RADY 403 Case Presentation

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Focused patient history and workup

- 16-year-old male with no prior medical history presenting with chest pain that started 5 days ago, along with 3-4 days of subjective fevers, drowsiness, and decreased appetite.
- On exam, chest pain noted to be pleuritic and positional (worse with leaning forward).
- Vitals normal
- Labs (CBC, BMP, LDH, and Uric acid) all within normal limits.
- EKG preformed and interpreted as normal.

List of imaging studies

- Chest X-ray (outside hospital) reported mediastinal mass
- Chest CT with contrast
- FDG PET-CT skull base to mid thigh



Chest X-ray



- Initial Chest X-ray preformed at OSH (images not available).
- Follow-up Chest Xray preformed 2 days after presentation is seen here:
 - Post-biopsy, chest tube in place
 - Widened mediastinum with superior mediastinal mass (blue arrow)

SCHOOL OF MEDICINE

Radiology

Chest CT with Contrast





Sagittal



- Anterior mediastinal mass (blue arrow)
- Narrowing of SVC and innominate vein (yellow arrow)
- No invasion of surrounding structures
- No tracheal obstruction
- No calcification in mass
- No other mediastinal, hilar, axillary, or supraclavicular lymphadenopathy
- CT A/P showed no additional adenopathy

DONC Radiology

FDG PET-CT





- Hypermetabolic anterior mediastinal mass
- No other suspicious metabolically active sites



Differential Diagnosis - Anterior Mediastinal Mass

5 T's

- 1. Thymus
 - Thymoma, thymic cyst, thymolipoma, thymic hyperplasia, thymic carcinoma
- 2. Thyroid
 - Thyroid neoplasms, parathyroid neoplasms, goiter
- 3. Thoracic aortic aneurysm
- 4. Terrible lymphoma
 - Hodgkin, non-Hodgkin
- 5. Teratoma (germ cell tumors)
 - Seminomas nonseminomatous



Patient treatment or outcome

- Thoracic surgery preformed VATs biopsy of mass.
- Surgical pathology: classic Hodgkin lymphoma, nodular sclerosing type
 - Stage 2A bulky
- Lost to follow-up and then restaged 2 months later due to concerns for progression in setting of new onset fatigue.
- PET/CT new, mild uptake of R internal mammary chain lymph node.
- Started on chemotherapy, with good response on follow up PET/CT.
- Recommended XRT, but family declined.
- No concern for recurrence on most recent imaging.



Hodgkin Lymphoma

- Lymphoma (Hodgkin and Non-Hodgkin) is 3rd most common pediatric cancer and most common mediastinal mass in children.
- Presents with B symptoms
- Two groups: classical and non-classical
 - Classical Nodular sclerosing, mixed cellularity, lymphocyte-rich and -depleted
 - Non-classical Nodular lymphocyte predominant
- Classic Hodgkin lymphoma of mediastinum is usually the nodular sclerosing type
- Can cause compression of trachea or SVC syndrome
- 5-year survival rate of stage 1 or 2a is 90% and ~60% for stage 4
- FDG PET with CT is recommended for disease staging and follow-up



Imaging Findings of Mediastinal Masses in Children

- Thymic:
 - Thymic cyst well-defined cystic mass with lack of enhancement
 - Thymic hyperplasia diffuse symmetric enlargement
 - Thymolipoma rare benign fatty mass, nodular appearance, well-defined
- Lymphoma:
 - Hodgkin lobulated heterogenous mass on CT
 - Non-Hodgkin diffuse enlargement, nodularity of thymus
- Germ cell tumors:
 - Teratoma includes fat, fluid, and calcifications
 - Seminomas lobulated mass with poorly defined margins, mild enhancement, no calcifications
- Vascular:
 - Lymphatic malformation multiseptated cyst, no prominent vessels or solid enhancement
 - Venous malformations slowly enhancing vascular channels that communicate with venous system



ACR Appropriateness Criteria

Variant 1: Clinically suspected mediastinal mass. Initial imaging.

Procedure	Appropriateness Category	Relative Radiation Level
Radiography chest	Usually Appropriate	\$
MRI chest without and with IV contrast	Usually Appropriate	0
MRI chest without IV contrast	Usually Appropriate	0
CT chest with IV contrast	Usually Appropriate	ଚଚଚ
CT chest without IV contrast	Usually Appropriate	ଚଚଚ
US chest	Usually Not Appropriate	0
Image-guided transthoracic needle biopsy	Usually Not Appropriate	Varies
CT chest without and with IV contrast	Usually Not Appropriate	***
FDG-PET/CT skull base to mid-thigh	Usually Not Appropriate	****

Imaging in this case followed ACR Appropriateness Criteria



UNC Top Three

- 5T's mnemonic for anterior mediastinal masses including thymus, thyroid, thoracic aortic aneurysm, terrible lymphoma, and teratoma.
- Lymphomas, including Hodgkin and Non-Hodgkin lymphoma, are the most common mediastinal masses in children.
- On CT, Hodgkin lymphoma will appear as a lobulated heterogenous mass that can have a mass effect on surrounding structures.



References

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