Case Presentation: 14-Year-Old Female with Lymphadenopathy

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History of Present Illness

14 year old female with no significant PMH presents to Connecticut's Children's Hospital directly from Backus Hospital for 3 weeks of painful lymphadenopathy of her left neck. She denies recent weight loss, fever, chills, night sweats, headache, fatigue, sore throat, recent travel, exposure to known sick contacts, animal bites / scratches or sexual activity.

Chest Radiograph and CT scan at Backus were notable for cervical, mediastinal, pericardiac, and supra diaphragmatic lymphadenopathy as well as a mediastinal mass measures 5.3 x 4 cm with mild tracheal narrowing.

The patient was admitted to CCMC's Hematology and Oncology service for further evaluation.

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Additional History

PMH of anxiety and disordered eating (not active issues).

She takes no medications daily. She has taken Tylenol PRN for neck pain and swelling. She has no known allergies.

She is in 9th grade and lives with her father, step-mother, sister (16), step-sister (12), and 2 dogs. Her mother is also involved.

She reports never smoking, drinking, or using other substances.

No known family history of malignancy.

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Examination

105/75 110 98.2F 18 99%

Patient is well appearing, anxious.

Cervical, left supraclavicular, and left axillary lymphadenopathy.

Lymph nodes are matted, firm, rubbery and tender to palpation.

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Initial Labs (Backus)

- CBC: WBC 14.7, ANC 10951, RBC 4.15, Hgb 12.4, plt 347K
- ESR: 48
- LDH: 395
- CRP: 12.7
- K+ 4.6, Ca2+ 9.3, P 4.2, Cr 0.5
- Mono screen negative

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Initial Outside Facility Imaging

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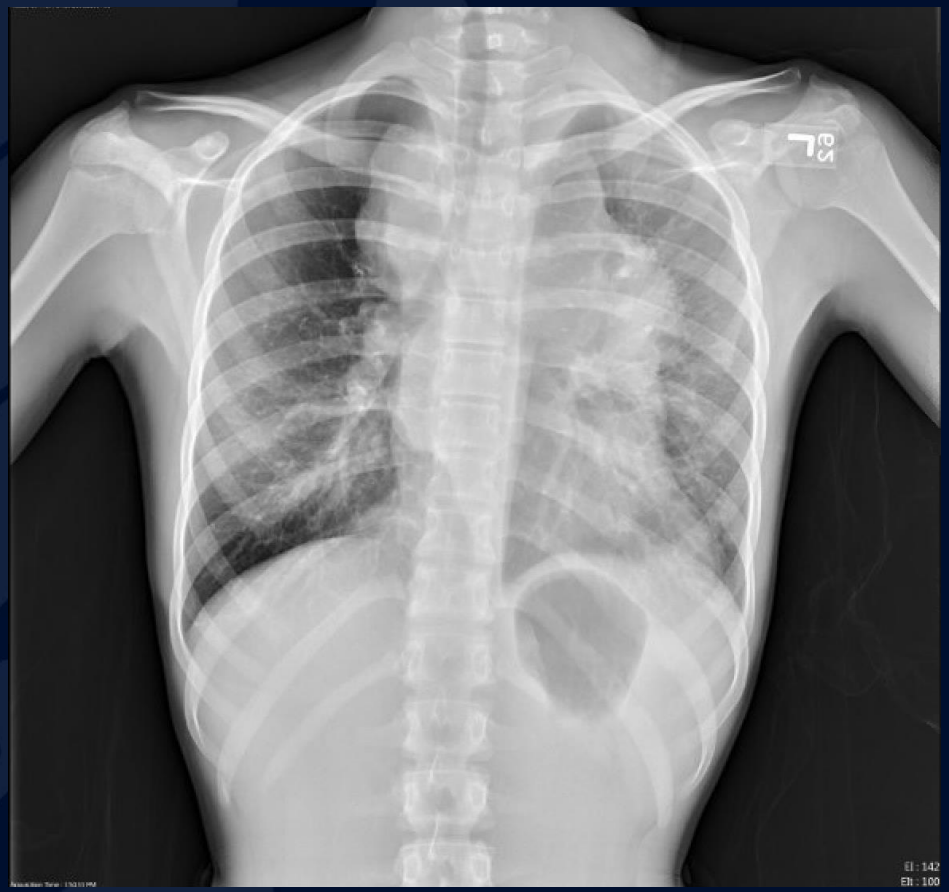
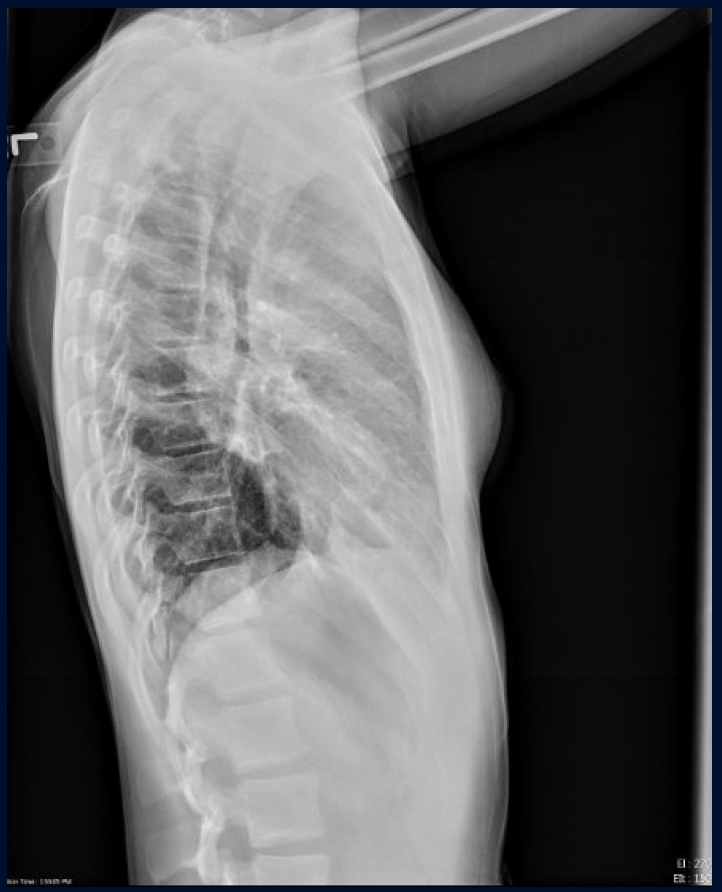
Chest X-ray

