



Findings in Diverse Cancers

FCDS

BETTY MALANOWSKI

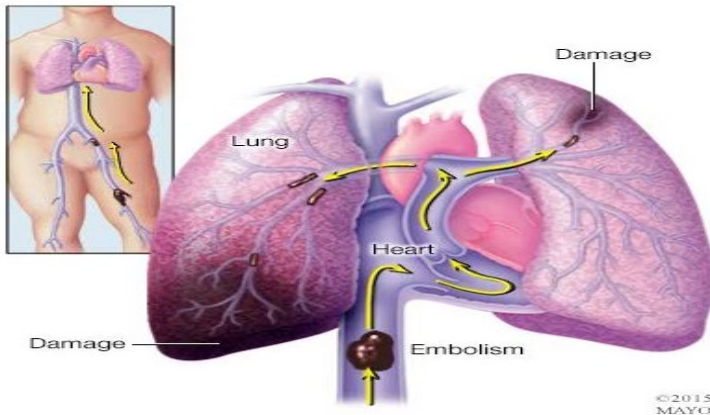
April 30, 2025

CANCER

Cancer patients have a higher probability of developing blood clots as Deep Vein Thrombosis DVT due to their hypercoagulability state, and because of certain cancer **treatment** too! as chemotherapy and **hormone** therapy.

Some people with **DVT** (Deep Vein Thrombosis) are diagnosed with cancer within a year.

Pulmonary embolism



According to MD Anderson Cancer Center, approx. 1-2% of cancer-related deaths are caused by a **PE** (Pulmonary Embolism).

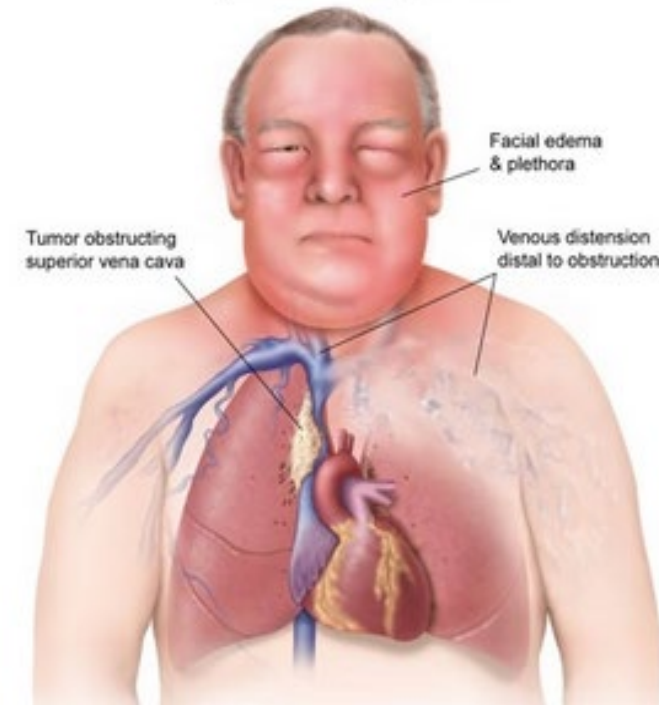
Cancer **obstruction** (Partial or Complete) of **airways, bile ducts, ureters, bowels...** which may require emergency intervention.

Other obstruction may cause **superior vena cava syndrome** (swelling in face, neck, arms, upper body), left varicocele ...

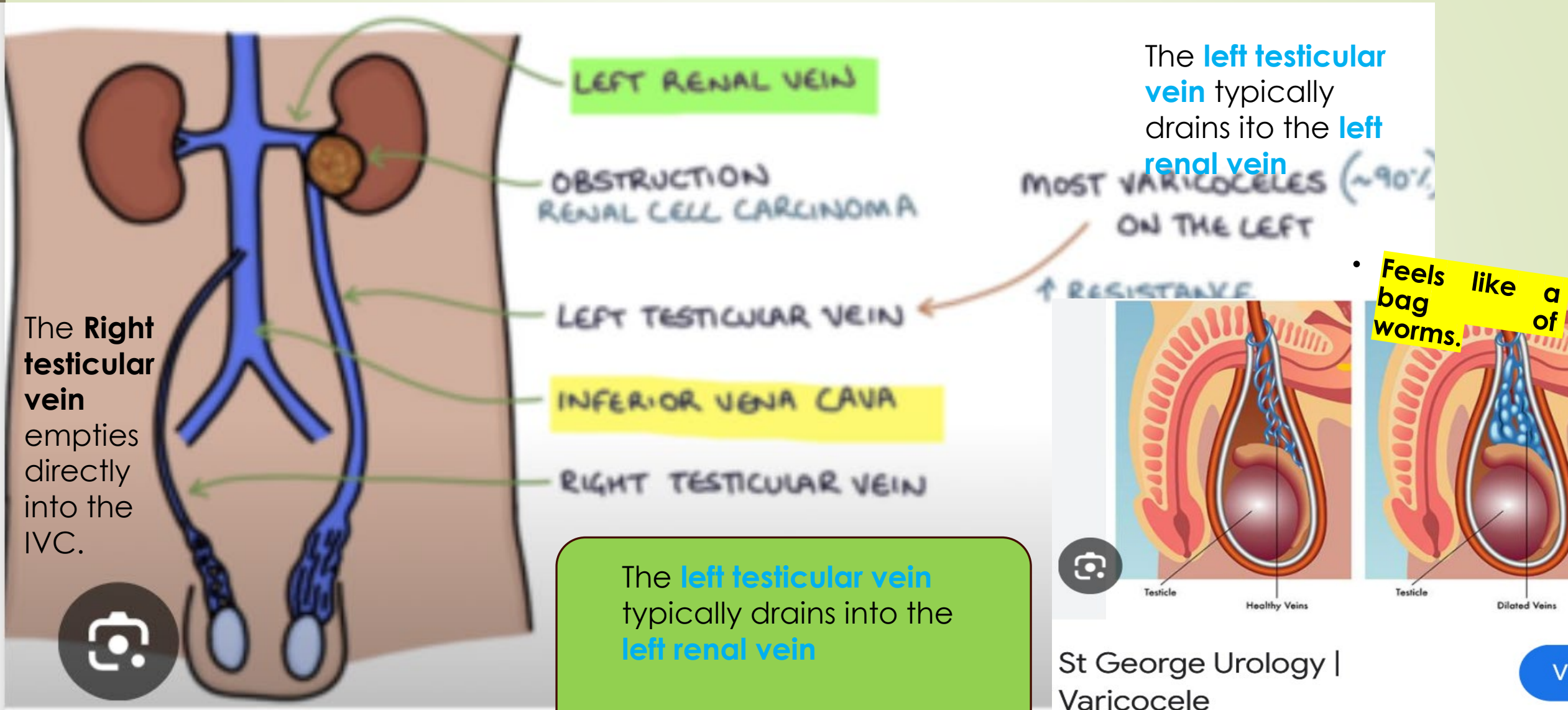
YouTube

Dr. Megren Alkhayatt · 2:16

Superior vena cava syndrome



Left Renal Cell Carcinoma



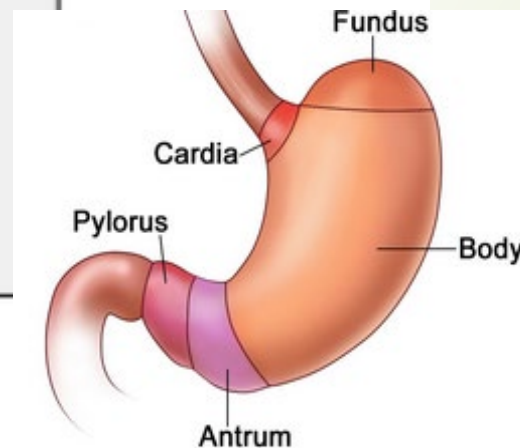
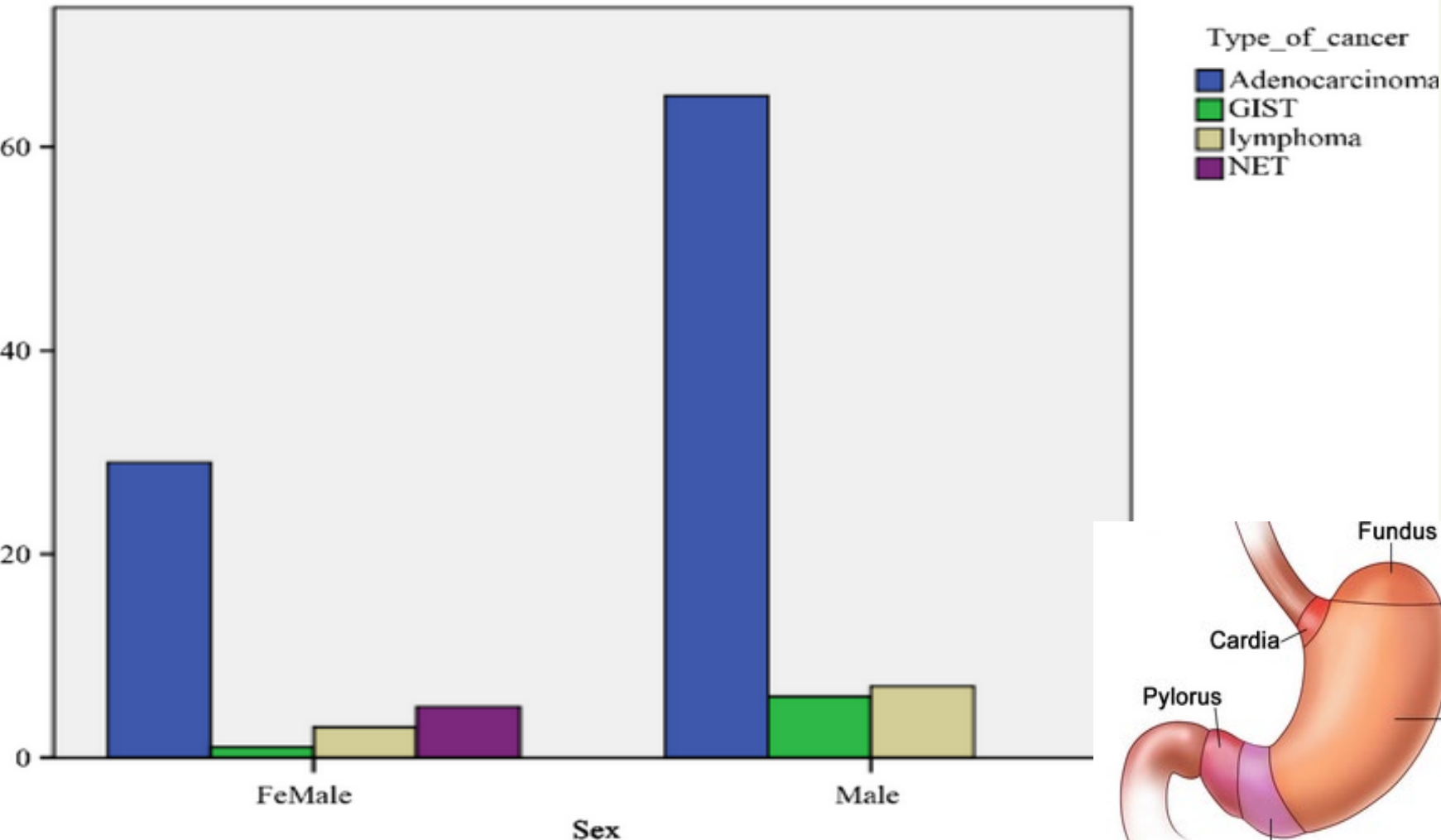
Most **varicocele** are on the left testicle. Many causes! One of them is obstruction of **Left renal vein** because of **Renal Cell Carcinoma**

