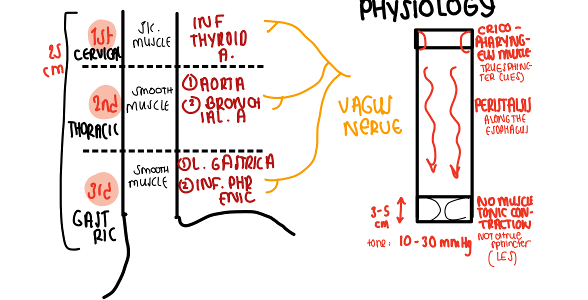
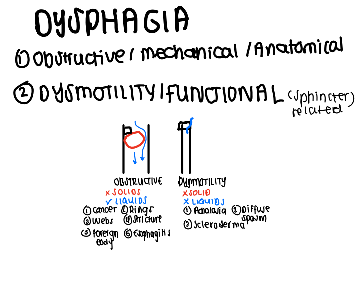
Lana Hango / 2022



DYSPHAGIA

① Obstructive / mechanical / Anatomical

② DYSMOTILITY / FUNCTIONAL (sphincter related)



HIATAL HERNIA cont'd

* DX:
  - ① Clinical { Dysphagia/Bleeding type II, III, IV; Reflux (GERD): type I; SOB, chest pain (rare) }
  - ② CXR: Air fluid level
  - ③ Barium swallow confirms Dx + type
* Treatment:
  - ① None (mostly)
  - ② GERD (type I: sliding): Fundoplication
  - ③ Elective surgery II, III, IV due to ↑ risk of complications
  - ④ Obstruction / volvulus: emergency surgery

DYSMOTILITY

ACHALASIA	SCLERODERMA	DES
APERISTALSIS	↓ PERISTALSIS	NON PERISTALTIC SIMULTANEOUS CONTRACTION
X LES RELAXATION	↓ LES TONE	Normal LES
DYSPHAGIA	GERD	CHEST PAIN
Myotomy (surgery)	No fundoplication!! anti regurgitation	CCB, Nitrates, POE long myotomy

GERD

* The stomach normally has some of its contents regurgitated to the esophagus BUT → no symptoms.

* GERD occurs when:

① ANTI REFLUX MECHANISMS ↓ ② ↑ REFLUX

* ANTI REFLUX MECHANISMS:

① LES: normally relaxes intermittently. Length 3-5 cm, tone 10-30 mmHg. Insufficiency? ↓ Length < 2 cm, ↓ Tone < 6 mmHg
(most imp area of ↑ pressure)

② Hiatal Crura: crura are tails/muscles of diaphragmatic insertions that extend to form the esophageal Hiatus, an opening from which the esophagus extends from Thorax → Abdomen. If the muscles are weak → Hiatus weakens → Reflux & LES weakness → GE Reflux.

③ Intra-abdominal ⅓ of esophagus. That part of the esophagus is narrower due to the +ve pressure in the abdomen, relative to the -ve pressure in the thorax. (TH → more patent; AB → protective against GERD.) Length of the intraab part should be ≥ 2 cm. If length < 1 cm this ↑ Risk of Reflux!

④ Angle of His:
(esophagus, < 90°, fundus) secretions can't go ↑ esophagus thanks to ∡

⑤ Phreno-esophageal Membrane
(Hiatus, crus, Abdominal Esoph-, Phreno esophageal membrane) Attaches esoph. to the crus / hiatal wall. This helps keep it closed & intact, preventing reflux.
If the membrane is LAX → won't hold esoph. well → HIATAL HERNIA: GEJ is above its norm lvl (above diaphragm)

⑥ Gastric emptying

⑦ Esophageal cont.

* TREATMENT

① Lifestyle modification
- Avoid food triggers
- Raise Head of bed
- Avoid food before bedtime
- ④ Weightloss

② Medication
- Mild: H2 Blockers
- Moderate-severe: PPI's (most effective)

③ Surgical Indications:
- ① Failure of medical Tx
- ② Complications: strictures, Asp. pneumonia
- ③ Hiatal Hernia

* Surgical complications:
- Dysphagia (Pts w. underlying dysmotility disorders) - can tell w. manometry/barium
  - → Due to tightening LES
  - → If ↓ peristalsis: Partial surgery, not complete
  - → If aperistalsis: No surgery (Achalasia/scleroderma)
  - (Assess motility of esophagus before surgery)

