Mediastinal mass

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WHAT'S THE DIFFERENTIAL?

- V - Vascular
- I - Infectious
- T - Trauma
- A - Allergic/Autoimmune
- M - Metabolic
- I - Iatrogenic
- N - Neoplastic (benign & malignant)
- S - Structural

DIFFERENTIAL

- Vascular
  - Aortic aneurysm
  - Pericardial effusion
- Infectious
  - Histoplasmosis
  - Paravertebral abscess
  - Bacterial pneumonia
- Traumatic
  - Hemomediastinum
- Iatrogenic
  - Foreign body
- Neoplastic
  - Benign
  - Malignant
- Structural
  - Diaphragmatic hernia
  - Thymus
  - Bronchogenic cyst
  - Pericardial cyst
  - Meningocele

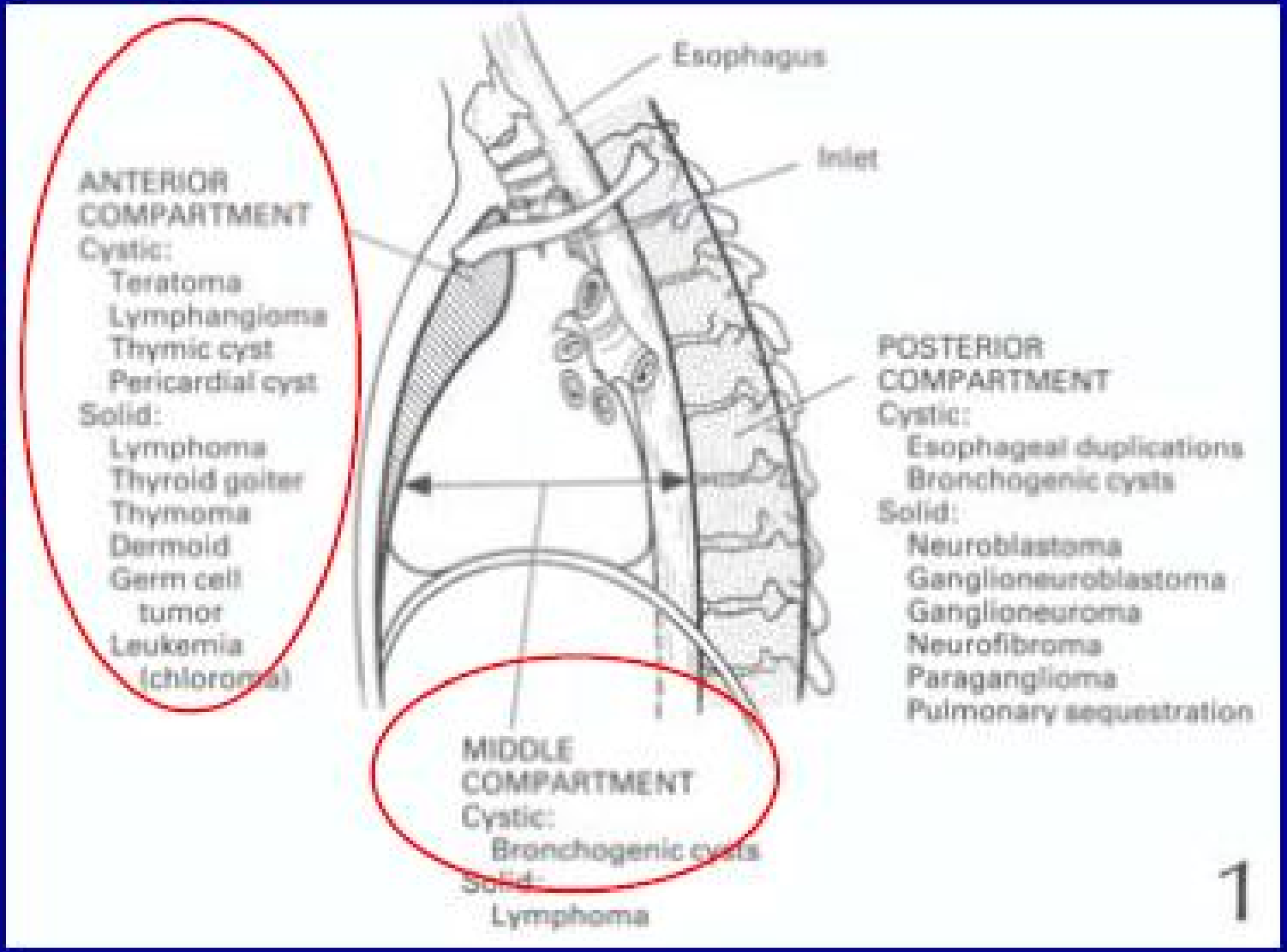
Duwe, Sterman, Musani, 2005

HOW TO WE DIAGNOSE THE PT?

- Anterior Mediastinum
  - Thymus
  - Fat
  - Lymph nodes
- Middle mediastinum
  - Heart, Pericardium
  - Ascending and transverse aorta
  - Brachiocephalic veins,
  - Trachea, Bronchi,
  - Lymph nodes
- Posterior mediastinum
  - Descending thoracic aorta
  - Esophagus
  - Azygous vein
  - Autonomic ganglia and nerves
  - Thoracic lymph nodes

Chest. 2005 Oct;128(4):2893-909

Overview


Esophagus
Inlet
ANTERIOR COMPARTMENT
Cystic:
Teratoma
Lymphangioma
Thymic cyst
Pericardial cyst
Solid:
Lymphoma
Thyroid goiter
Thymoma
Dermoid
Germ cell tumor
Leukemia (chloroma)
POSTERIOR COMPARTMENT
Cystic:
Esophageal duplications
Bronchogenic cysts
Solid:
Neuroblastoma
Ganglioneuroblastoma
Ganglioneuroma
Neurofibroma
Paraganglioma
Pulmonary sequestration
MIDDLE COMPARTMENT
Cystic:
Bronchogenic cysts
Solid:
Lymphoma

Commonest Tumors of the Mediastinum

- Superior
  - Thymoma/thymic cyst
  - Malignant lymphoma
  - Thyroid tumors
  - Parathyroid tumors
- Posterior
  - Neurogenic tumors
    - Neurilemoma
    - Neurofibroma
    - Neuroblastic tumors
    - Schwannoma
    - Paraganglioma
  - Gastroenteric cysts
- Anterior
  - Thymoma/thymic cysts
  - Germ cell tumors
  - Thyroid/parathyroid tumors
  - Malignant lymphoma
  - Paraganglioma
  - Lymphangioma
  - Hemangioma
  - Lipoma
- Middle
  - Pericardial cysts
  - Bronchogenic cysts
  - Malignant lymphoma