PA



Lateral



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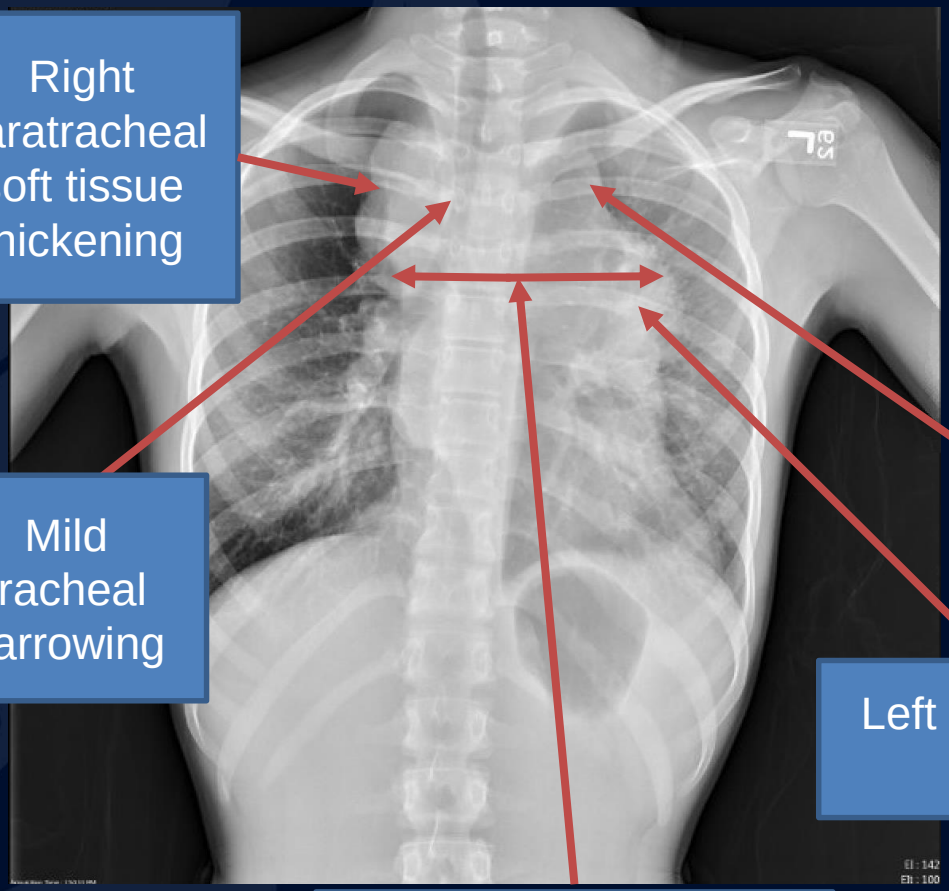
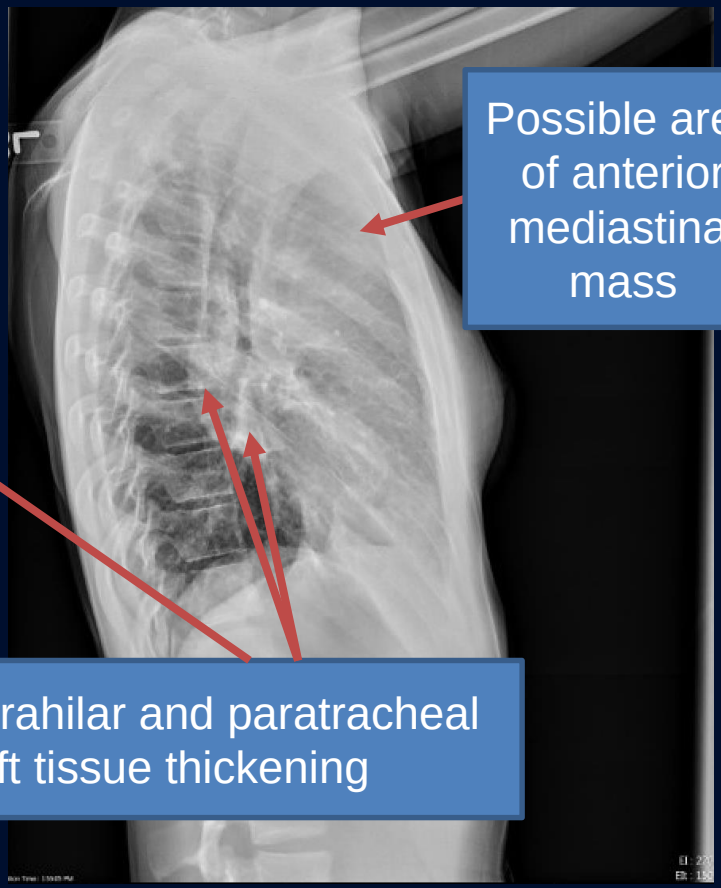
Chest X-ray