* Symptoms: (leads to ① esophagitis ② fibrosis & stricture)
  - * GI: Heartburn, substernal ①, acidic taste ②, dysphagia ③, associated w. food, regurgitation ④
  - * RS: Hoarseness ①, wheeze & dry cough (Asthma-like), aspiration pneumonia, URTI
  - ATYPICAL PRESENTATION: CHEST PAIN (CAD-like)
  - (Diagram labels: ① Hoarse, ② wheezing, cough; ③ Acidic taste; ④ regurgitation; ⑤ heartburn; ⑥ aspiration pneumonia)

* Exacerbating Factors
  - ① Position: supine
  - ② Foods: spicy, fatty, coffee, chocolate.
  - ③ Smoking
  - ④ Stress
  - ⑤ Tight clothing
  - ⑥ Obesity

* Relieving Factors:
  - ① Sitting up
  - ② Antacids: H2 Blockers, PPI

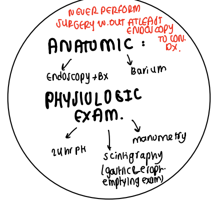
* DIAGNOSIS
  - ① Hx is sufficient
  - ② Imaging if atypical presentation / red flags:
    - ① > 55 at onset
    - ② Bleeding / vomiting
    - ③ Abd. Pain
    - ④ Weight loss / anorexia

* WHICH DIAGNOSTIC TOOL SHOULD WE USE?
(Investigations indicated if: ① persistent ② symptoms indicate injury (dysphagia, etc) ③ prevent ... uncertain Dx)
- ① TYPICAL & NO RED FLAGS → CLINICAL DX (Hx of recurrent heartburn is sufficient for Dx of GERD) → Med Tx.
- ② ATYPICAL PRESENTATION / NOT RESPONDING TO MEDICATIONS → 24 hour pH monitoring
- ③ You're sure pt has REFLUX + -ve pH testing → Impedance Testing
- ④ Suspected dysmotility: ① Manometry ② Barium swallow

* SURGERY cont'd — FUNDOPLICATION (knit/stitch the fundus around the LES to close it)
- NO DYSMOTILITY DISORDER: • NISSEN FUNDOPLICATION (complete) 360°
- PARTIAL PERISTALSIS: ① Toupet (270°) Fundoplication ② Dor (180°) fundoplication

* BARIUM SWALLOW FIRST LINE
- * It's the 1st test of choice for most esophageal disorders.
- * (contrast & xray) Pros & cons: ① xray ② contrast — Anatomy & function of the esophagus
- 1* If ① Perforation Risk → X Barium swallow: Risk of barium mediastinitis!! → Instead: Water-soluble contrast.
- 2* Risk of Aspiration: → X Barium swallow → X water soluble

* Barium swallow can identify:
- ① Causes of GERD
  - 1- Mechanical: Hiatal hernia
  - 2- Motility: Scleroderma
- ② Complications of GERD
  - 1- Lower stricture → Dysphagia
  - 2- Erosions in esophageal wall



* ENDOSCOPY: (normal mucosa doesn't rule out GERD)
  - * Identifies:
    - 1- Erosions
    - 2- Strictures
    - 3- Salmon colored mucosa at the bottom of the esophagus BARRET
    - 4- Hiatal Hernia (GEJ above diaph.)
    - 5- Esophagitis & grade of reflux
  - Pts w. severe/persistent GERD should have at least 1 endoscopy to assess mucosa (Risk of CA & BARRET, esophagitis, strictures). Least you can do prep.

* BARRET ESOPHAGUS
- ① PREMALIGNANT: ↑ Risk w. ↑ Dysplasia
- ② METAPLASIA: squamous → Intestinal columnar
- ③ If detected: BIOPSY! → To check for dysplasia
- ④ Irreversible w. meds / GERD treatment
- ⑤ If dysplasia is detected → Ablation → Through: ① Cryotherapy ② Radiofrequency ③ EMR: Endoscopic mucosal Resection

* MANNOMETRY (measures motility)
- * Identifies causes:
  - 1- Dysmotility disorders: ① Scleroderma ② Achalasia (Rare) ③ Diffuse Esophageal spasm
  - 2- Mechanical causes: ① LES insufficiency (Length < 2 cm, intraab. < 1 cm, Pressure < 6 mmHg)