GASTRIC CANCER

Male-to-female ratio 2:1 or 3:1

-Average age at diagnosis: 68

-Early onset of gastric cancer: 10-30%



5-Year
Relative Survival

36.4%

2014-2020

relationship of patient gender with type of gastric cancer.

Gastric ADENOCARCINOMA classification

WHO (2010)

Papillary adenocarcinoma

Tubular adenocarcinoma

Mucinous adenocarcinoma

Signet-ring cell carcinoma

And other **poorly cohesive** carcinoma

Mixed carcinoma

Adenosquamous carcinoma

Squamous cell carcinoma

Hepatoid adenocarcinoma

Carcinoma with lymphoid stroma

Choriocarcinoma

Carcinosarcoma

Parietal cell carcinoma

Malignant rhabdoid tumor

Mucoepidermoid carcinoma

Paneth cell carcinoma

Undifferentiated carcinoma

Mixed adeno-neuroendocrine carcinoma

Endodermal sinus tumor

Embryonal carcinoma

Pure gastric yolk sac tumor

Oncocytic adenocarcinoma

Lauren (1965)

Intestinal type 54%

Diffuse type 32%

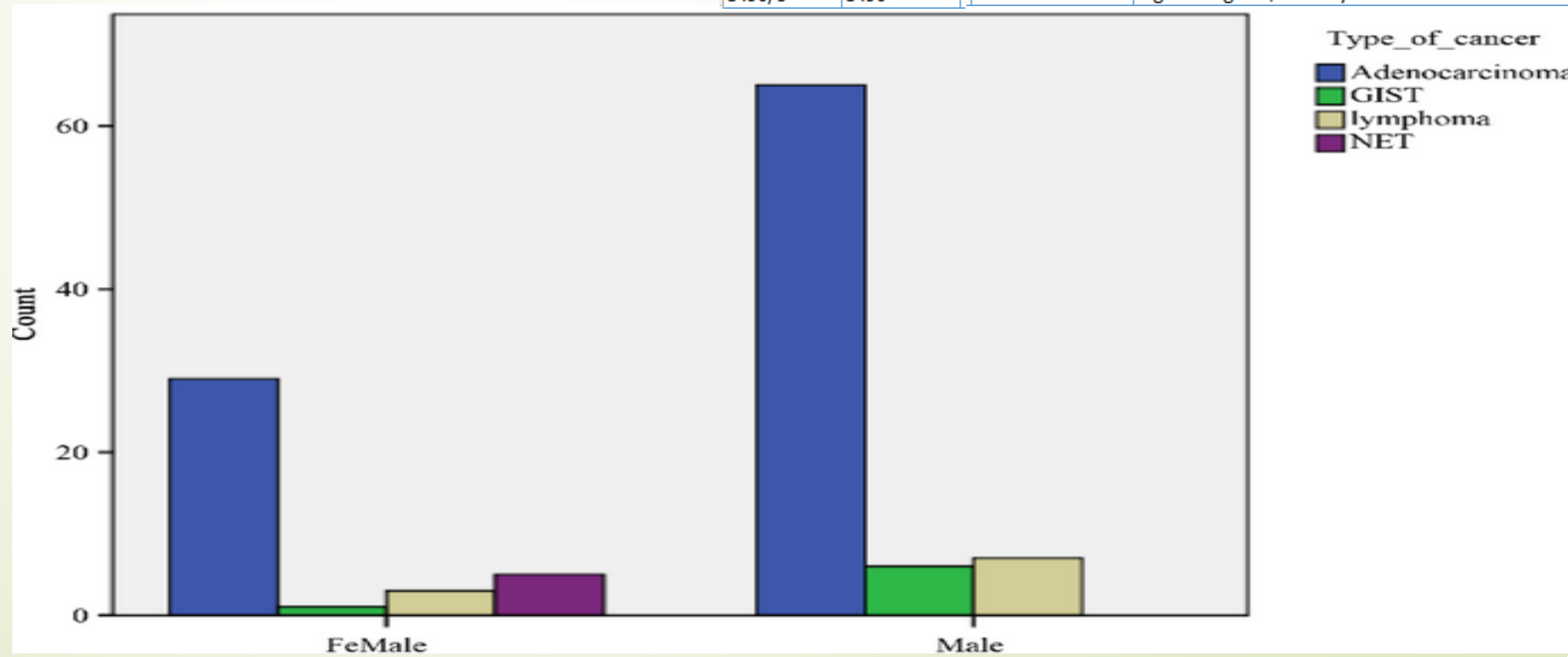
Indeterminate type 15%

More often associated with **Helicobacter pylori** infection and intestinal metaplasia

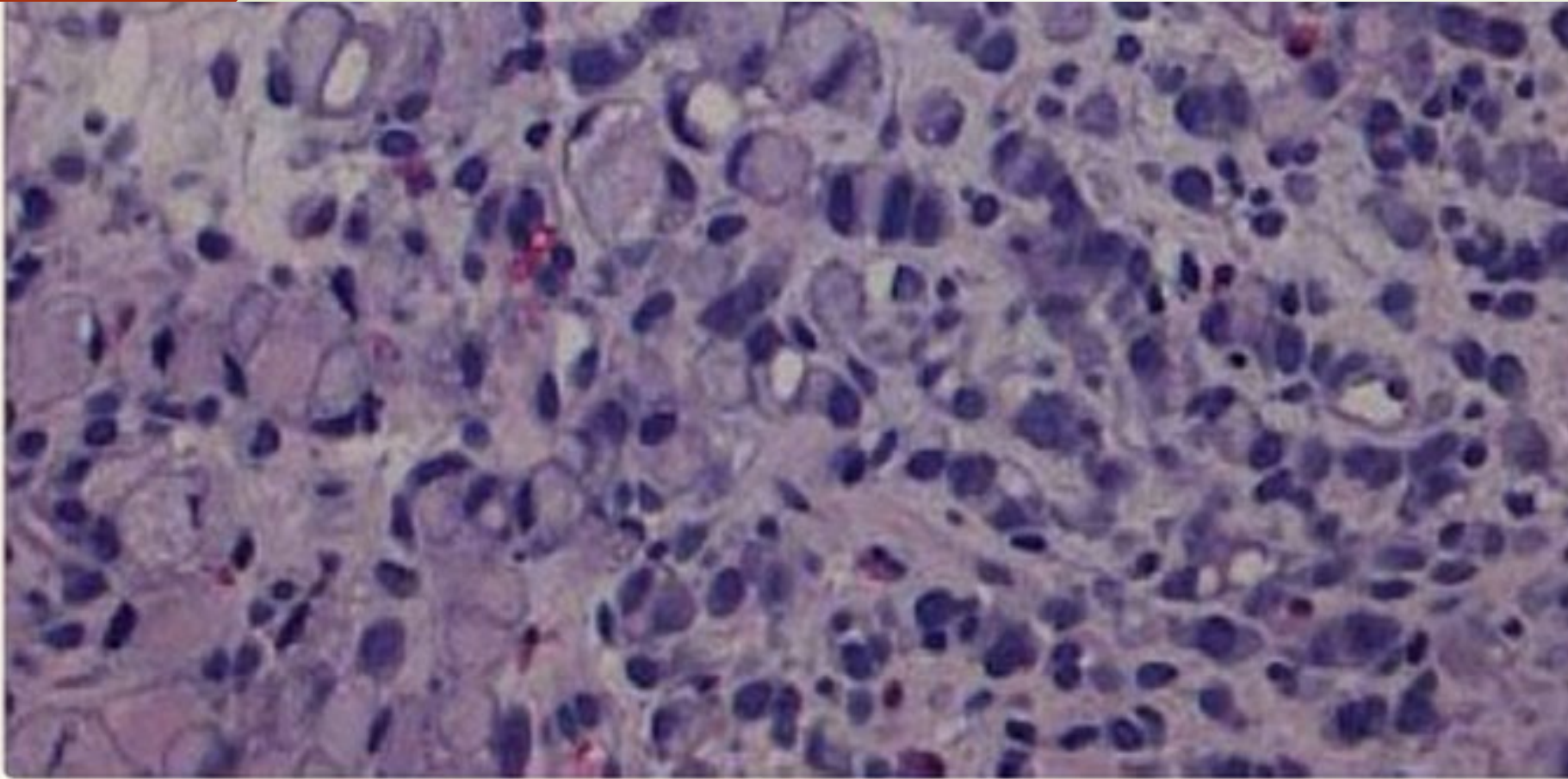
More often seen in **female** and **young** individuals. (EBV, Genetics...)