PA

Lateral





Right paratracheal soft tissue thickening

Mild tracheal narrowing

Widened mediastinum

Left suprahilar and paratracheal soft tissue thickening

Possible area of anterior mediastinal mass

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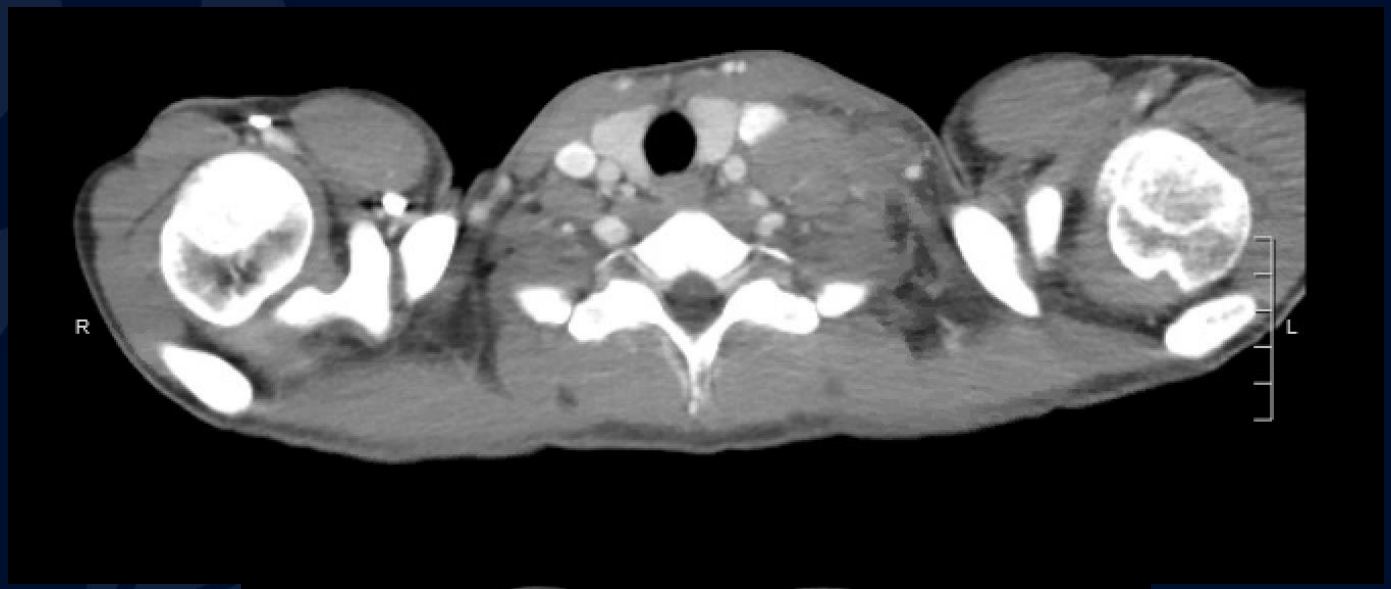
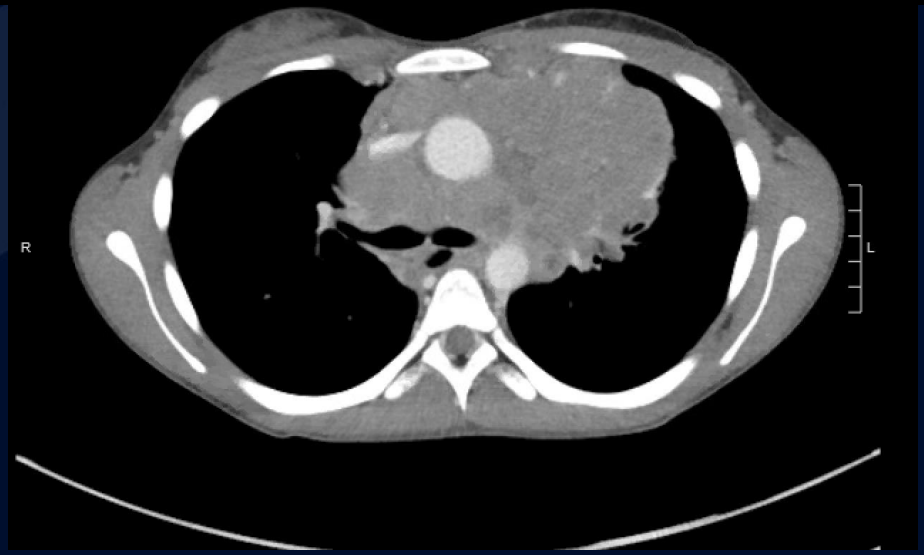
CT Chest with Intravenous Contrast