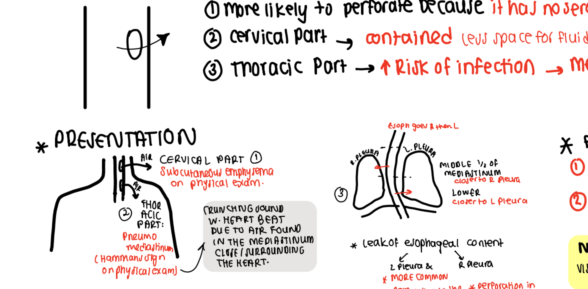
* 24 Hour pH test — DIAGNOSTIC FOR GERD GOLD STAND. (used to rule out/in if Dx isn't clear)
- * Measures:
  - ① pH & Duration
  - ② Duration of symptoms
  - ③ Duration of reflux
- * GERD Dx: > 6% of the time, pH < 4
- * In case of ALKALINE REFLUX: IMPEDENCE TESTING & can't be identified on 24 hr pH testing. Detects presence of reflux, but it isn't known whether it's acidic/alkaline.
- * Do if ATYPICAL OR PREOP + NO RESP TO T

ESOPHAGEAL PERFORATION

① More likely to perforate because it has no serosa

② Cervical part → contained (less space for fluid to go to)

③ Thoracic part → ↑ Risk of infection → Mediastinitis due to -ve pressure



* FOR DX: ABCs then → →
  - ① CXR: subcut. emphysema ①, Pneumo mediastinitis ②, pleural effusion ③.
  - ② Upright Abdominal XR: Pneumoperitoneum
  - NOTE! ALL PERFORATED VISCERA REQUIRE XRAY FOR DX
* TO CONFIRM DX:
  - (Unstable) ① WATER SOLUBLE CONTRAST ESOPHAGOGRAPHY (XRAY + contrast)
  - (Stable) ② WATER SOLUBLE CONT. CT SCAN. (CT + contrast)
  - NOTE! Endoscopy is contraind. due to air insufflation

* TREATMENT
- → STABLE (patient) & CONTAINED (perforation): The content remains inside the esophagus
  - NPO + NG Decompression (IN ALL VISCERAL PERFORATION) + IV BROAD SPECTRUM ABX (IN ALL VISCERAL PERFORATION) ↘ ↓ Risk of sepsis } → THEN: Follow up w. CT / Esophagography
- → IF NOT: URGENT SURGERY + NPO, NG, IV ABXs
  - ↳ Debridement of nonviable tissue.

* CAUSES:
- ① MOST COMMON CAUSE: ENDOSCOPY! (50%) (Rigid > Flex)
- Others: ② Malignancy ③ Esophagitis

* BOERHAAVE SYNDROME: Perforation of lower part of the esophagus due to excessive vomiting (1° or complication to Mallory Weiss (tear → Bleed → Perforation))
(Diagram: lower esoph.; "mallory weiss" longitudinal tears; ① ↑ vomiting; ② acidity)

MALLORY WEISS SYNDROME

* Tear at the lower ⅓ of the esophagus which partially extends to the stomach, due to excessive vomiting, presenting w. UGIB.

* CAUSES:
  - ① Bulimia / anorexia
  - ② Alcoholism
  - ③ Hyperemesis Gravidarum

* Risk Factors:
  - ① NSAIDs
  - ② Portal HTN

* TREATMENT (FOR INITIAL STABILIZATION)
  - ① IV access ② NG Tube ON
  - ③ NPO ④ Fluids
  - ⑤ Blood ⑥ Endoscopy → Dx + Tx
    - ① Epinephrine ② Sclerotherapy ③ Cryotherapy ④ Electrical
    - No use? → ⑦ Angiography (Coil) (No use? Surgery)

* Symptoms like any UGIB (usually asymptomatic)
  - ① Melena / hematemesis
  - ② ↓ BP & anemia

HIATAL HERNIA

* Cause: Laxity of Phrenoesophageal membrane

* Types:

1. SLIDING HIATAL HERNIA (90%)
   - * Part of the esophagus & Gastroesoph. junc. (GEJ) slides above level of diaphragm hiatus.
   - * Asymp. * ↑ Risk of GERD
2. PARAESOPHAGEAL HERNIATION (Less common)
   - * GEJ Remains in its place (in the stomach) but the fundus of the stomach is herniated (paraesophageal)
   - * ↑ Risk of complications: ① Most common: GI bleeding (compressed vessels rupture) ② Volvulus (gastric) ③ Ulceration & Ischemia
   - Also due to compression of the esophagus through the fundus: ① Obstruction ② Dysphagia
3. MIXED HERNIA — Type I: fundus in place, GEJ above; Type II: GEJ in stomach, fundus herniated; Type III: Both
4. COMPLEX HERNIA (Most common: colon) ① Additional organ herniated through hiatus ② GEJ in the chest ③ fundus herniated