Uncommon

8490/3	8490	Preferred	Signet ring cell carcinoma
8490/3	8490	Synonym	Signet ring cell adenocarcinoma
8490/3	8490	Synonym	Acinar adenocarcinoma, signet ring-like variant
8490/3	8490	Synonym	Mucinous carcinoma, signet ring cell type
8490/3	8490	Related	Poorly cohesive carcinoma
8490/3	8490	Related	Signet ring cell/histiocytoid carcinoma



Signet ring cell ADENOCARCINOMA



SIGNET RINGS:

Abundant mucin displaced the nucleus to the periphery giving the ring shape.

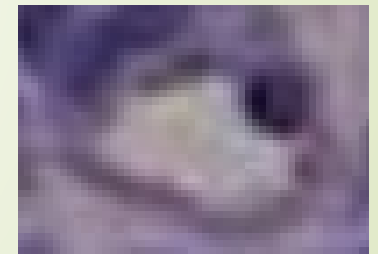
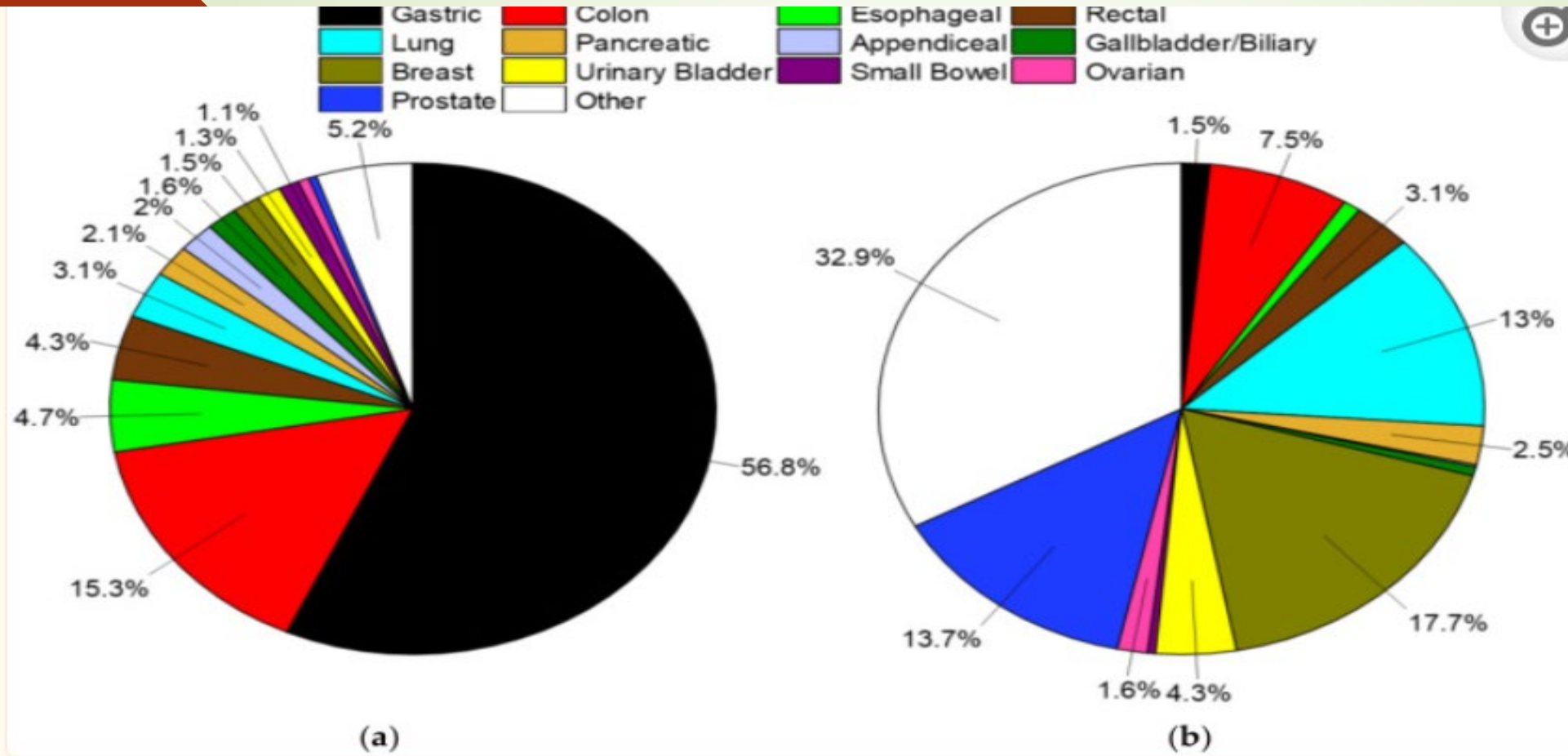


Figure 3

Signet ring cell carcinoma. Signet ring carcinoma cells are predominantly at the

Signet ring Adenocarcinoma think GI tract: GASTRIC and COLON CA

GASTROINTESTINAL vs Ovary Primary



“Gastric adenocarcinomas in younger women are typically of the **signet-ring** type, and these have a predilection to metastasize to the **ovary (Krukenberg tumors)**”

Figure 2

8490	3	Preferred	Signet ring cell carcinoma
8490	3	Synonym	Signet ring cell adenocarcinoma

(a) Distribution of signet ring cell tumors in SEER, 1975–2016, total of 41,847 cases. (b) Distribution of all solid (non-blood borne), non-signet ring cell tumors in SEER, 1975–2016, total of 9.56 million cases. In both plots data labels are percentages. Markers omitted if less than 1%.

Krukenberg Tumor

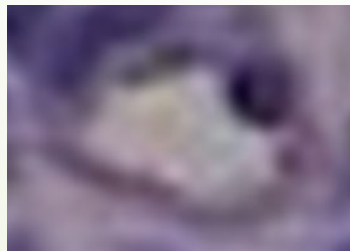
10% of ovarian tumors are metastatic from another primary site, nearly half are Krukenberg tumors

Krukenberg tumor is a metastatic **signet-ring** cell adenocarcinoma of the **ovary** characterized by mucin-rich, signet-ring cells, originating from a **gastrointestinal** primary in **70%** of cases, but also involving the colon, breast, appendix, and biliary tract. The incidence of Krukenberg tumors ranges from 1% to 21%, most common

<https://www.ncbi.nlm.nih.gov/books/NBK482284/>

- Primary is a **GASTRIC** cancer in 70-80% of cases, mostly in the pylorus
- Followed by the **COLORECTAL**

Gastric + ColoRECTAL = Almost 70-90% of Krukenberg Tumors

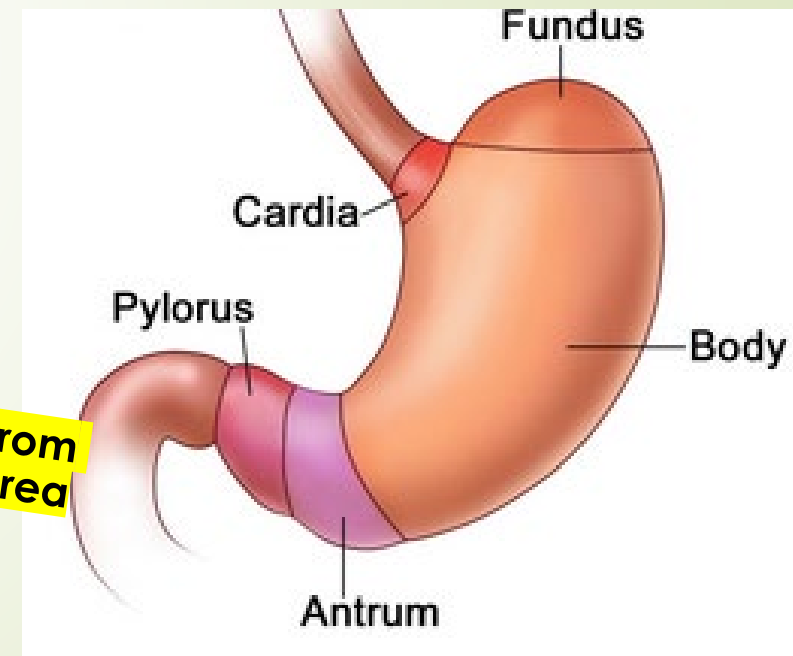


Other sites.