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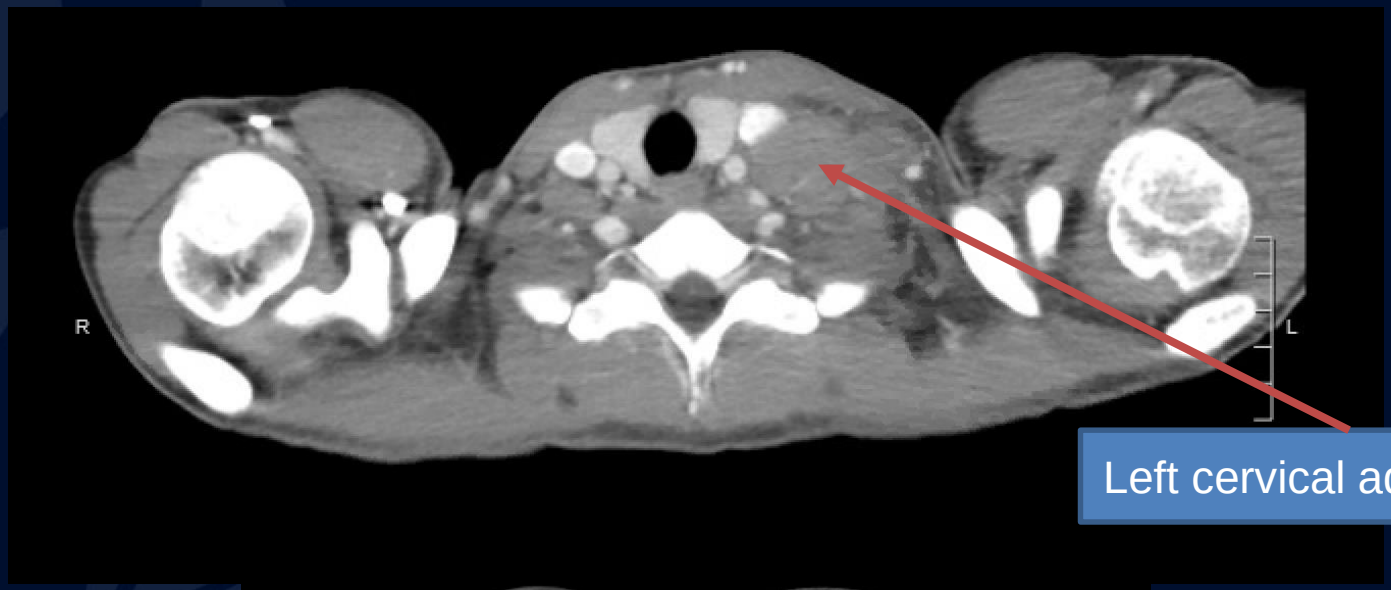
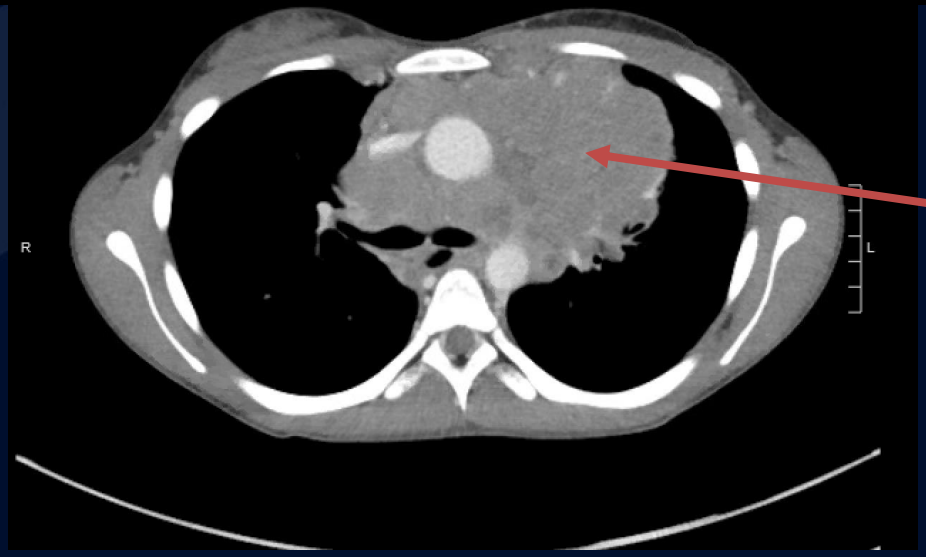
CT Chest with Intravenous Contrast