DIFFERENTIAL DIAGNOSIS

Anterior	Middle	Posterior
Thymoma	Lymphoma	Neurogenic tumor
Teratoma, Seminoma	Pericardial cyst	Bronchogenic cyst
Lymphoma	Bronchogenic cyst	Enteric cyst
Parathyroid adenoma	Metastatic cyst	Xanthogranuloma
Intrathoracic goiter	Systemic granuloma	Diaphragmatic hernia
Lipoma		Meningocele
Lymphangioma		Paraverterbral abscess
Aortic aneurysm		
Benign Hyperplastic Thymus		

Chest. 2005 Oct;128(4):2893-909

Diagnostic infection lymph adenopathy

- Size
- Anatomic location - localized or generalized (local infection vs. systemic disease)
- Involvement of other tissues
- Duration
- Associated symptoms - compression of adjacent structures vs. invasion vs. systemic

Chronic Generalized Lymphadenopathy

Chronic systemic infection:

- Endemic fungal infections
- Tuberculosis and nontuberculous mycobacteria
- IM syndromes: EBV*, CMV, toxoplasmosis
- HIV*
- Syphilis
- Bartonella (cat scratch)
- Brucellosis
- Lymphogranuloma venereum

Miscellaneous Bacteria

- Bartonella - prominent regional lymphadenopathy, massive lymphadenopathy very rare, exposure history
- Brucellosis - prominent hepatosplenomegaly, systemic and musculoskeletal symptoms, exposure history
- Syphilis - peripheral lymphadenopathy and rash usual, massive lymphadenopathy very rare, exposure history
- Lymphogranuloma venereum (Chlamydia trachomatis) - regional adenopathy, exposure history

HIV

- Lymphadenopathy > 1 cm in > 2 anatomic locations > 3 months
- Nontender; cervical, occipital, axillary - discrete, mobile
- Primary or secondary to opportunistic infections*
  - - tuberculosis, nontuberculous mycobacteria, toxoplasmosis, CMV
- Syphilis, histoplasmosis
- Malignancy

EBV

- 75% present as infectious mononucleosis: pharyngitis, generalized lymphadenopathy, hepatosplenomegaly and atypical lymphocytosis
- Symptoms most prominent in first 2 weeks, resolve within 4 weeks
- Lymphadenopathy typically posterior cervical > anterior cervical & submandibular
- *Lymphoproliferative disease in congenital and acquired immunodeficiency
- Case reports of Horner syndrome (neuritis)

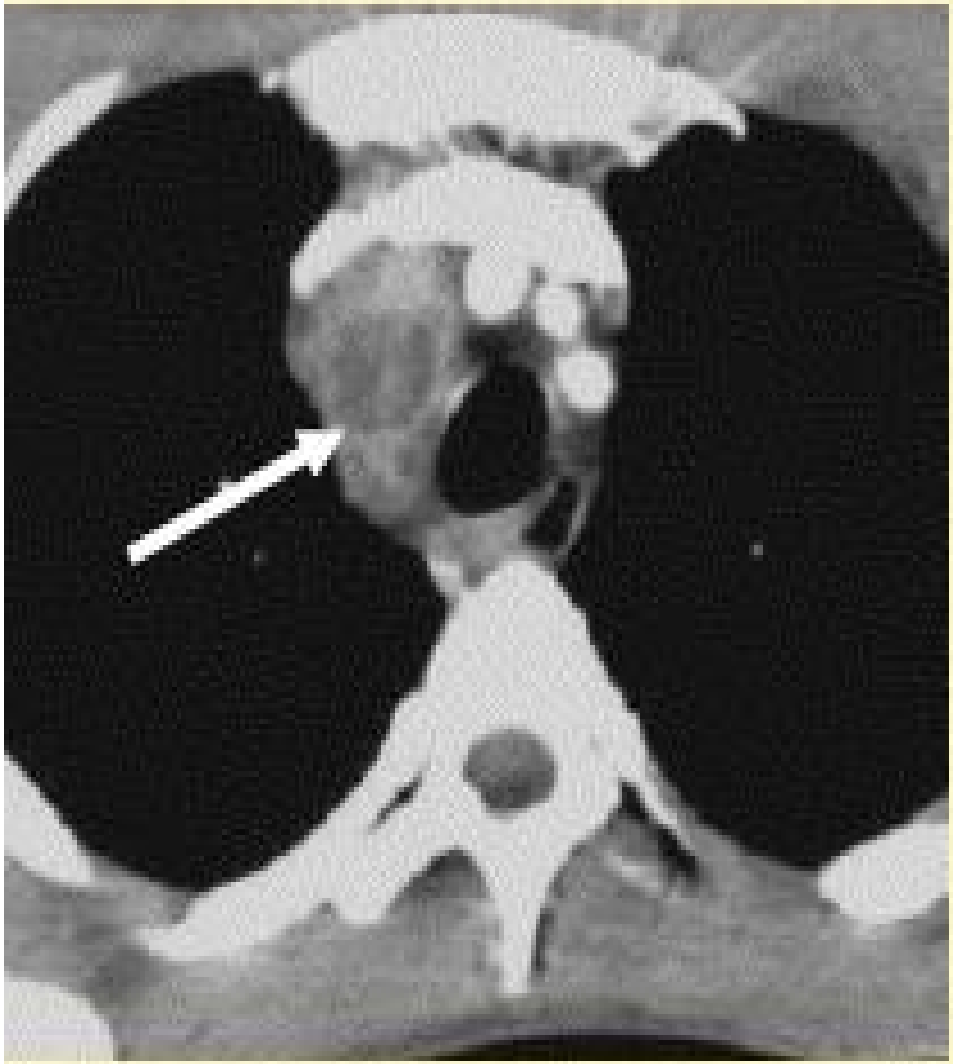
CMV - symptomatic disease less common and milder than EBV

Toxoplasmosis - usually asymptomatic - lymphadenopathy most commonly involves solitary node in head or neck, but mediastinal adenopathy reported, especially in AIDS

Tuberculosis

- Mediastinal adenopathy most common with primary infection but also reported in reactivation (5-10%)
- Most common radiological abnormality is adenopathy (90-95% of children), usually unilateral, hilar or paratracheal
- 70% have associated parenchymal lung disease, pleural disease common
- Horner syndrome reported
- Distinctive CT appearance

Tuberculous Mediastinal Adenopathy



Endemic Mycoses

- *Histoplasma capsulatum, Blastomyces dermatitidis, Coccidiodiomyces immitis*
- Coccidiodiomycosis restricted to Southwest
- Mediastinal adenopathy reported in 0-20% of blastomycosis, generally with pulmonary parenchymal disease - culture diagnostic test of choice (>90% sensitive), antigen detection also sensitive but cross-reactivity with other fungi (Histoplasmosis), serology not recommended

Histoplasmosis

- Endemic in Mississippi and Ohio River valleys (80% skin test positive)
- 99% of infections asymptomatic
- Symptomatic infection more likely in young children (< 2 years of age), immunocompromised persons, large inoculum of organisms