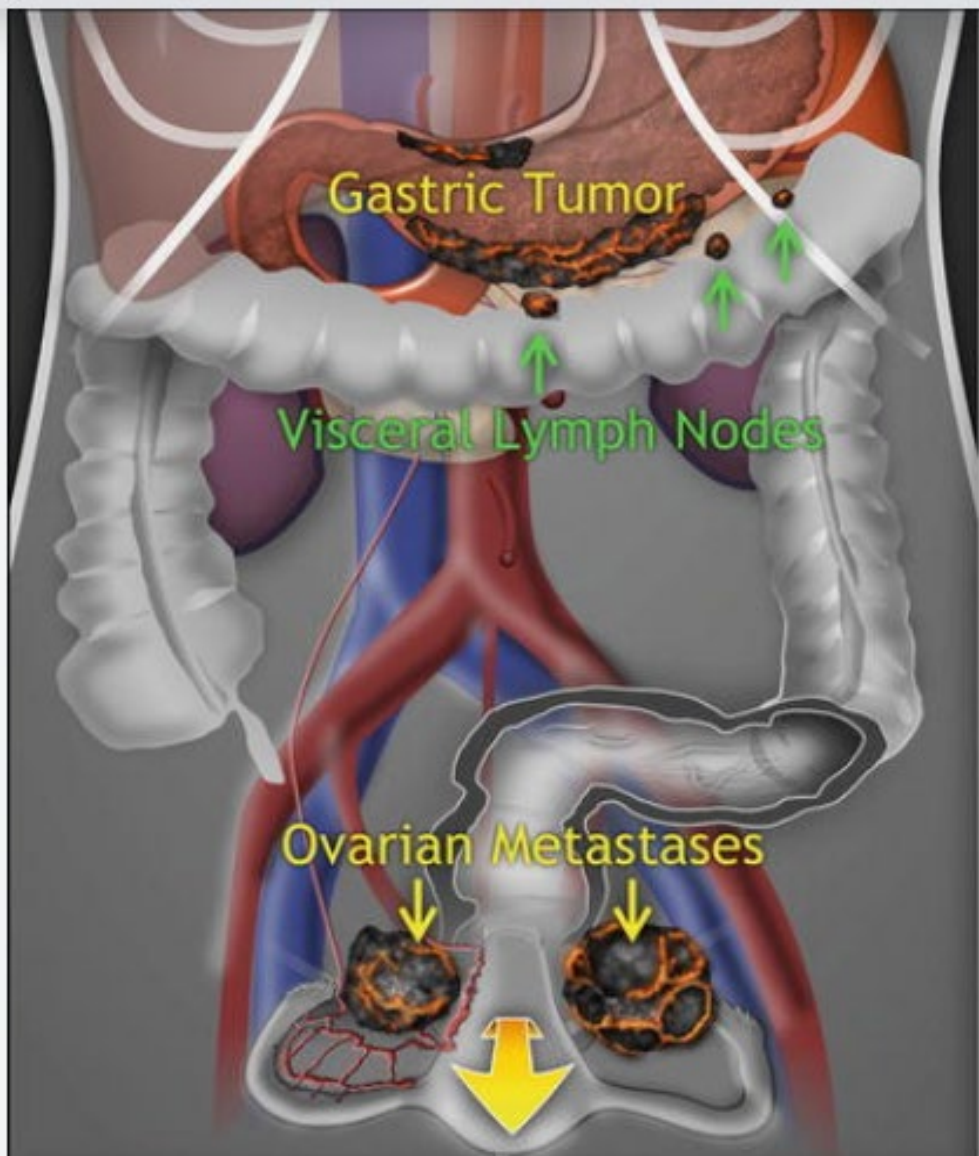
LESS COMMON primary sites: **BREAST** and **APPENDIX**.

RARE primary sites: small bowel, gallbladder, ureter, urinary bladder, biliary tract, pancreas, ampulla of Vater, and cervix.

Most likely from the pylorus area



Krukenberg tumor



- ▶ Krukenberg tumor in the ovary (ovaries) appear like a big mass (es) and it may be mistakenly confused with an ovary primary.
- ▶ Registrars should report the primary site not the metastatic site.
- ▶ Histology is **SIGNET RING cell CA**

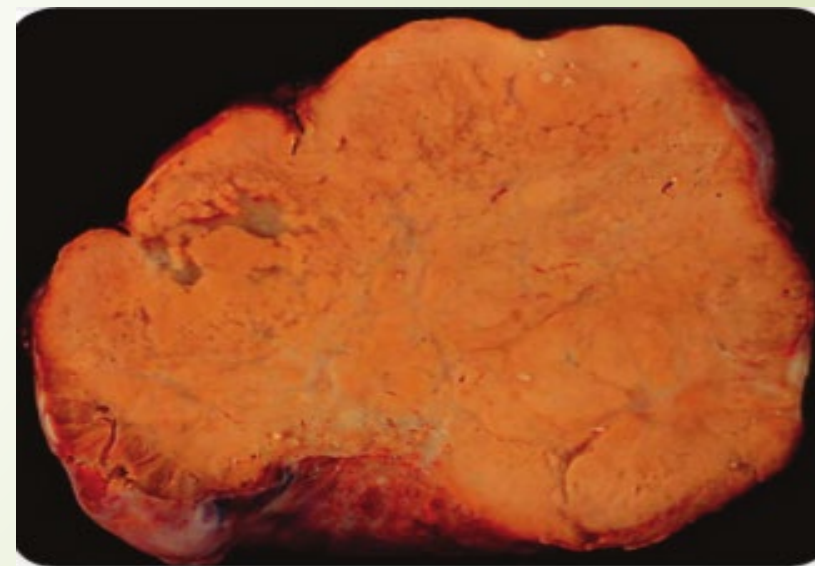
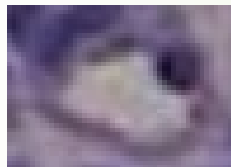


Figure 124.12 The gross pathological appearance of a Krukenberg tumor. The ovary has been entirely replaced by metastasis.

8490	3	Preferred	Signet ring cell carcinoma
8490	3	Synonym	Signet ring cell adenocarcinoma

Krukenberg tumor aka Carcinoma Mucocellulare

- Refers to the "signet ring" subtype of metastatic tumor to the ovary. A metastatic cancer to the ovaries characterized by histologically mainly by mucin **signet ring** cells.
- 76% from **STOMACH** cancer
- 11% from colorectal cancer
- **4%** comes from **BREAST** ca
- **3%** comes from **appendix**
- **Gallbladder** and **Pancreas**, biliary tract, ampulla of Vater, small bowel, urinary bladder, ureter, and cervix.

Gastric and colorectal cancers together account for almost 90% of primary sites of Krukenberg tumor.

Krukenberg

Stomach

Adenocarcinoma (81403; 95% of all gastric cancers; subtypes: ulcerative 70%, polypoid 10%, scirrhous/diffusely spreading/Linitis plastica 10%, superficially spreading 5%)

- Signet ring adenocarcinoma (84903)
- Linitis plastica (81423)—complete involvement of the stomach; leathery appearance
- Krukenberg tumor (84906)—metastatic signet ring carcinoma in the ovaries; most likely from stomach or intestinal primary <https://training.seer.cancer.gov/ugi/abstract-code-stage/morphology.html> **OLD!**

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➔ incidence of Krukenberg tumors in Japan, Korea, and China is approximately 18%- 21% due to their greater prevalence of gastric cancer.

➔ Close to 80% of Krukenberg tumors are bilateral

➔ Ovarian tumors may grow large enough to have the risk of ovarian torsion which is an emergency.

PM Inside Precision Medicine



Multifactorial Strategy Shows Promise For Lethal Ovarian Cancer | Inside Precision Medicine

Krukenberg Treatment and Prognosis

Unfortunately, Krukenberg tumors are less responsive to chemotherapy than primary ovarian cancers. Improvement in survival in patients who had metastasectomy for Krukenberg tumor compared with chemotherapy alone.

- In some studies, **survival** was **greater** for patients who underwent **excision before chemo** therapy compared with those **who had surgery after chemotherapy**.
- “**Cytoreductive surgery is thought to increase the responsiveness of chemotherapy** in patients with Krukenberg tumors”. Chemotherapy alone has less impact on overall survival than metastasectomy.
- Using **HIPEC (hyperthermic intraperitoneal chemotherapy)** improved **survival** in patients with peritoneal metastases.

Prognosis is less favorable compared with **other types of ovarian metastases or primary ovarian** tumors.

In general, the overall survival is under 1 year from the time of diagnosis of a Krukenberg metastasis. Mean survival is 14 months.

How to distinguish an ovary primary vs krukemberg

KRUKENBERG

- ➔ **Signet ring** Adenocarcinoma **Histology** in OVARY (ies) with GI tract cancer (most likely STOMACH ca) at the same time.
- ➔ **Younger** patient: < 50-year-old. Median age is 48 years, with a range of **27** to 65 years
- ➔ Bilateral ovarian cancer in about 80% of cases.