Left cervical adenopathy



Left mediastinal adenopathy + mediastinal soft tissue masses

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Differential Diagnosis

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Lymphadenopathy Differential Diagnosis

- Infectious
  - Epstein-Barr virus
  - Toxoplasmosis
  - Cytomegalovirus
  - Mycobacterial
- Malignancy
  - Hodgkin lymphoma
  - Non-Hodgkin lymphoma
  - Metastatic adenopathy from primary tumor

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Infectious Etiology

- Epstein-Barr Virus
  - Typically presents with fever and pharyngitis in addition to lymphadenopathy
  - Lymphadenopathy generally symmetric
- Toxoplasmosis
  - History of ingesting raw or undercooked meat or changing cat litter
  - Usually asymptomatic though can present with lymphadenopathy, typically symmetric
- Cytomegalovirus
  - Usually asymptomatic though can present with lymphadenopathy, typically symmetric
  - Common in immunocompromised patients
- Mycobacterial
  - Can present with lymphadenopathy alone
  - Typically develops over weeks-months

Malignant Etiology

- Characteristics highly suspicious of malignancy in children with peripheral lymphadenopathy:

Systemic symptoms (fever >1 week, night sweats, weight loss [>10% of body weight])
Supraclavicular (lower cervical) nodes
Generalized lymphadenopathy
Fixed nontender nodes in the absence of other symptoms; matted nodes
Nontender lymph nodes >1 cm with onset in the neonatal period
Nontender lymph nodes ≥2 cm in diameter that increase in size from baseline or do not respond to 2 weeks of antibiotic therapy
Abnormal chest radiograph (particularly mediastinal mass or hilar adenopathy)
Abnormal complete blood count (eg, lymphoblasts, cytopenias in more than 1 cell line)
Absence of symptoms in the ear, nose, and throat regions
Persistently elevated ESR/CRP or rising ESR/CRP despite antibiotic therapy

ESR: erythrocyte sedimentation rate; CRP: C-reactive protein.

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Abnormal complete blood count (eg, lymphoblasts, cytopenias in more than 1 cell line)
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ESR: erythrocyte sedimentation rate; CRP: C-reactive protein.

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Malignant Etiology

- Hodgkin Lymphoma
  - Typically localized, single group of nodes with contiguous spread
  - Bimodal distribution: young adulthood and >55 years
  - Subtypes:
    - Nodular sclerosis – most common
    - Lymphocyte rich – best prognosis
    - Mixed cellularity – eosinophilia, usually seen in immunocompromised patients
    - Lymphocyte depleted – seen in immunocompromised patients

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Malignant Etiology

- Non-Hodgkin Lymphoma:
  - Typically multiple lymph nodes involved with noncontiguous spread. Extra nodal involvement is common
  - Occurs in children and adults
  - Subtypes:
    - Burkett's lymphoma – typically in adolescents or young adults, associated with EBV, see jaw lesions or pelvic mass
    - Diffuse large B cell lymphoma – seen in both children and adults, most common type in adults
    - Follicular lymphoma – more common in adults, lymphadenopathy waxes and wanes
    - Mantle cell lymphoma – seen in adult males, aggressive, presents in late stage disease
    - Marginal zone lymphoma – seen in adults, associated with diseases of chronic inflammation (e.g., Sjogren syndrome)

Further Workup

- Diagnosis will be established by histologic examination of a suspicious Lymph Node via Biopsy
- Further imaging with CT scan of the neck, abdomen and pelvis, as well as PET scan will help determine extent and staging of disease