ACHALASIA

* ETIOLOGY . Most common: Idiopathic
  • AI disorder: Damage to nerves → ↑ LES tone, aperistalsis
  • Infection → Chagas (trypanosoma cruzi)
* XLES RELAXATION + APERISTALSIS

* PRESENTATION
  ① Dysphagia → solids & liquids (solids > liquids)
  ② pain
  ③ RARELY: REFLUX! food reaches hypertonic LES & goes back ↑

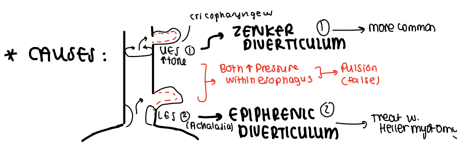
* DX:
  ① Manometry (GOLD STANDARD)
  - Shows hypertonic LES ∇∇ tone > 30 mmHg
  - Aperistalsis
  - Nutcracker esophagus Tone > 120
  ② Barium Swallow
    ① Bird's peak
    ② Dilated esophagus
    ③ Constricted / narrow LES
  ③ Endoscopy + endosc. U/S to check surroundings
  To rule out Pseudoachalasia
  * Pseudoachalasia: ① Malignancy in esophageal wall
    ② Malignancy close to (outside) esophagus compressing it
  * Perform in ↑ Risk pts / for elderly as it wont appear on barium swallow or manometry.
  * on BS & Manometry . same as achalasia: ① Hypertonic LES ② Aperistalsis ③ Birds peak

* TREATMENT
  ① Conservative treatment Botox injections
    → every 6 mo's (temporary)
    → ↑ risk of fibrosis
  ② Balloon Dilation if pt is > 40
    → pt < 40 → Rigid esophagus → Risk of rupture
    → pt > 40 → flexible esophagus
  ③ Surgery: Heller Myotomy
    → ↑ success Rate
    → cut wall of lower esophagus & loosen LES
    → ↑ Risk of GERD due to loosening LES
      ↳ ∴ Follow w. fundoplication (partial: Dor/toupet)
    NOT DONE TO TREAT BUT TO PREVENT GERD AS A COMPLICATION OF SURGERY

ESOPHAGEAL DIVERTICULA

* Bulge (outward) of a luminal organ due to:
  ① Pulsion: ↑ pressure inside esophagus → bulge (push out)
    FALSE → involves mucosa + submucosa only
  ② Traction: outward pull of the layers → bulge (pull)
    TRUE → involves all layers

* CAUSES:



* ZENKER DIVERTICULUM

* PRESENTATION:
  ① Age
  ② Dysphagia mechanical due to proximal → hypertonia, food accumulates
  ③ Reflux food accumulates
  ④ Halitosis undigested food

* PE:
  • IF LARGE: LATERAL NECK MASS

* DX:
  • BARIUM SWALLOW (Gold standard)
  Filling in post esophagus: Zenker

imp
* TREATMENT:
  ① Diverticulectomy
  ② Diverticulopexy: fix what's left of esoph.
  ③ CRICOPHARYNGEUS myotomy

ESOPHAGEAL NEOPLASIA

BENIGN

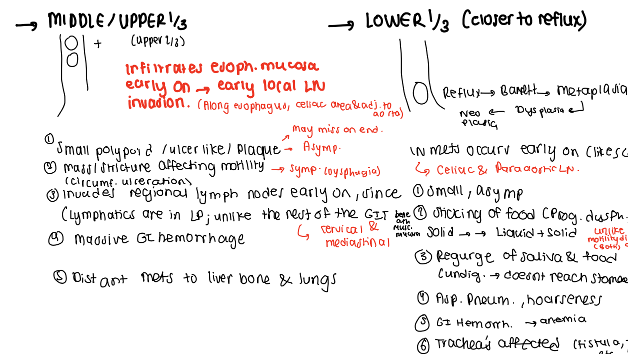
* Leiomyoma (MC) 60%
  → Barium: Smooth filling defect
  → Mech. Dysphagia
1 * Epithelial → (MC) Esophageal cysts
2 * NON EPITHELIAL → (MC) Leiomyoma
  → X RAY: Post. mediastinal mass
  → ENDOSCOPY: Leave as it is, excise it & send to Pathology
  → X BIOPSY IF MUCOSA IS INTACT (ex: leiomyoma which prevents under the mucosa)
    ↳ may allow tumor to spread!