PRIMARY OVARY

Different Histology than signet ring adenocarcinoma

Usually, **older** females >65-year-old

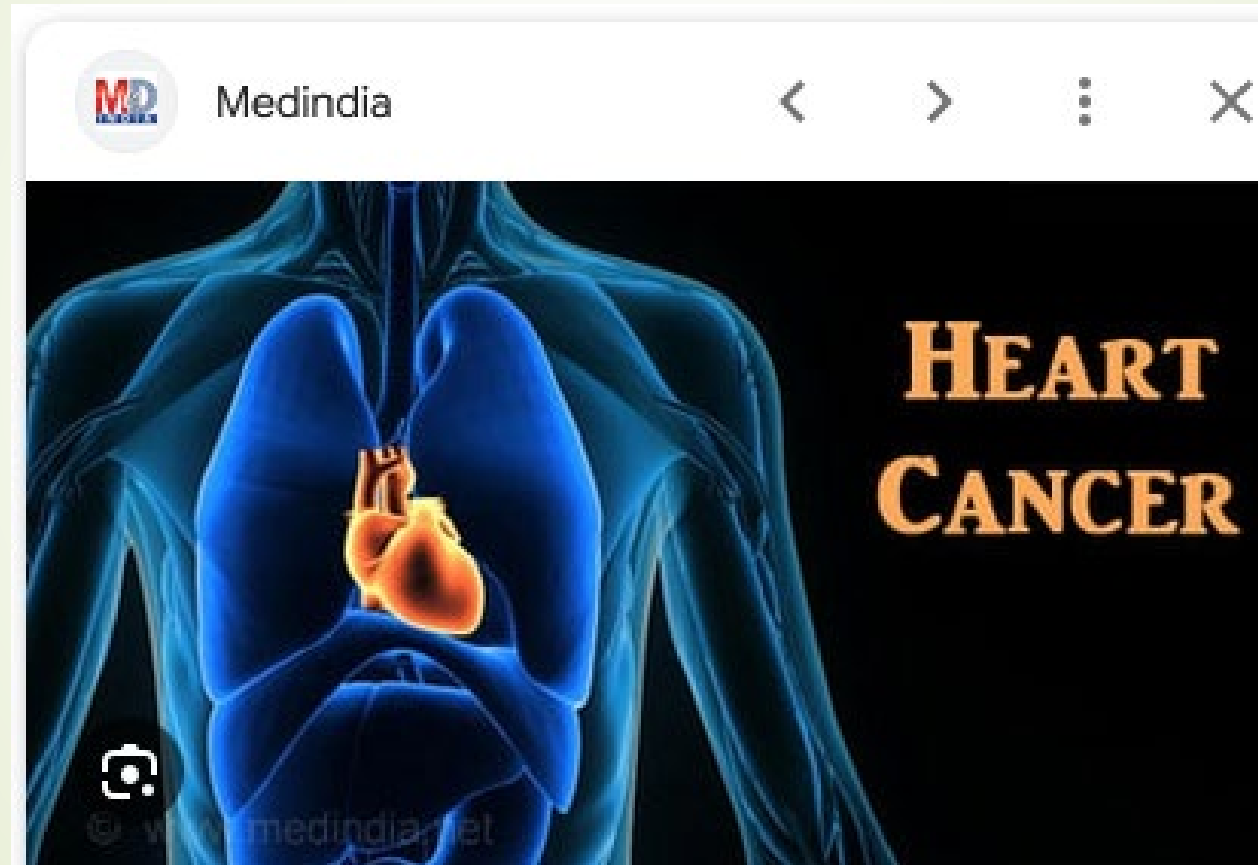
Usually unilateral

Immunostains and tumor markers levels are different.

Krukenberg vs primary ovary ca

- **Primary ovarian cancer** is often strongly positive for cytokeratin 7 (**CK7**) and negative for cytokeratin 20 (CK20), whereas **Krukenberg** tumor is positive for **CK20** or both **CK20** and **CK7**
- **CA-125** tumor marker is higher in **primary ovarian cancer** than in **Krukenberg** tumors.
- **CEA (Carcinoembryonic Antigen)** and **cancer antigen 19-9 (CA19-9)** are, on average, higher in **Krukenberg** tumors than in **primary** ovarian malignancies.

HEART primaries



Metastasis to the heart (e.g.: melanoma, lung, breast, carcinoid)
...or Cardiac primary?

Cardiac Rhabdomyosarcoma

- Is a muscular tumor that arises in the heart's **muscle**.

Cardiac Angiosarcoma

- Originates in the heart's **blood vessels**.

American
British **myo-** a
combining
form meaning
"muscle"

RHABDOMYO:
Striated
muscle

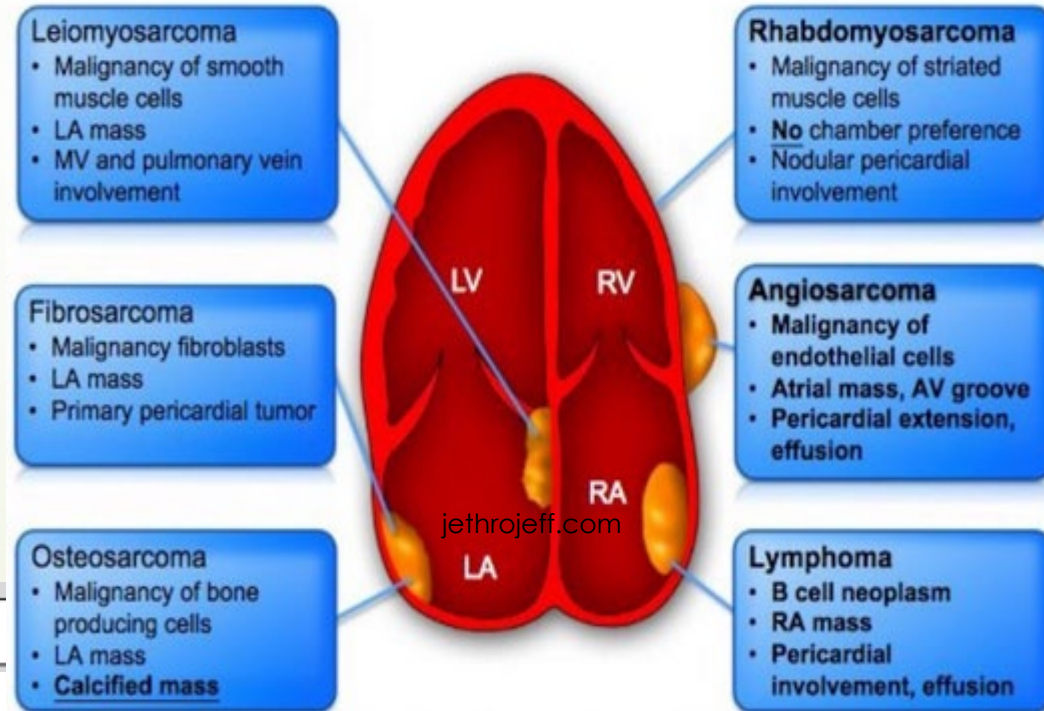
Text - Dx Procedures - Pathology Report

12/11/21 BIOPSY OF RIGHT PARAPHARYNGEAL SPACE MASS: NO EVIDENCE OF MALIGNANCY. 1/19/22 INTRACARDIAC MASS RESECTION: RHABDOMYOSARCOMA, EMBRYONAL W/ANAPLASTIC FEATURES, FOXO1 NEGATIVE.

ancies

SMOOTH muscle found in heart valves

Location Helps



Cureus. 2021 Jul 19;13(7):e16492. doi: [10.7759/cureus.16492](https://doi.org/10.7759/cureus.16492)

The Rarest of the Rare: A Case of Primary Cardiac Osteosarcoma

Fewer than 50 cases of primary cardiac osteosarcomas have been reported in the literature. Even though complete resection can be achieved in some cases, long-term results are usually poor. No standard therapy has been established.

20	Carcinoid heart disease based on clinical information	Carcinoid heart disease is not reportable but this diagnosis indicates that the patient likely has a carcinoid tumor which may be reportable. Obtain further information.
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CARDIAC Embryonal Rhabdomyosarcoma (ERMS)

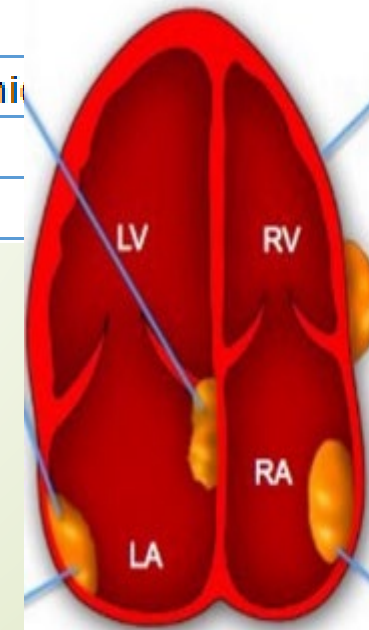
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Malignancies

8910/3	8910	3	Preferred	Embryonal rhabdomyosarcoma, NOS
8910/3	8910	3	Synonym	Rhabdomyosarcoma, embryonal type
8910/3	8910	3	Related	Embryonal rhabdomyosarcoma, pleomorphic
8910/3	8910	3	Related	Sarcoma botryoides
8910/3	8910	3	Synonym	Botryoid sarcoma

- Usually affects infants and young children, but it can affect adults.
- They usually affect the VENTRICULAR walls, but in adults it may arise from the ATRIAL cardiac walls.
- It metastasizes. Long term prognosis is poor. Highly lethal!