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Further Imaging

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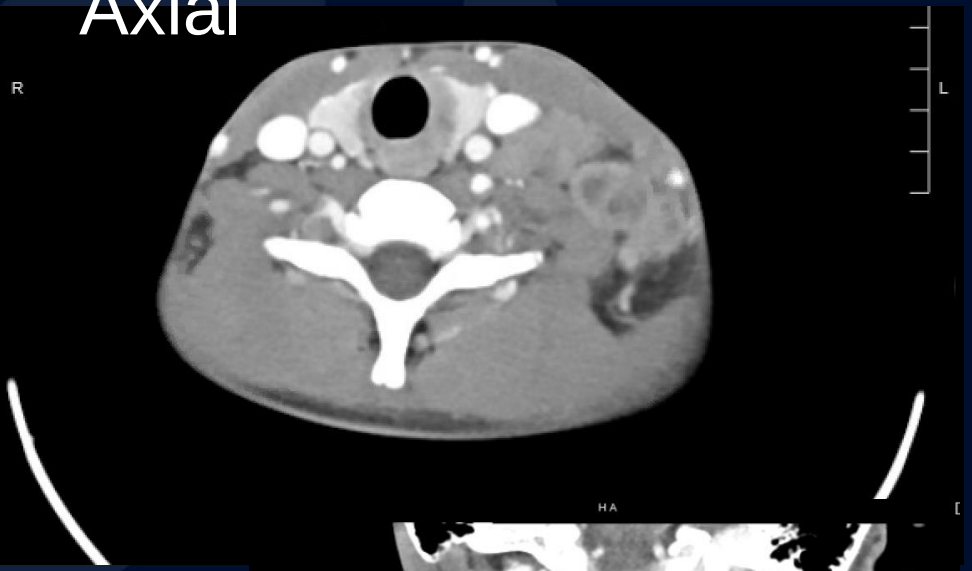
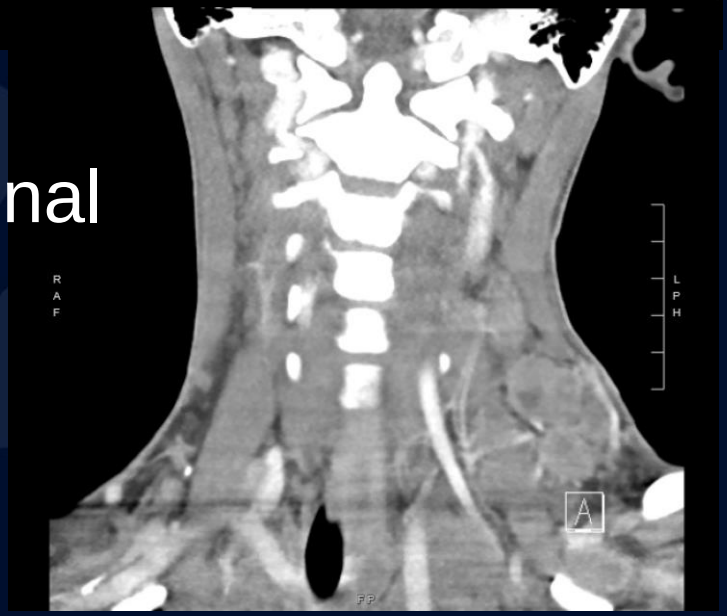
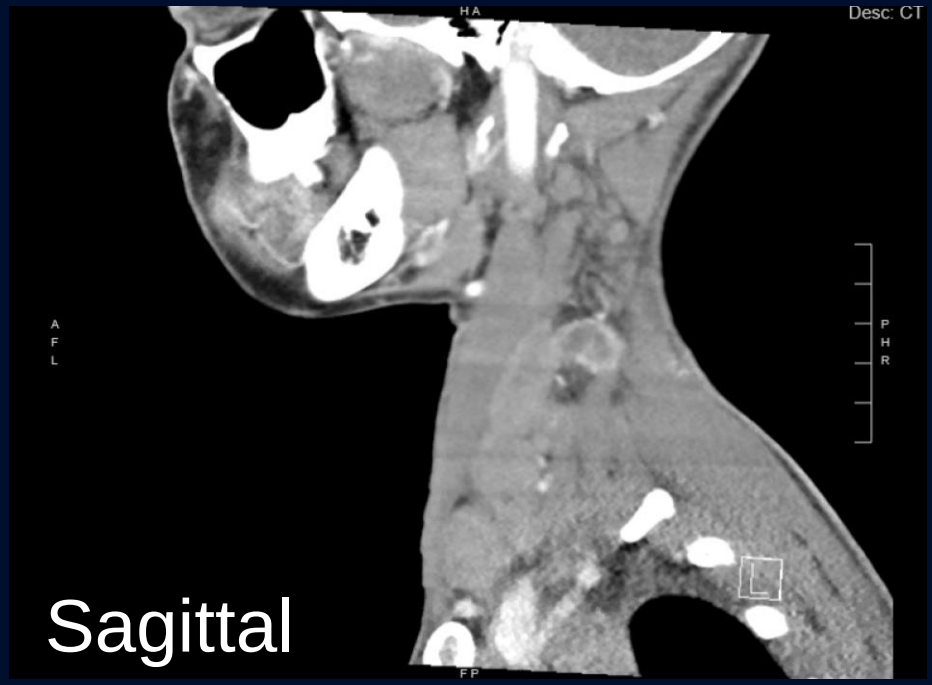
CT Soft Tissue Neck with IV Contrast

