonomic neuropathy”, look between the toes for fungal infection, any signs of cellulitis, Charcot foot deformity.
- Palpation: sensation, capillary refill time, peripheral pulses, temperature, look for vascular angle.



Monofilament test: used to assess for diabetic foot neuropathy. A positive test when the monofilament is bent (10 mg force) indicates the presence of neuropathy.

Investigations:

Blood: CBC, glucose level, HbA1C, urea, electrolytes, Cr, serum lipids and blood culture if patient septic

Foot investigations: wound culture if its infected, foot xray if osteomyelitis or charcot foot is suspected

Ischemia specific investigations: ABI, arterial duplex, angiogram

	Arterial Ulcer	Venous Ulcer
Site	Distal end of limbs	Gaiter region above the medial malleolus
Size	Small	Large
Depth	Deep	Shallow
Edge	Punched out	Sloped
Base	Necrotic	Granulation tissue
Margin	Regular	Irregular
Pain	Yes, unless neuropathic	Minimal
Surrounding features	Pallor, hair loss, onychogryphosis, cold skin, weak/absent pulses, prolonged capillary refill	Edema, hyperpigmentation, lipodermatosclerosis
		

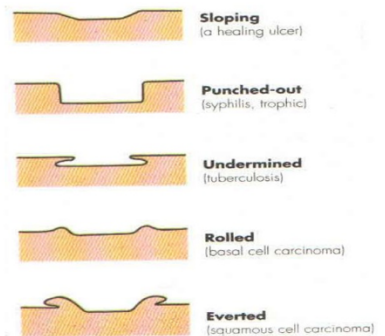


FIG 1.15 The varieties of ulcer edge.

Appendicitis:

Random info:

- We only give one prophylactic dose of antibiotics before surgery in appendicitis
- If patient had perforated, abscess or gangrenous appendicitis we give antibiotics for 5 days (ceftriaxone + metronidazole)
- Patients might complain of RLQ pain lasting for more than 5 days with vomiting and a RLQ mass think about **appendicular mass**, in such patients we don't operate Rx: IV antibiotics. If they later complained of recurrent pain, we go for appendectomy otherwise its not recommended
- if a patient complained of high fever, RLQ pain and a tender mass (appendicular abscess) diagnosis: CT Rx: surgical drainage

Examination in appendicitis		
Sign	Finding	
Peritoneal signs	Rebound tenderness: acute increase in pain after removing the hand from applying pressure Involuntary guarding: tensing of abdominal wall muscles during the palpation of abdomen Rigidity: persistent tension of the abdominal wall muscles	Peritoneal irritation
Psoas sign	RLQ pain with extension of right thigh	Abscess adjacent to psoas or retrocecal appendix
Obturator sign	RLQ pain with internal rotation of right thigh	Pelvic appendix or abscess
Rovsing's sign	RLW pain with LLQ palpation	Acute appendicitis
Rectal tenderness	Right pelvic pain during rectal examination	Pelvic appendix or abscess

Cellulitis:

Acute infection of the skin involving the dermis and subcutaneous tissue

Causes: S.aureus, b-hemolytic streptococci

Risk factors: trauma, recent surgery, PVD, lymphedema, diabetes, cracked skin in feet/toes (tinea pedis)

Clinical features: pain, edema, erythema with indistinct borders +/- regional lymphadenopathy. Fever, chills and malaise. Can lead to ascending lymphangitis (red streaking)

Investigations: CBC, blood culture if febrile, skin swab only if open wound with no pus

Treatment:

- Antibiotics: cephalixin/if extensive erythema or systemic symptoms IV cefazolin
- MRSA (anti-MRSA) ☺
- Limb elevation and rest to reduce swelling

Admission criteria:

- Immunosuppression
- Intolerance of oral antibiotics
- Lack of response after 72 hours of oral therapy
- Noncompliant with medications
- Shock or DIC
- Signs and symptoms of sepsis
- Total WBC <1K

Differential diagnosis of cellulitis

- Eczema
- Edema
- DVT
- Chronic venous insufficiency
- Vasculitis

Class I	Class II	Class III	Class IV
-No systemic signs and symptoms -No comorbidities Within a 48-72 hrs will response to therapy Outpatient treatment take a swab of the exudate antibiotics: dicloxacillin oral for 7-10 days OR clindamycin for penicillin allergy if MRSA: clindamycin/TMP-SMX	-Mild-moderate systemic signs and symptoms -Stable comorbidity -Failure of response within 48-72 hrs oral =consider for outpatient IV antibiotics	-Significant symptoms -Unstable comorbidities (poor diabetes/immunosuppression or PAD) -Limb threatening infection = Inpatients with IV or oral antibiotics <ul style="list-style-type: none"> • Flucloxacillin or cefazolin • MRSA vanco/linezolid or tacoplanin 	<ul style="list-style-type: none"> • Severe sepsis • Necrotizing fasciitis = Inpatients with IV or oral antibiotics <ul style="list-style-type: none"> • Flucloxacillin or cefazolin • MRSA vanco/linezolid or tacoplanin