Fibrosing mediastinitis

- Rare complication of histoplasmosis, tuberculosis (90%) and idiopathic (10%)
- Often fatal progressive fibrosis of mediastinal structures, leading to encroachment upon vascular structure, airways, nerves
- No convincing data that persons with granulomatous mediastinitis progress to fibrosing mediastinitis - subset of patients with abnormal fibrotic response
- Idiopathic form steroid or tamoxifen-responsive
- Relationship to infectious agent usually inferred from positive serology or TST

Mediastinal Mass

- Differential Diagnosis
  - Infectious process
  - Sclerosing mediastinitis
  - Inflammatory myofibroblastic tumor
    - Unlikely with negative ALK
  - Inflammatory pseudocapsule of underlying tumor

TABLE 39-1. INCIDENCE OF MEDIASTINAL MASS AND SUPERIOR VENA CAVA SYNDROME (SVCS) AT ST. JUDE CHILDREN'S RESEARCH HOSPITAL BETWEEN 1973 AND 1988

Diagnosis	No. of patients	Mediastinal mass (%)	SVCS with mediastinal mass (%)
Acute lymphoblastic leukemia	1,464	130 (8.4)	6 (4.6)
Acute nonlymphocytic leukemia	392	9 (2.3)	0
Hodgkin's disease	333	102 (30.6)	2 (2.0)
Non-Hodgkin's lymphoma	330	230 (69.7)	8 (3.4)
Neuroblastoma	332	69 (20.8)	3 (4.3)
Germ cell tumors	114	10 (8.8)	2 (20.0)
Sarcomas	696	26 (3.7)	3 (11.0)

From Ingram L, River G, Shapiro DDN. Superior vena cava syndrome associated with childhood malignancy. Analysis of 24 cases. Med Pediatr Oncol 1990;18:476, with permission.

How to Evaluate Anterior Mediastinal Mass?

- Imaging studies
- Lab datas
- Sampling of tissues

Be Sure to Know….

- Respiratory symptoms occur in 40% to 60% of children with mediastinal mass.
- High incidence of cardio-respiratory arrest with sedation / general anesthetics.

TABLE 39-2. SYMPTOMS AND PHYSICAL FINDINGS IN PATIENTS WITH SUPERIOR VENA CAVA SYNDROME AT INITIAL PRESENTATION

Finding	No. (%)
Cough/dyspnea	11 (68)
Dysphagia/orthopnea	10 (63)
Wheezing	5 (31)
Hoarseness	3 (19)
Facial edema	2 (12)
Chest pain	1 (6)
Pleural effusion	8 (50)
Pericardial effusion	3 (19)

Respiratory Symptoms on Admission

	HD, n (%)	NHL, n (%)	*P* Value
Symptomatic	9 (30)	16 (76)	.002
Respiratory Distress	5 (17)	8 (38)	.109
Short of Breath w/ Activity	5 (17)	6 (29)	.327
Dyspnea at Rest	1 (3)	8 (38)	.002
Stridor	1 (3)	6 (29)	.015
Orthopnea	5 (17)	9 (43)	.057

Conclusion

- High-risk group:
  - The patients with large mediastinal mass
- The patients with severe tracheal compression (more than 50 %) on CT scan
- Recommending the use of local anesthesia with sedation for the children in high-risk group.

Diagnostic Approach

- Golden rule:
  - Starting with less-invasive procedure.

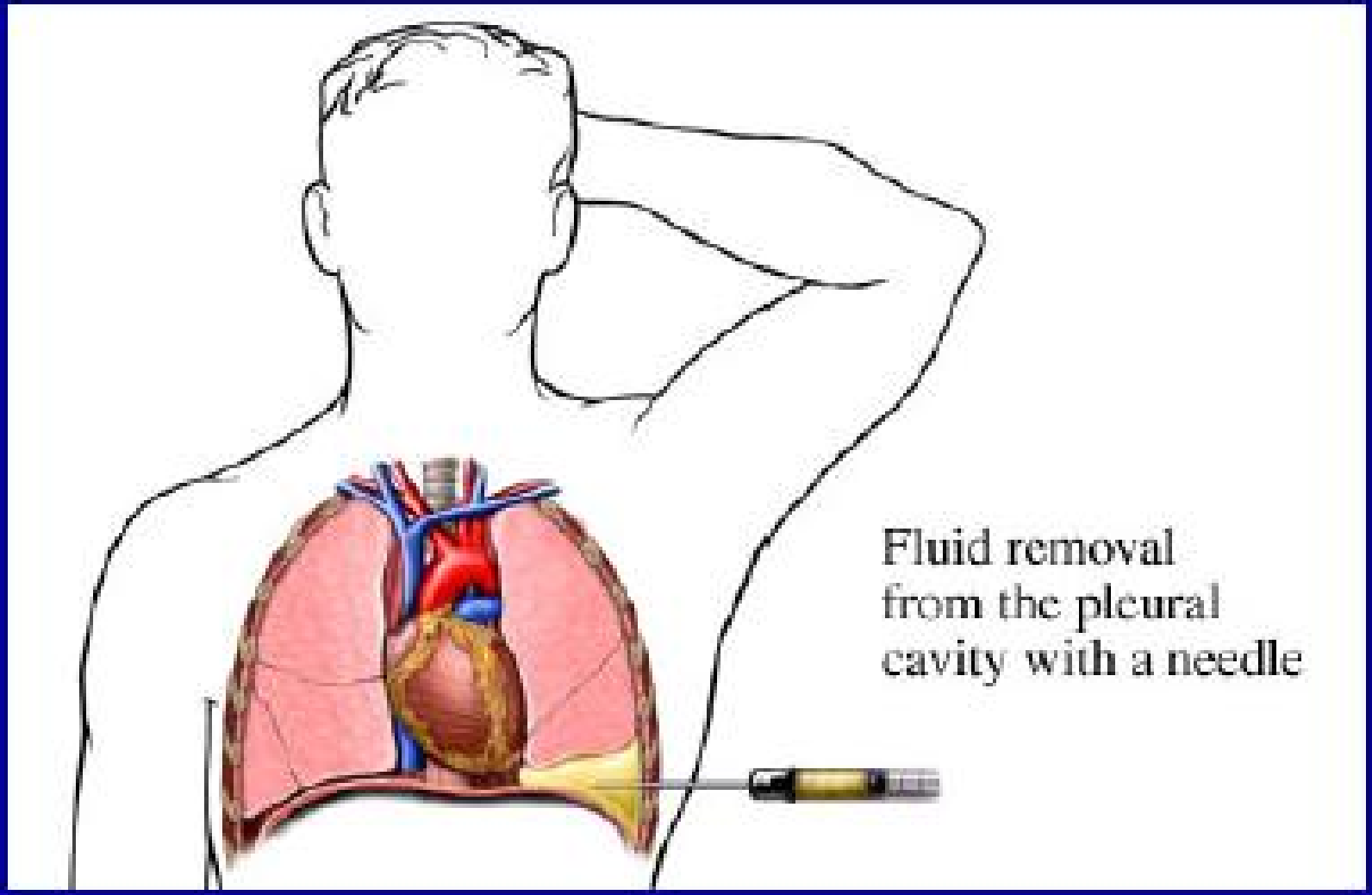
Initial Evaluation (Less Invasive)