Axial



Coronal





Sagittal

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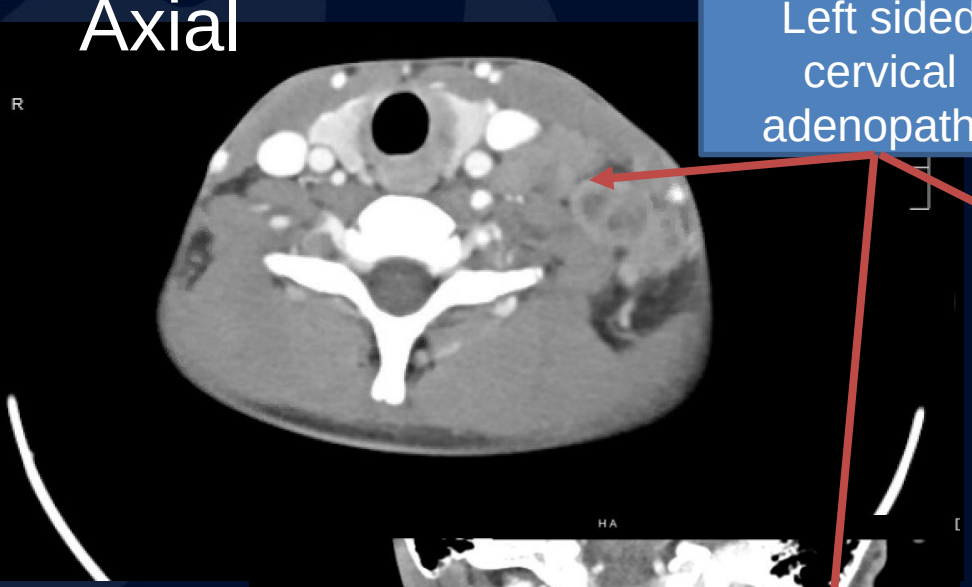
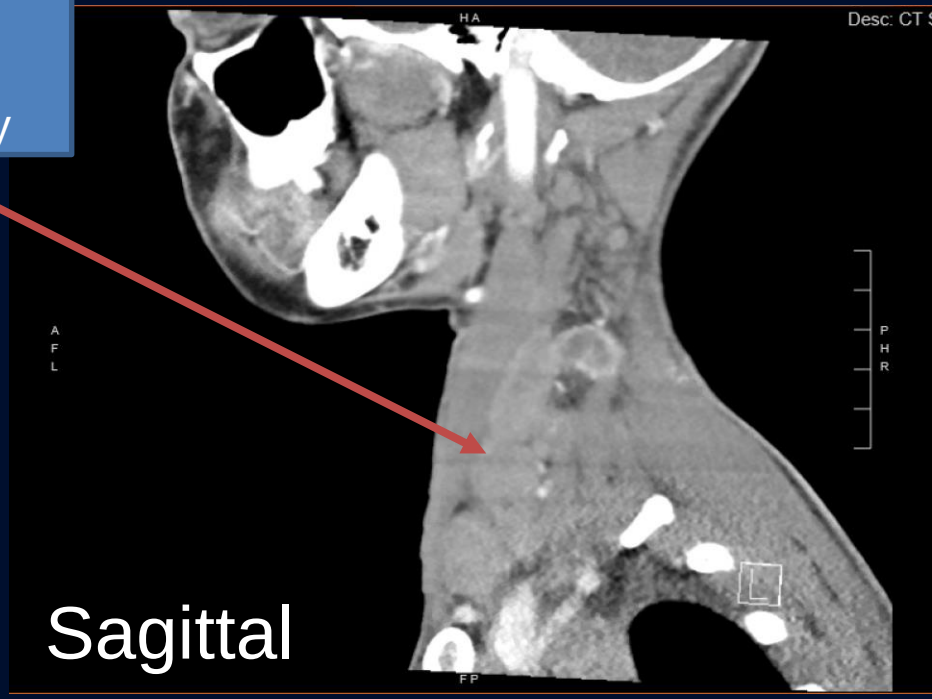
CT Soft Tissue Neck with IV Contrast

Axial

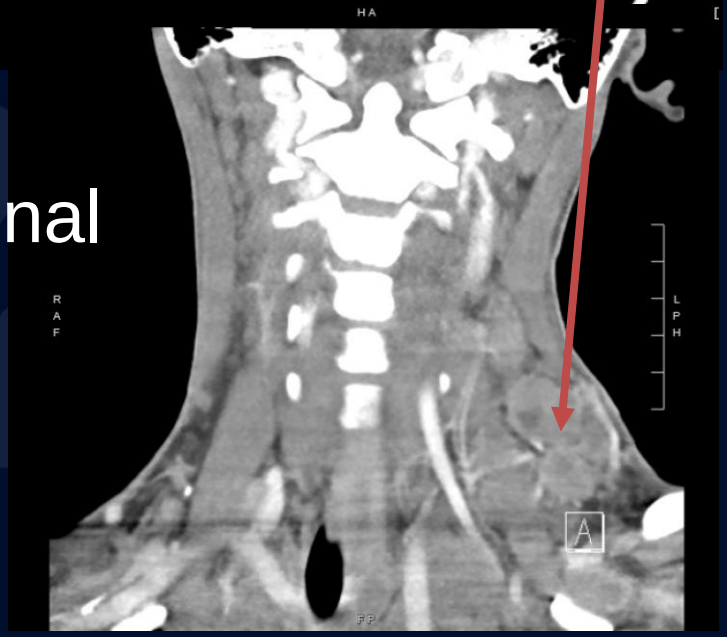
Left sided cervical adenopathy





Sagittal

Coronal



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CT Abdomen and Pelvis w/ contrast

Impression:

No evidence of pathologic lymphadenopathy caudal to the diaphragm.

No focal splenic lesion.