Rhabdomyosarcoma

- Malignancy of striated muscle cells
- **No** chamber preference
- Nodular pericardial involvement

Angiosarcoma

- Malignancy of endothelial cells
- Atrial mass, AV groove
- Pericardial extension, effusion

Lymphoma

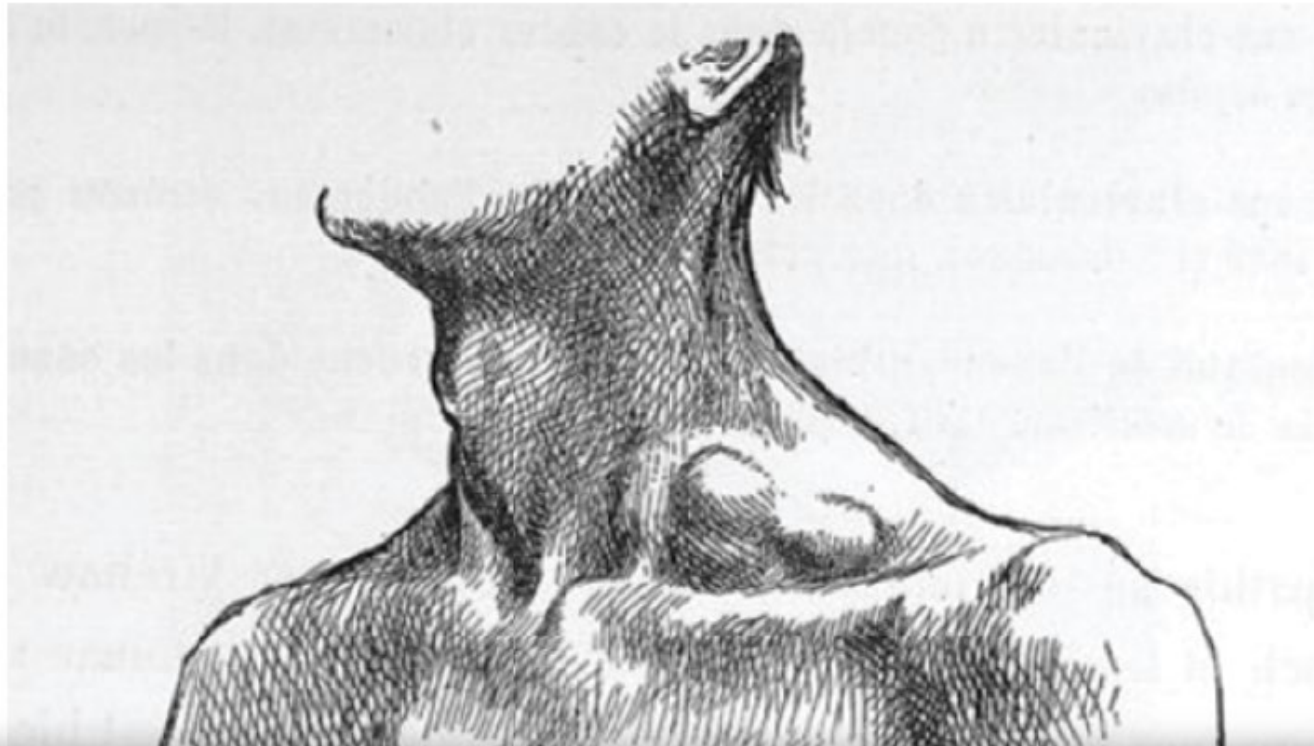
- B cell neoplasm
- RA mass



Virchow's node vs Pancoast

SIMILAR LOCATION

Virchow's node (ONLY **Left**) vs **Pancoast** lung tumor (APEX Right or Left)



Both above clavicle

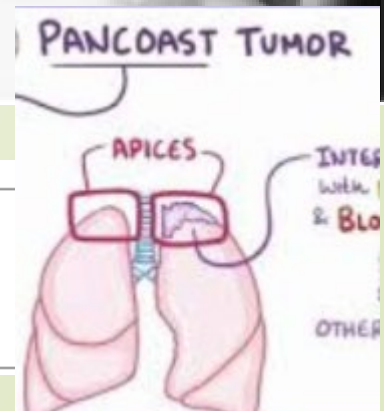
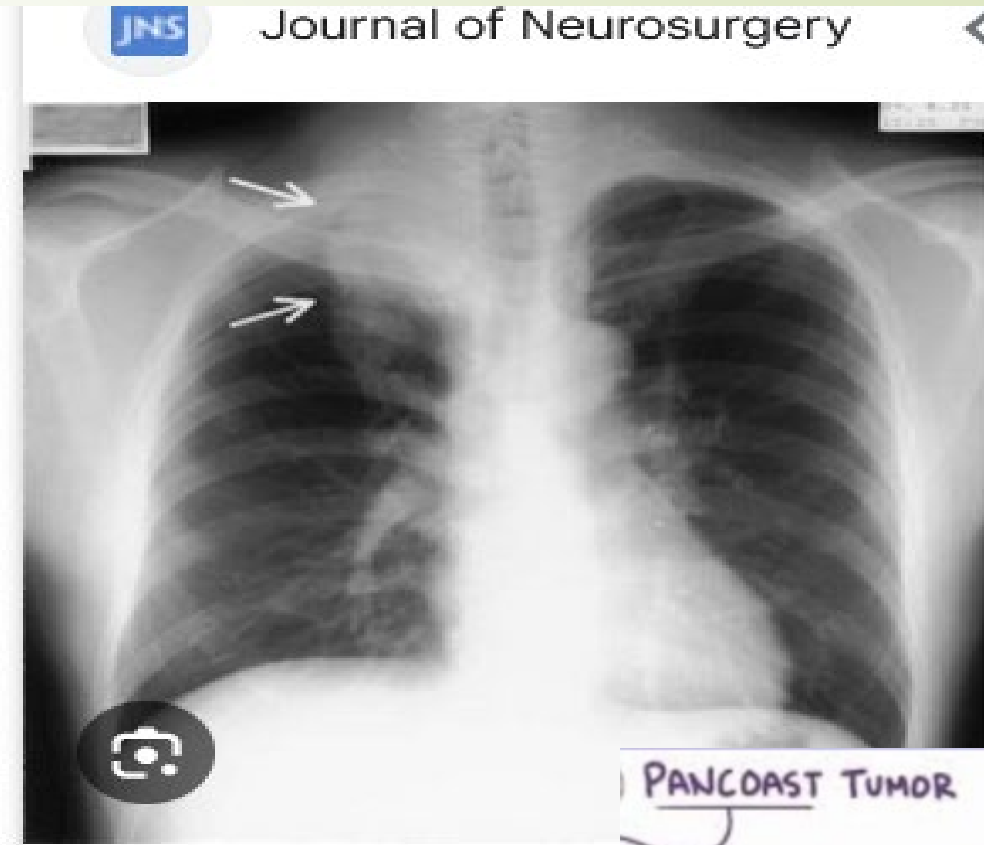


Figure 1. Enlarged left supraclavicular lymph node. Source Troisier EC. Titres et travaux scientifiques. Paris, Masson et Cie, 1901, p 18.

Lingula of lung	Left	Upper lobe C341
Apex	Bilateral	Upper lobe C341
Apex of lung		
Lung apex		
Pancoast tumor		
Superior lobar bronchus		
Upper lobe bronchi		

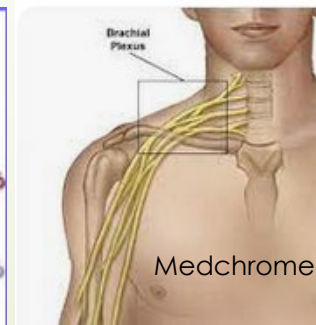
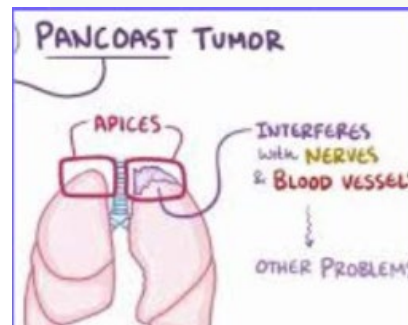
Pancoast lung tumor

2 Regional by direct extension only

- Atelectasis/obstructive pneumonitis
 - Extends to hilar region, involving part or all of lung
- Blood vessel(s) (major)
 - Aorta
 - Azygos vein
 - Pulmonary artery or vein
 - Superior vena cava (SVC syndrome)
- Brachial plexus
- Carina from lung
- Chest wall (thoracic wall)
- Compression of esophagus or trachea not specified as direct
- Diaphragm (separate lesion-see code 7)
- Esophagus
- Mediastinum, extrapulmonary or NOS
- Nerve(s)
 - Cervical sympathetic (Horner's syndrome)
 - Recurrent laryngeal (vocal cord paralysis)
 - Vagus
- Pancoast tumor (superior sulcus syndrome), NOS
- Parietal pericardium

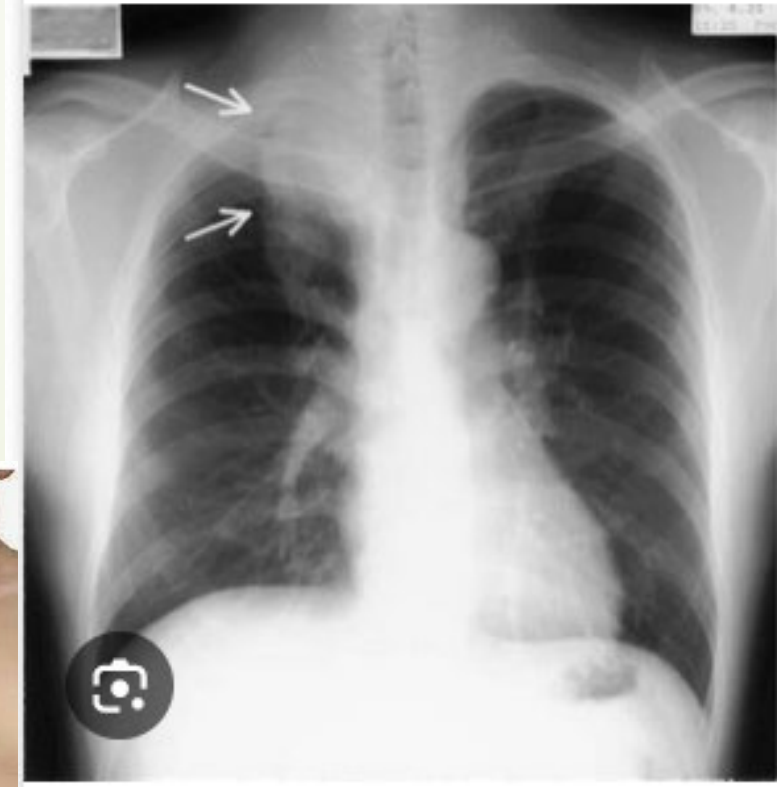
Code the Date of Diagnosis from the imaging report when a Pancoast tumor is identified on IMAGING prior to biopsy.