- Malignancy
  - Bone Marrow:
    - mildly hypocellular marrow with orderly trilineage hematopoiesis
    - mild eosinophilia
    - **no morphologic evidence of malignancies**
  - Urine VMA and HVA **NEGATIVE**
  - AFP and BHCG **NORMAL** range

Initial Evaluation

- Infectious Disease
  - Histoplasma Antigen/Antibodies NEGATIVE
  - Bartonella titers NEGATIVE
  - RPR NEGATIVE
  - PPD NEGATIVE
  - EBV
    - EA IgG NEGATIVE,
    - EBV NA IgG NEGATIVE
    - EBV VCA IgG POSTIVE
    - EBV VCA IgM NEGATIVE

Thoracentesis Under Local Anesthesia



Biopsy of Extra-Thoracic Lesion

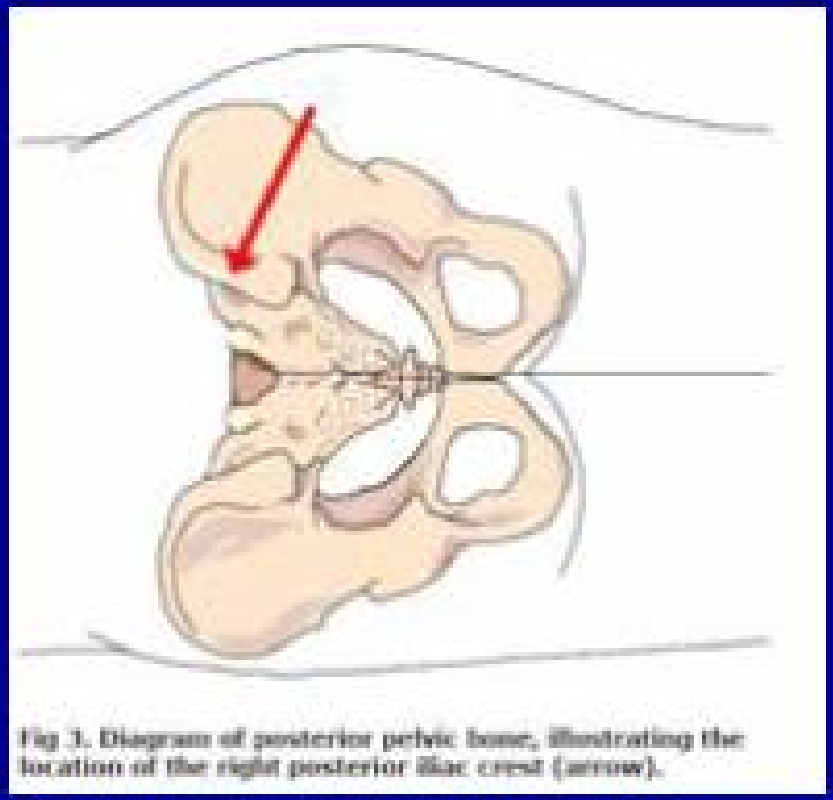
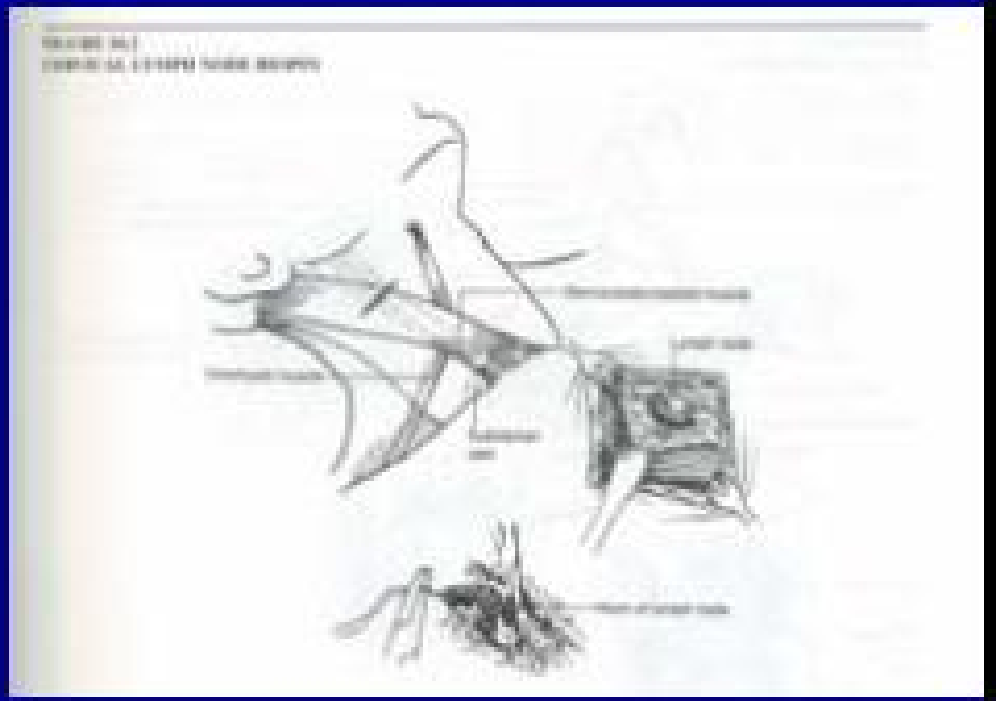


Fig 3. Diagram of posterior pelvic bone, illustrating the location of the right posterior iliac crest (arrow).

Bone marrow aspiration



Cervcical LN biopsy

Image Bros: An Illustrated Guide to performing bone marrow aspiration and biopsy
Accessed 07/21/2008