MALIGNANT

* SCC of esophagus (squamous cell)
  → BARIUM: Irregular filling defect
  → Dysphagia + Red flag signs (fever, weight loss, anorexia, fatigue)
  → On presentation Locally advanced, LN, regional invasion
  → M > F

SCC
M:F, 3:2
- RF → SMOKING
- RF → ALCOHOL: irritates esophagus
- RF → Nitrosamines smoked food
- RF → ACHALASIA
- RF → ESOPH. WEB membrane is proximal esophagus, unlike stricture which is fibrosis due to reflux
  - Plummer Vinson: Beefy tongue, IDA, webs, koilonychia
- → Atrophic Gastritis
- RF → Tylosis (autosomal dominant hyperkeratosis)
- RF → Hx of Gastrectomy
- RF → Tylosis
- RF → Poor Oral Hygiene

ADENOCARCINOMA
M:F 10:1
- RF → OBESITY
- RF → BARRETT
- RF → REFLUX → leads to barrett
  ∴ ↑ incidence in USA
- RF → ACHALASIA
- RF → SMOKING
  MAINLY SQ.
- RF → H pylori



→ MIDDLE / UPPER 1/3 (upper 1/3)
Infiltrates esoph. mucosa early on → early local LN invasion. (Along esophagus, celiac area & aorta)
① Small polypoid / ulcer like / plaque → may miss on endo. Asymp.
② mass / stricture affecting motility → symp. (dysphagia) (circumf. ulceration)
③ Invades regional lymph nodes early on, since (lymphatics are in LP; unlike the rest of the GIT (are in musc. mucosa)) → cervical & mediastinal
④ Massive GI hemorrhage
⑤ Distant mets to liver bone & lungs

→ LOWER 1/3 (closer to reflux)
Reflux → Barrett → Metaplasia
Neo plasia ← Dysplasia ←
LN mets occurs early on (like SCC) ↳ celiac & paraaortic LN.
① small, asymp
② sticking of food (prog. dysph.) Solid → Liquid + Solid (unlike motility disorders)
③ Regurge of saliva & food (undig. → doesn't reach stomach)
④ Asp. Pneum., hoarseness
⑤ GI Hemorrh. → anemia
⑥ Trachea's affected (fistula,) etc

→ DX: ① BS (Barium study) — not specific
② ENDOSCOPY — changes in mucosa (may not see tumor)
  BRUSH BIOPSY + Biop. (6-10 biopsies) DETERMINE TYPE
③ ENDOSC. U/S — how much the tumor is invading the wall
  - Check local invasion (T & N)
  - multiple biopsies if there are changes in mucosa
  - for STAGING
④ CT
  → (Triphasic) chest, Ab. pelvis
  → mets (N)
+ PET
  → check occult mets (microscopic) (N)
Determine METS

DX: Endoscopy + biopsy
T: Endos. U/S
N: Endos. U/S, CT
Distant mets ↓ CT, PET

→ T1 mucosa submucosa
T2 muscularis
T3 Adventitia
T4 Local invasion beyond adventitia
  a. Resectable: ① pleura ② pericardium ③ Diaphragm
  b. Nonresectable: ① Aorta ② Trachea ③ vertebra

→ N: # of LN
• IF LN's are near surgery → Resect
• IF can't be removed → surgery is contraindicated (no benefit as removal won't stop tumor from spreading)
• Can be determined:
  * esophagectomy
  * Lymphadenectomy
    ↳ upper: cervical
    → middle: mediastinal
    → Lower: Abd.

→ STAGES: ① STAGE 1 (T1 or T2) N0 — Go to surgery, No LN envolvement ② ST. 2 ③ ④

→ TREATMENT:
① CIS / BARET
  ① Radiofreq. Ablation
  ② Cryotherapy
  ③ Endos. mucosal resection
② Resectable Tumors
  - Esophagectomy
  - Adjuvent chemo / radio after surgery
  - EARLY STAGE (1) are eligible
③ Large Tumor Advanced
  - Neoadj chemo / radiotherapy make it resectable THEN REASSESS FOR ESOPHAGECTOMY (stage 2b or 3, LN envolved)
④ unresectable
  - Palliative to ↓ symptoms (esoph. stent to open esophagus to ↓ dysphagia)

→ ST. 1,2? → ESOPHAGECTOMY → ADJ CHEMOTX
→ ↑T or LN involvement → Neoadj. Chemotx → REASSESS FOR SURGERY

When is surgery contraindic?
① Distant mets
② Old age
③ Comorbidities
④ T↑ — Instead, do primary chemotx

ADENOCARCINOMA
* ESOPHAGECTOMY Siewert I / II (epicenter is above or in the GEJ)
* GASTRECTOMY Siewert III (below the GEJ) within cardia