Summary Stage 2 for Pancoast lung tumor.



One side shoulder or arm pain, muscle weakness, atrophy of hand muscles, tingling and numbness (Compression of brachial plexus).
- On one side of the body: Eyelid drooping, decreased sweating, small pupil (Horner's Sx –sympathetic nerve)

JNS Journal of Neurosurgery



Virchow's node or Troisier sign

A hard **left** supraclavicular lymph node where some **cancer cells become trapped** with resultant **enlargement**.

It could be a first sign of a metastatic cancer.

Possibilities: gastric cancer (mainly), or other gastrointestinal tract sites as esophagus, other GI tract, common bile duct, liver, pancreas. Also, lungs and urogenital system.



Figure 1. Enlarged left supraclavicular lymph node. Source Troisier EC. Titres et travaux scientifiques. Paris, Masson et Cie, 1901, p 18.

- Lymph nodes get bigger and swollen because of **infections, diseases** as AIDS, or **malignancies**. LNs are part of the immune system and trap and try to filter foreign harmful substances/ waste materials or cells not recognized by our body as virus, bacteria, cancer cells and try to get rid of them through their lymphocytes cells which are a kind of white blood cells.

Right lymphatic duct

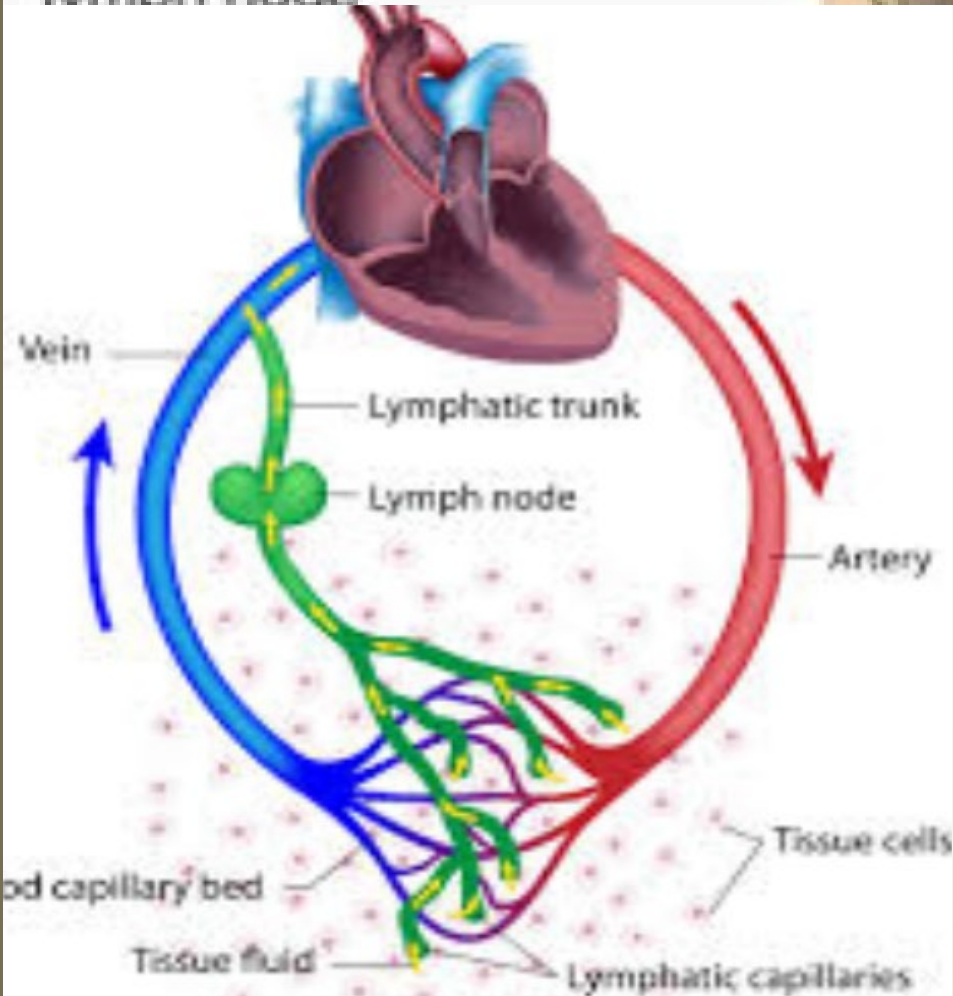
Thymus

Axillary lymph node

Cervical lymph node

Thoracic duct

Subclavian veins



Oxygenated blood is pumped out of the **left side** of the heart through major arteries to give oxygen to all the organs in the body. Arteries connect to smaller arteries, **arterioles**, **capillaries**, **venules** and veins, and returns to the right side of the heart with deoxygenated blood.

Capillaries leak into the **interstitial space** and **interstitial fluid** accumulates.

Lymphatics pick up the interstitial fluid accumulated and transport it to the **lymphatic system**. the **lymph is eventually returned to blood circulation** via the thoracic or lymphatic duct.

“The **thoracic duct** drains lymph from roughly two-thirds of the **tissue spaces of the body** and opens into the left subclavian **vein**, while the **right lymphatic duct** drains into the right subclavian **vein**”.

"The **thoracic duct** drains lymph from roughly two-thirds of the tissue spaces of the body and opens into the left subclavian vein, while the **right lymphatic duct** drains into the right subclavian vein".

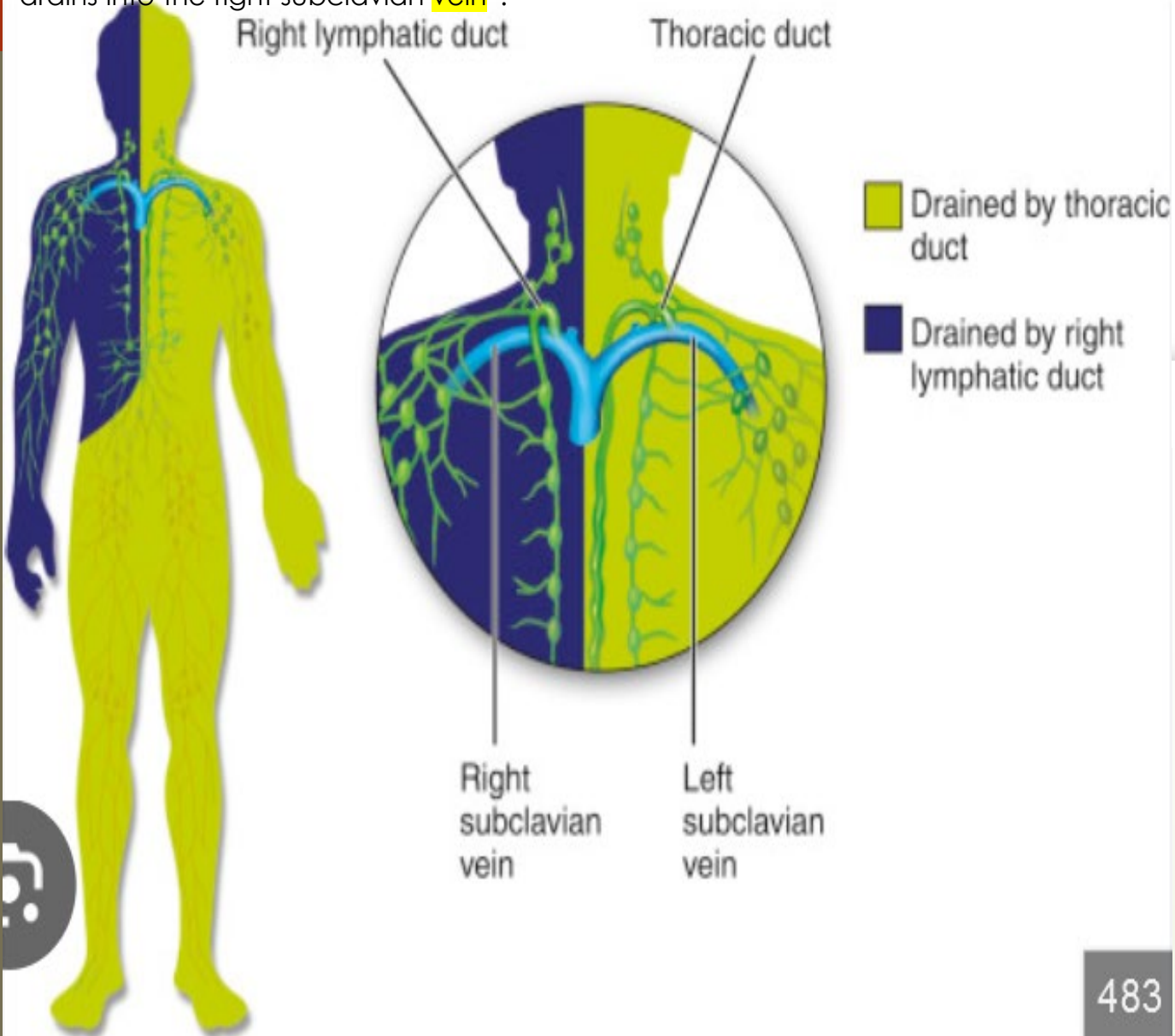


Figure 1. Enlarged left supraclavicular lymph node. Source Troisier EC. Titres et travaux scientifiques. Paris, Masson et Cie, 1901, p 18.