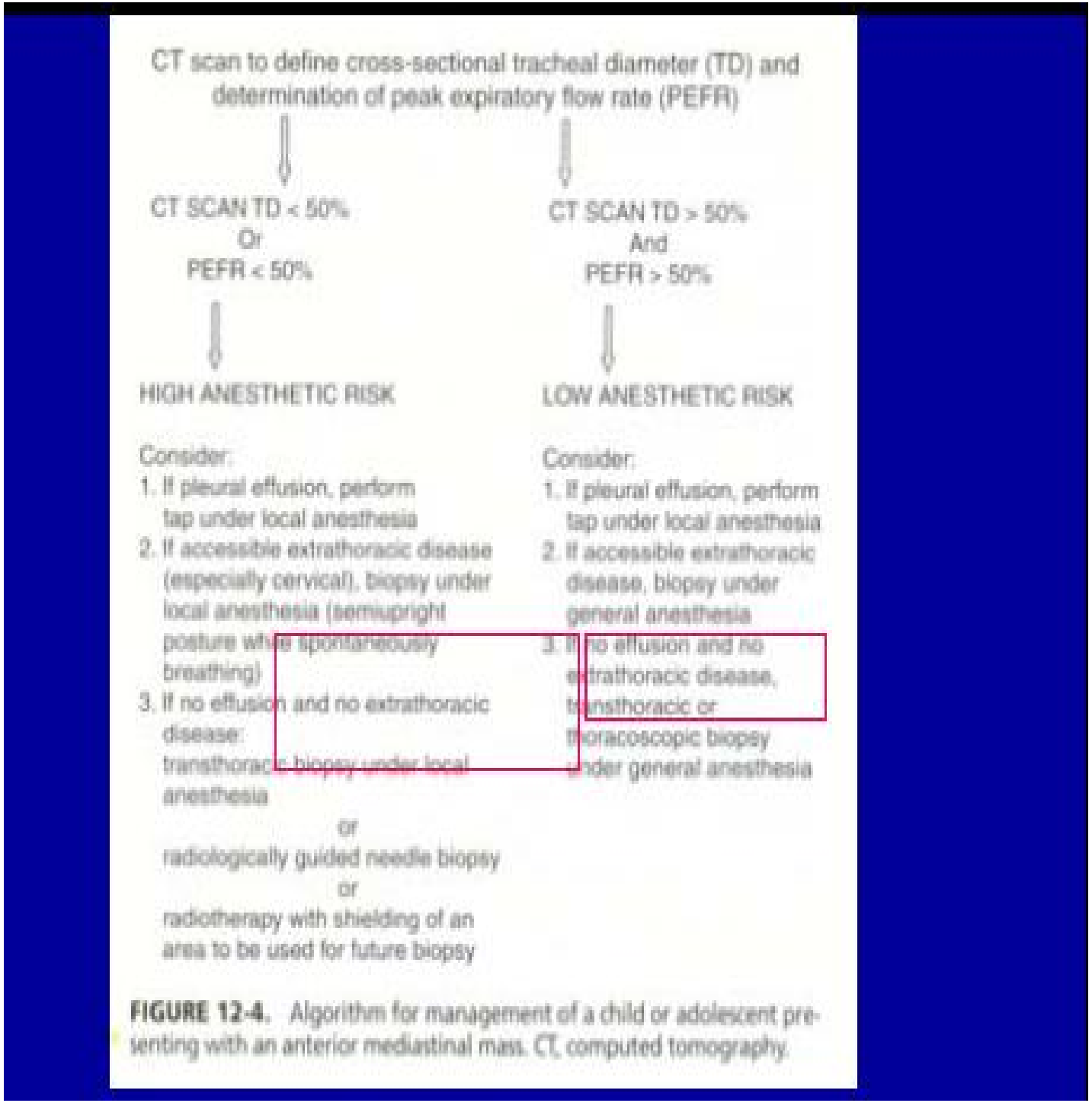
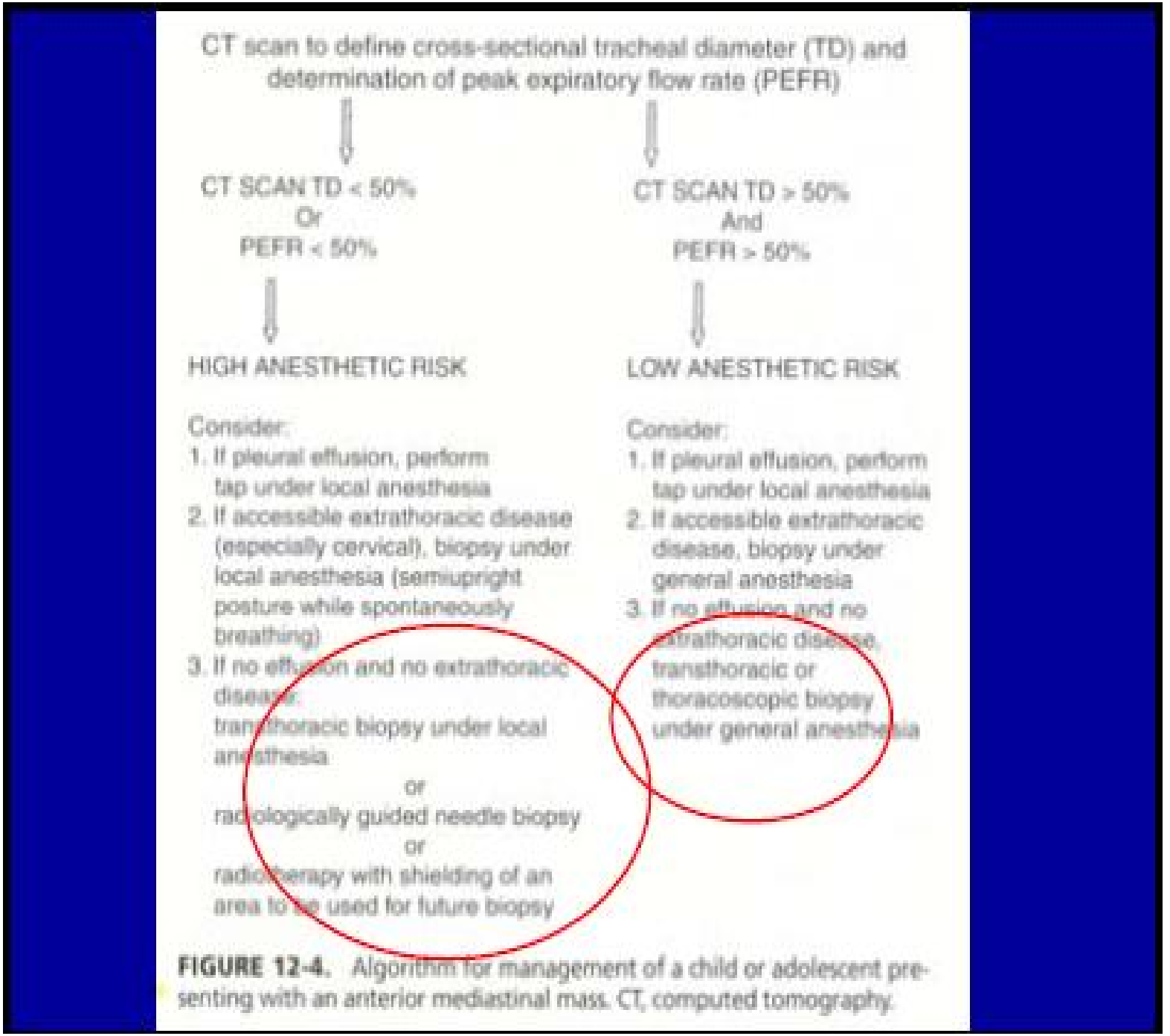


FIGURE 12-4. Algorithm for management of a child or adolescent presenting with an anterior mediastinal mass. CT, computed tomography.