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NM Fluorine-18 FGD PET/CT Scan

Impression:

Extensive lymphadenopathy with markedly increased FDG uptake in the **neck**, left greater than right. There is also abnormal activity in the **mediastinum**, left greater than right, and in the **epicardial** regions bilaterally. These findings are ***consistent with suspected lymphoma***. This is classified as a **Deauville 5**.

No abnormal uptake or lymphadenopathy are demonstrated in the abdomen or pelvis.

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NM Fluorine-18 FGD PET/CT Scan

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Deauville Score	[^{18}F]FDG Uptake
1	No uptake
2	≤ Mediastinal blood pool
3	> Mediastinum and ≤ liver
4	Moderately more than liver at any site
5	Markedly more* than liver at any site and/or new sites of disease

Abbreviations: [^{18}F]FDG, [^{18}F]fluorodeoxyglucose; PET, positron emission tomography.
*Maximum standardized uptake value of the lesion more than two times liver uptake.

Used to visually interpret FDG uptake in the initial staging and assessment of treatment response in Hodgkin lymphoma and certain types of non-Hodgkin lymphomas

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Diagnosis

- **Lymph node biopsy** performed shows calcifications and abnormal looking cells consistent with Hodgkin lymphoma.
- Final pathology report confirmed **stage IV nodular sclerosing Hodgkin lymphoma**

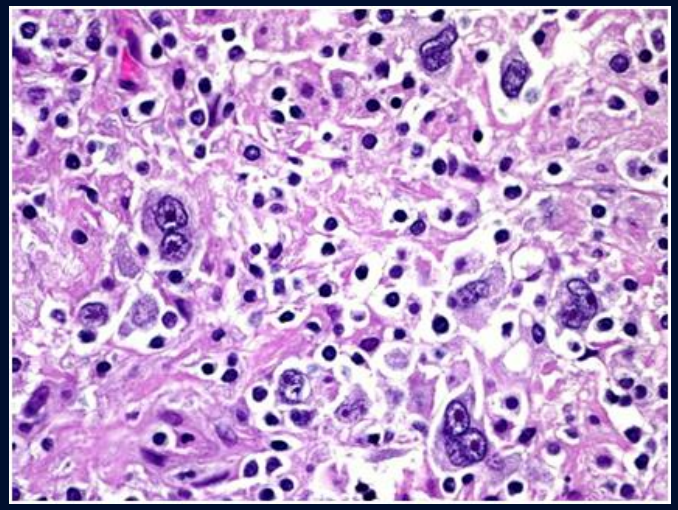

Image source: Bolognesi et al

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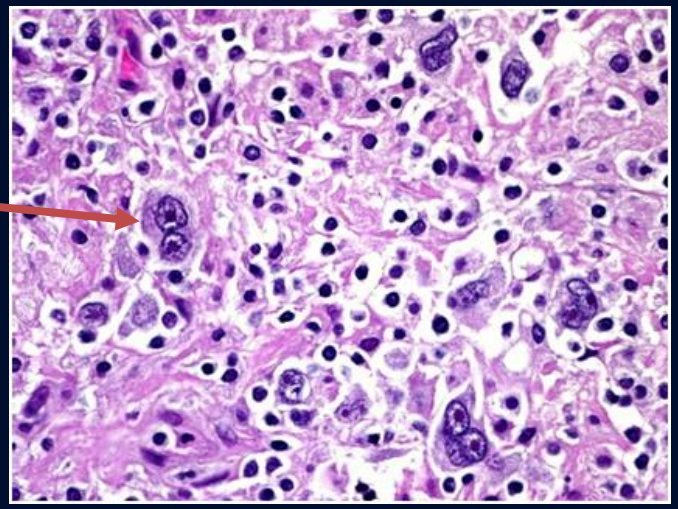

Image source: Bolognesi et al

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Nodular Sclerosing Hodgkin Lymphoma

- Epidemiology:
  - Most common subtype of Hodgkin Lymphoma
  - Bimodal age distribution: young adulthood and >55 years
  - Male predominance in childhood
  - Associated with EBV infection
- Clinical Presentation:
  - Lymphadenopathy commonly above the diaphragm
  - B symptoms (night sweats, weight loss, fever), pruritis, hepatosplenomegaly

Nodular Sclerosing Hodgkin Lymphoma

- Diagnosis:
  - Excisional lymph node biopsy showing classic Reed-Sternberg cells (“owl’s eye” appearance)
  - Staging involves number of lymph node groups involved, presence of B symptoms, and whether lymph node involvement is bilateral or unilateral
- Management:
  - Stage-dependent, often chemotherapy +/- radiation
  - Prognosis: 5-year survival rate ~90% for stage I and II, ~84% for stage III, & ~65% for stage IV

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Epilogue

- Patient underwent **port placement** and **bone marrow biopsy**
- Remained admitted due to mediastinal mass and concern for tracheal narrowing
- Started on **chemotherapy** under the OPEA-COPDAC protocol consisting of **doxorubicin**, **etoposide**, **dexrazoxane**, and **vincristine** which she tolerated well
- Remainder of chemotherapy treatment will take place as an outpatient

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Sources

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