"The **left supraclavicular nodes** are the classical **Virchow's node** because **they receive lymphatic drainage of most of the body 2\3rd (from the thoracic duct)** and enters the venous circulation via the **left subclavian vein**. The **metastasis may block the thoracic duct** leading to regurgitation into the surrounding Virchow's nodes".

Virchow's node will trap cancer cells of most of the body.



Paraneoplastic Syndromes and Cancer

Paraneoplastic Syndromes

-PARA beside : alongside of ...Cancer

Paraneoplastic: **Caused by or resulting from the presence of cancer in the body** but not the physical presence of cancerous tissue in the part or organ affected.

Merriam-Webster Dictionary

Recognition of Paraneoplastic Syndromes with concurrent cancer may be useful in preventing disability, and prolonging survival due to a *prompt intervention in both conditions*.

Sometimes we see the presence of the paraneoplastic syndrome without making the connection that the patient may have cancer.

- ▶ They can appear when a cancer of any type releases a hormone, substance or protein which affects any body system: **HORMONE** (excess)RELATED Paraneoplastic SX.
(Hypercalcemia, Cushing's, Ectopic ACTH Sx, SIADH,) 15%
- ▶ **HUMORAL** Paraneoplastic Sx when the **immune system attacks** because of a cancer is present (Antibodies against our own tissues). Most common affect **NEUROLOGICAL** or dermatological <1%

Hypercalcemia of Malignancy is a Paraneoplastic SX

Hypercalcemia has been reported to occur in up to 30% of patients who have a malignancy

Three mechanisms for **Hypercalcemia of Malignancy**

-excessive secretion of parathyroid hormone-related protein (**PTHrP**) aka hypercalcemia of malignancy (HHM)

-**bone metastases** with the release of osteoclast activating factors,

-or the production of 1,25-dihydroxy **vitamin D** (calcitriol).

Almost all cases of **Hodgkin** lymphoma and about one-third of **non-Hodgkin** lymphoma cases cause hypercalcemia by **increasing** 1,25-dihydroxy **vitamin D production**.

Squamous cell carcinoma of the **head/neck**, and **lungs, breast** cancer, **ovarian** cancer, **renal** carcinoma, **leukemia, myeloma multiple**, bone metastasis...

Neurologic paraneoplastic syndromes associated with small cell lung cancer

Antibody	Cellular location	Conditions found	Diagnostic value	Titer predictive?
Anti-Hu	Intracellular	Cerebellar degeneration, opsoclonus-myoclonus-ataxia, peripheral nerve palsy, limbic encephalitis	Yes	No
Anti-Yo	Intracellular	Cerebellar degeneration	Yes	No
P/Q channels	Presynaptic neuromuscular junction	Lambert Eaton syndrome	Yes	No

**Autoimmune!
Cross-Reactivity**

Opsoclonus Chaotic **eye movements in all directions.**

Myoclonus : spasmodic jerky contraction of groups of muscles.

Ataxia: gait **imbalance** due to poor muscle control.

Limbic Encephalitis: Inflammation of amygdala and hippocampus. Some **short-term memory loss, mental decline, seizures.**

Cerebellar degeneration: ataxia, **dizziness, hypotonia, difficult speaking / swallowing...**

“Cancers associated with **paraneoplastic cerebellar degeneration** are Hodgkin’s, small-cell lung cancer (SCLC), breast, and gynecologic cancers”.

HCG Human Chorionic Gonadotropin (+)



Human chorionic gonadotropin (HCG) and **Testicular** cancer

HCG is the hormone of pregnancy. Gestational trophoblastic disease (GTD) in women.

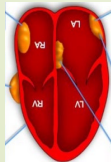
- ▶ If a young man peed on a pregnancy test and it is positive + he better get medical advice to look for cancer.
- ▶ Alpha-fetoprotein (AFP) and human chorionic gonadotropin (**HCG**). When these tumor markers are in the blood, it suggests that there's a **testicular** CANCER Age 15-year-old to 45. **Peak incidence 20-34 y/o**. American Cancer Society
- **Non-seminomas** often raise AFP and/or **HCG** levels.
- Pure **seminomas** occasionally raise **HCG** levels but never AFP levels.
- **Germ cell tumors** of the ovary and **testicle**

Elevated serum HCG levels are observed in 45-60% of patients with **biliary** and **pancreatic** cancer and in 10-30% of most other cancers.

Hepatobiliary tumors (hepatoblastomas, hepatocellular carcinomas, and cholangiocarcinoma) **and neuroendocrine** tumors (islet cell tumors and carcinoids) are associated with hCG production.

CONCLUSION

- Cancer is a Hypercoagulability state: Causes blood clots.
- Cancer may cause partial or complete obstruction, and it may cause **Superior Vena Cava Syndrome**, **Pancoast** syndrome, **VARICOCELE** on **left** testicle due to invasion of LEFT RENAL VEIN IN Renal Cell Carcinoma.
- Code the **Date of Diagnosis** from the **imaging report** when a **Pancoast** tumor is identified on **IMAGING** prior to biopsy.
- Signet Ring Carcinoma histology is most likely in the STOMACH or other GI tract site.
- Beware of **SIGNET RING ADENOCARCINOMA** histology **in 2 different sites** involving ovaries. The ovaries may be a Krukenberg metastatic tumor most likely from primary stomach (pylorus) or GI tract. Registrars should report the primary site not the metastatic site.
- Cancer may affect the brain not only by metastasis, but by PARANEOPLASTIC syndromes.
- We also have PRIMARY HEART Cancers: Leiomyosarcomas, Rhabdomyosarcomas, Angiosarcomas, Fibrosarcomas, Lymphomas, Osteosarcomas...



Leiomyosarcoma

- Malignancy of smooth muscle cells
- LA mass
- MV and pulmonary vein involvement

Rhabdomyosarcoma

- Malignancy of striated muscle cells
- **No** chamber preference
- Nodular pericardial involvement

Angiosarcoma

- Malignancy of endothelial cells
- Atrial mass, AV groove
- Pericardial extension, effusion

Fibrosarcoma

- Malignancy fibroblasts
- LA mass
- Primary pericardial tumor

Lymphoma

- B cell neoplasm
- RA mass
- Pericardial involvement, effusion

Osteosarcoma

- Malignancy of bone producing cells
- LA mass
- **Calcified mass**

FCDS

Thank you ALL!





Please feel free to send any questions or doubts.

Findings in Diverse Cancers

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- Journal of Medical Case Reports
- <https://radiopaedia.org/articles/krukenberg-tumour-1?lang=us>
- https://www.researchgate.net/figure/A-diagram-showing-the-partial-obstruction-of-the-left-renal-vein-to-induce-varicocele_fig1_12161894
- <https://www.ncbi.nlm.nih.gov/books/NBK482284/>
- <https://www.stgeorgeurology.com.au/varicocele>
- <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7352645/>
- <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3418539/>
- <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3418539/>
- <https://www.cancer.org/cancer/types/testicular-cancer/detection-diagnosis-staging/how-diagnosed.html>
- <https://pubmed.ncbi.nlm.nih.gov/15234236/>
- https://www.osmosis.org/learn/Krukenberg_tumor
- <https://www.scienceabc.com/pure-sciences/lymphatic-system-lymph.html>
- https://en.wikipedia.org/wiki/Supraclavicular_lymph_nodes
- <https://tactilemedical.com/resource-hub/general/what-is-lymphatic-circulation/>
- https://seer.cancer.gov/archive/manuals/2022/SPCSM_2022_Appendix_E.pdf
- <https://medika.life/the-lymphatic-vessels/>
- <https://www.ncbi.nlm.nih.gov/books/NBK482423/>
- <https://radiologykey.com/ovarian-tumors-clinical-setting-and-us/>
- <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3418539/table/t1/?report=objectonly>

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- Journal of Medical Case Reports
 - <https://radiopaedia.org/articles/krukenberg-tumour-1?lang=us>
 - https://www.researchgate.net/figure/A-diagram-showing-the-partial-obstruction-of-the-left-renal-vein-to-induce-varicocele_fig1_12161894
 - <https://www.ncbi.nlm.nih.gov/books/NBK482284/>
 - <https://www.stgeorgeurology.com.au/varicocele>
 - <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7352645/>
 - <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3418539/>
 - <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3418539/>
 - <https://www.cancer.org/cancer/types/testicular-cancer/detection-diagnosis-staging/how-diagnosed.html>
 - <https://pubmed.ncbi.nlm.nih.gov/15234236/>
 - <https://www.freepik.com/free-photos-vectors/happy-man-jumping>
 - <https://ascopubs.org/doi/full/10.1200/JOP.2016.011155>
 - https://www.freepik.com/search?format=search&last_filter=selection&last_value=1&query=sad%20woman&selection=1
 - <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3418539/table/t1/?report=objectonly>

- 
- <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7656388/>
 - <https://www.sciencedirect.com/topics/neuroscience/limbic-encephalitis>
 - <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7656388/>
 - <https://rarediseases.org/rare-diseases/cerebellar-degeneration-subacute/>
 - https://www.researchgate.net/figure/The-relationship-of-patient-gender-with-type-of-gastric-cancer_fig2_283829407
 - 13.Kokkola A, Sipponen P. Gastric carcinoma in young adults. *Hepatogastroenterology*. 2001;48:1552–1555. [PubMed] [Google Scholar]
 - <https://www.yalemedicine.org/news/stomach-cancer-gastric-cancer>
 - <https://seer.cancer.gov/statfacts/html/stomach.html>
 - www.dictionary.com
 - <https://pmc.ncbi.nlm.nih.gov/articles/PMC8373439/>
 - <https://pmc.ncbi.nlm.nih.gov/articles/PMC101057/>