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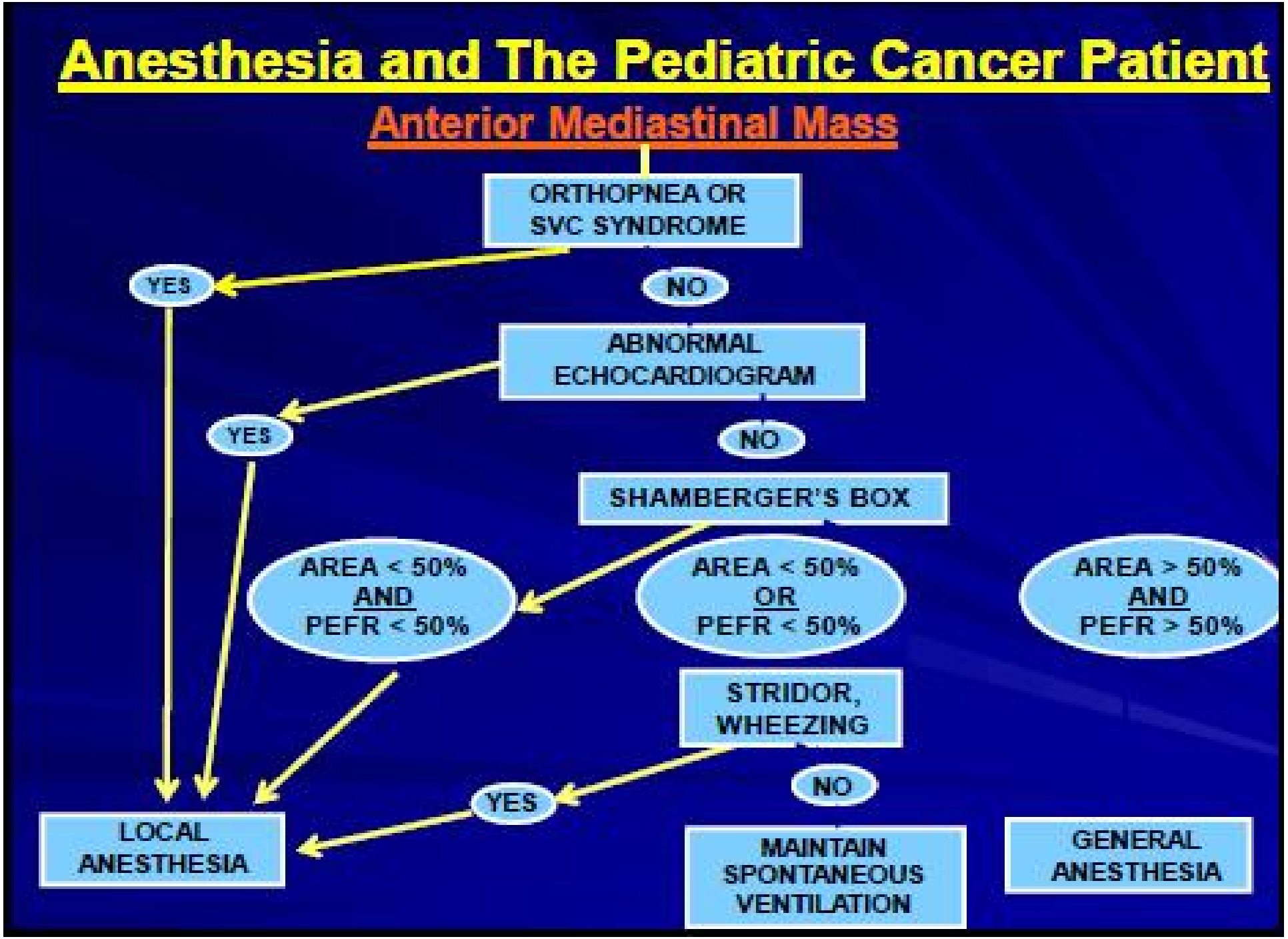
Anesthesia and The Pediatric Cancer Patient