Table 16. Comparison of Erysipelas and Cellulitis

	Clinical Presentation	Etiology	Complications	Differential Diagnosis	Investigations	Management
Erysipelas	Involves upper dermis Confluent, erythematous, sharp raised edge, warm plaque, well demarcated Very painful ("St. Anthony's fire") Sites: face and legs Systemic symptoms: fever, chills, headache, weakness (if present, sign of more serious infection)	GAS	Scarlet fever, streptococcal gangrene, fat necrosis, coagulopathy Spreads via lymphatics	DVT (less red, less hot, smoother), superficial phlebitis, contact dermatitis, photosensitivity reaction, stasis dermatitis, panniculitis, vasculitis	Clinical diagnosis: rarely do skin/blood culture If suspect necrotizing fasciitis: do immediate biopsy and frozen section, histopathology	1st line: penicillin, cloxacillin or cefazolin 2nd line: clindamycin or cephalexin If allergic to penicillin, use erythromycin
Cellulitis	Involves lower dermis/subcutaneous fat Unilateral erythematous flat lesion, often with vesicles poorly demarcated, not uniformly raised Tender Sites: commonly on legs Systemic symptoms (uncommon): fever, leukocytosis, lymphadenopathy	GAS, <i>S. aureus</i> (large sized wounds), <i>H. influenzae</i> (periorbital), <i>Pasteurella multocida</i> (dog/cat bite)	Uncommon	Same as erysipelas	Same as erysipelas	1st line: cloxacillin or cefazolin/cephalexin 2nd line: erythromycin or clindamycin Children: cefuroxime If DM (foot infections): TMP/SMX and metronidazole

Salivary Glands:

Read the anatomy and salivary gland tumors

Salivary gland stones

The submandibular glands and ducts are most commonly involved and they can obstruct the salivary outflow and predispose to infection the actual etiology is unknown but has been stated that its caused by the more viscous secretion of the gland and the elongation of the gland the stone can be found anywhere in wharton's duct.

Clinical features: swelling and pain at time of salivation before eating.

The patient can also present with an acute bacterial infection (secondary infection caused by the obstruction)

Diagnosis: plain X-ray or U/S

Rx: surgical removal



Acute bacterial sialadenitis: infection of the parotid gland caused by poor oral hygiene or dehydration resulting in painful unilateral swelling and limited mouth opening (trismus) the parotid gland can also ooze

Rx: antibiotics and surgical removal of the abscess if present.

Sutures:

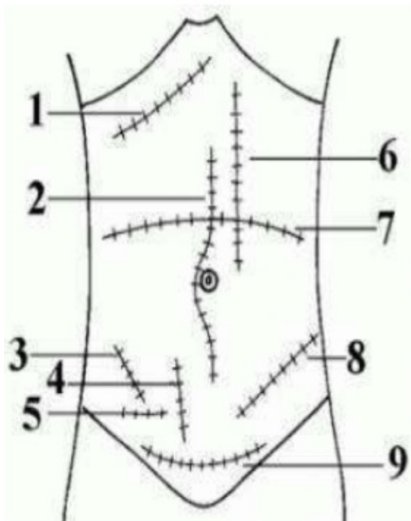
How long do we keep the suture for the following cases?

Midline laparotomy: ~ 10 days (in diabetics and immunocompromised is up to 14 days)

Cut wound in face or neck: 5-7 days

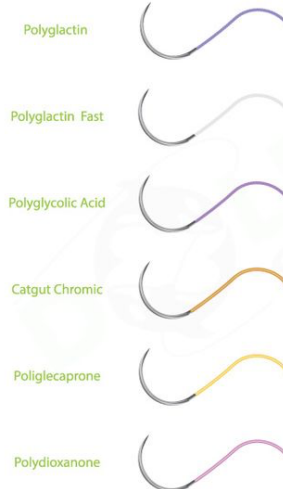
Lower limbs: 14 days

Suture types								
Absorbable					Non-absorbable			
Braided		Monofilament			Braided		Monofilament	
Vicryl	Vicryl rapide	Monocryl	Fast absorbing gut	Chromic gut	Ethibond	Silk	Ethilon	

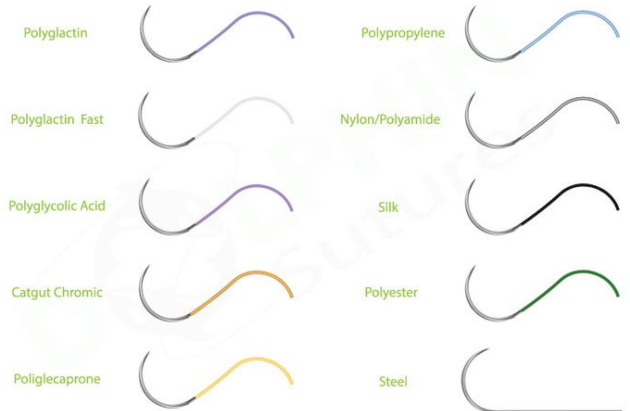


- ▶ 1. Kocher's incision
- ▶ 2. midline incision
- ▶ 3. Gridiron muscle splitting
- ▶ 4. Battle incision
- ▶ 5. Lanz incision
- ▶ 6. paramedian
- ▶ 7. transverse
- ▶ 8. Rutherford Morrison incision
- ▶ 9. Pfannestiel

Absorbable Sutures



Non-absorbable Sutures



*Know the composition and types of IV fluids