Anterior Mediastinal Mass



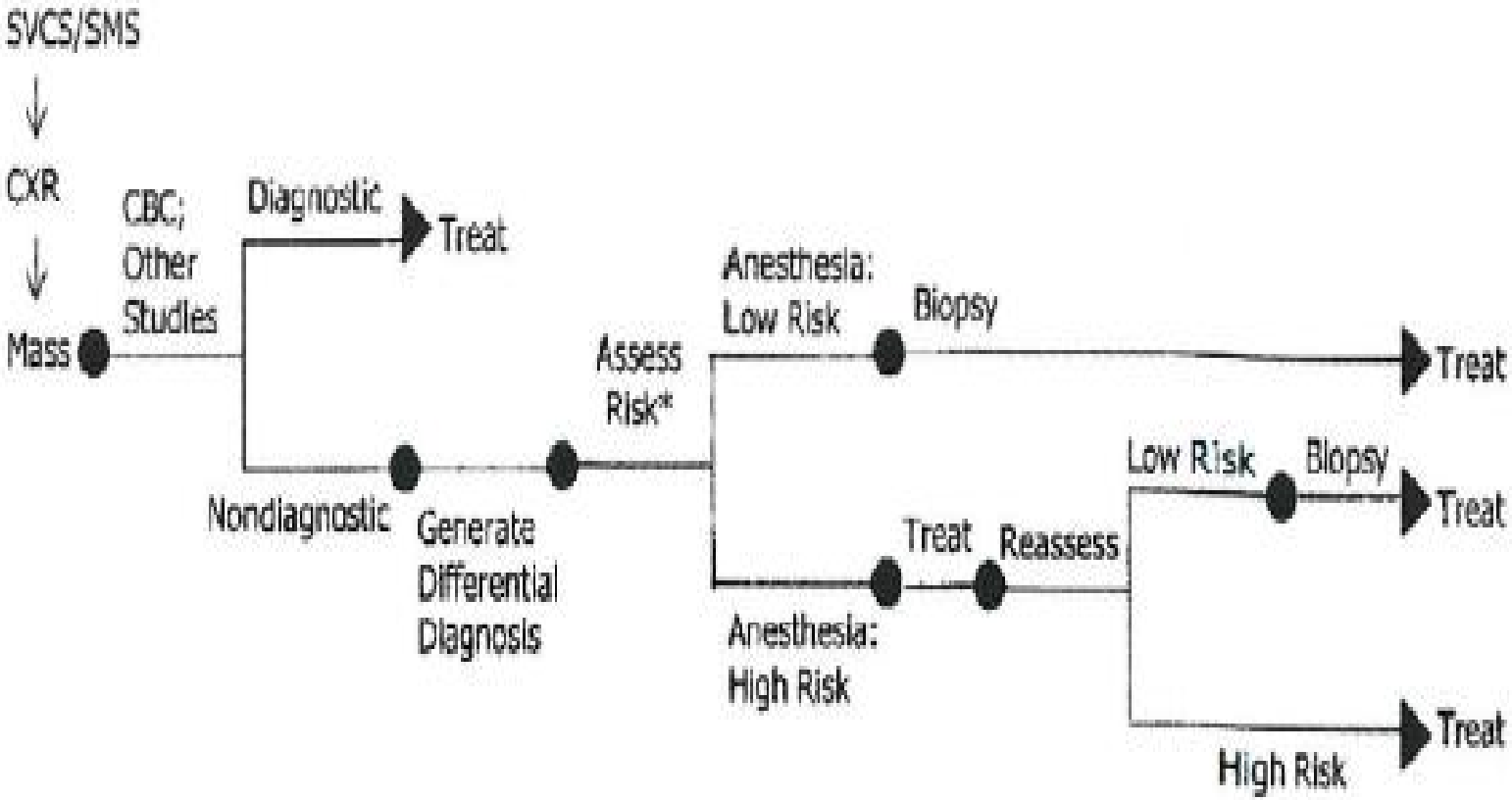
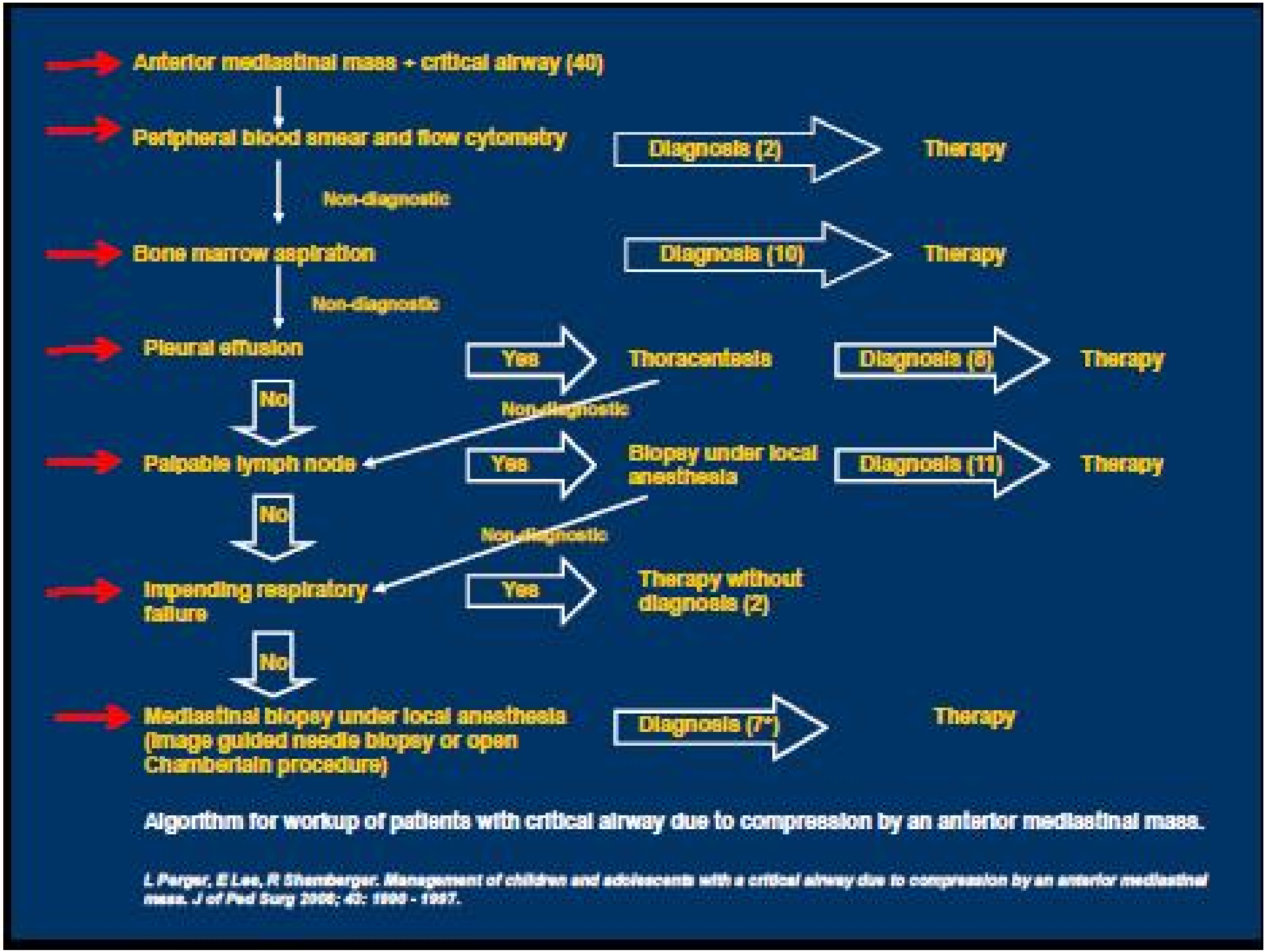


FIGURE 38.2 Assessment and management of a child with respiratory distress, superior mediastinal syndrome (SMS), or superior vena cava syndrome (SVCS) and an anterior mediastinal mass. Initial assessment for anesthetic risk may include computed tomography of the chest, echocardiography, pulmonary function tests, and flow volume loop. If the patient cannot tolerate these studies, or if the studies indicate severely compromised cardiopulmonary reserve, the patient is a high anesthetic risk. CBC, complete blood cell count; CXR, chest radiograph.

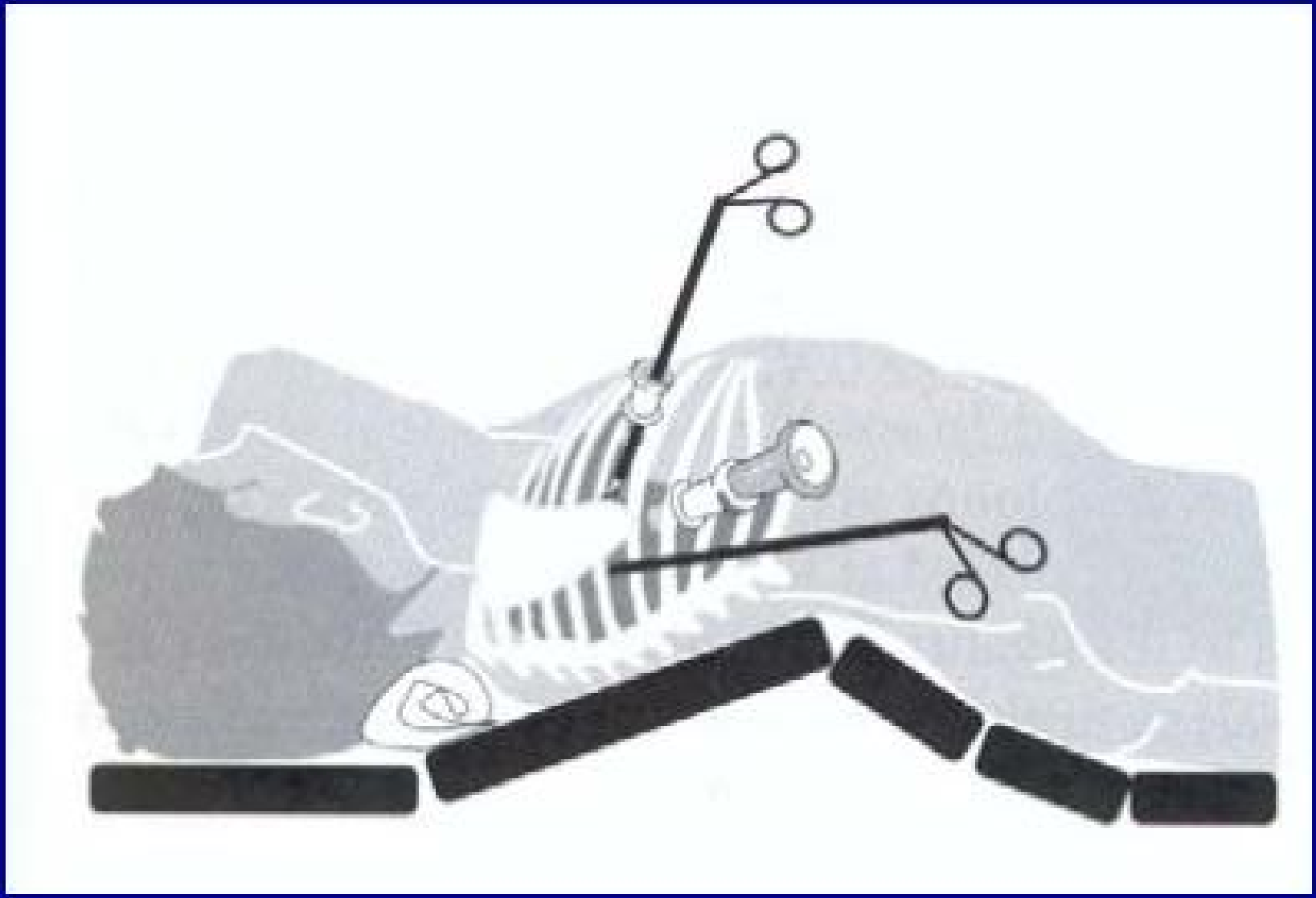


Algorithm for workup of patients with critical airway due to compression by an anterior mediastinal mass.

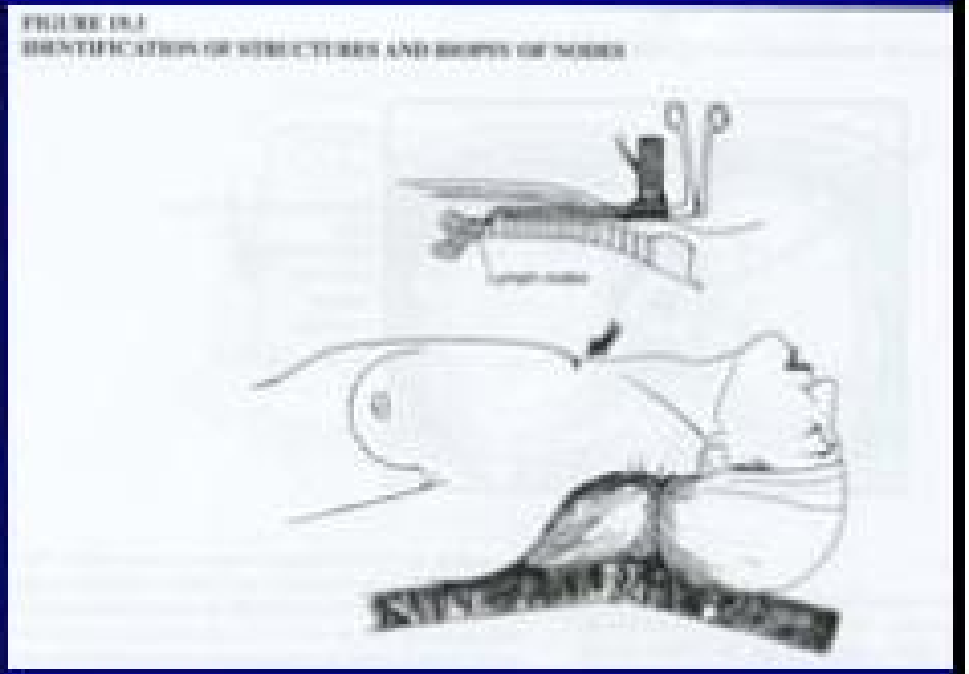
L Perger, E Lee, R Shamberger. Management of children and adolescents with a critical airway due to compression by an anterior mediastinal mass. J of Ped Surg 2006; 41: 1990 - 1997.

Percutaneous Needle Biopsy

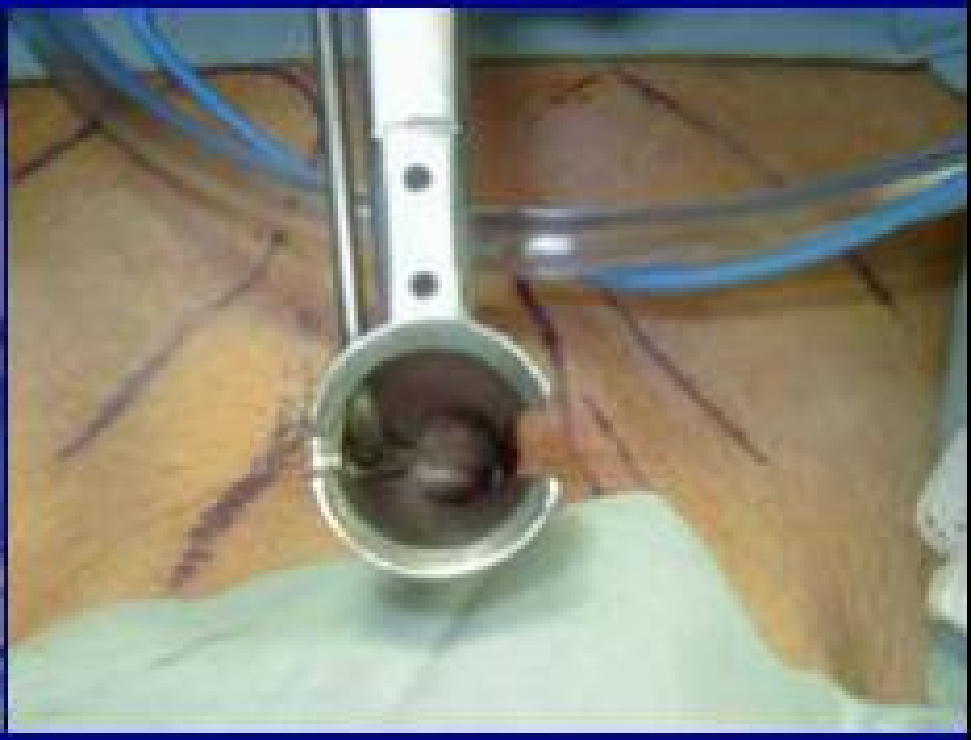
Thoracoscopy



Mediastinoscopy



Mediastinoscopy



If Patient's Respiratory Status is Severely Compromised ...

Initiation of Emergent Treatment

- Irradiation
- Chemotherapy

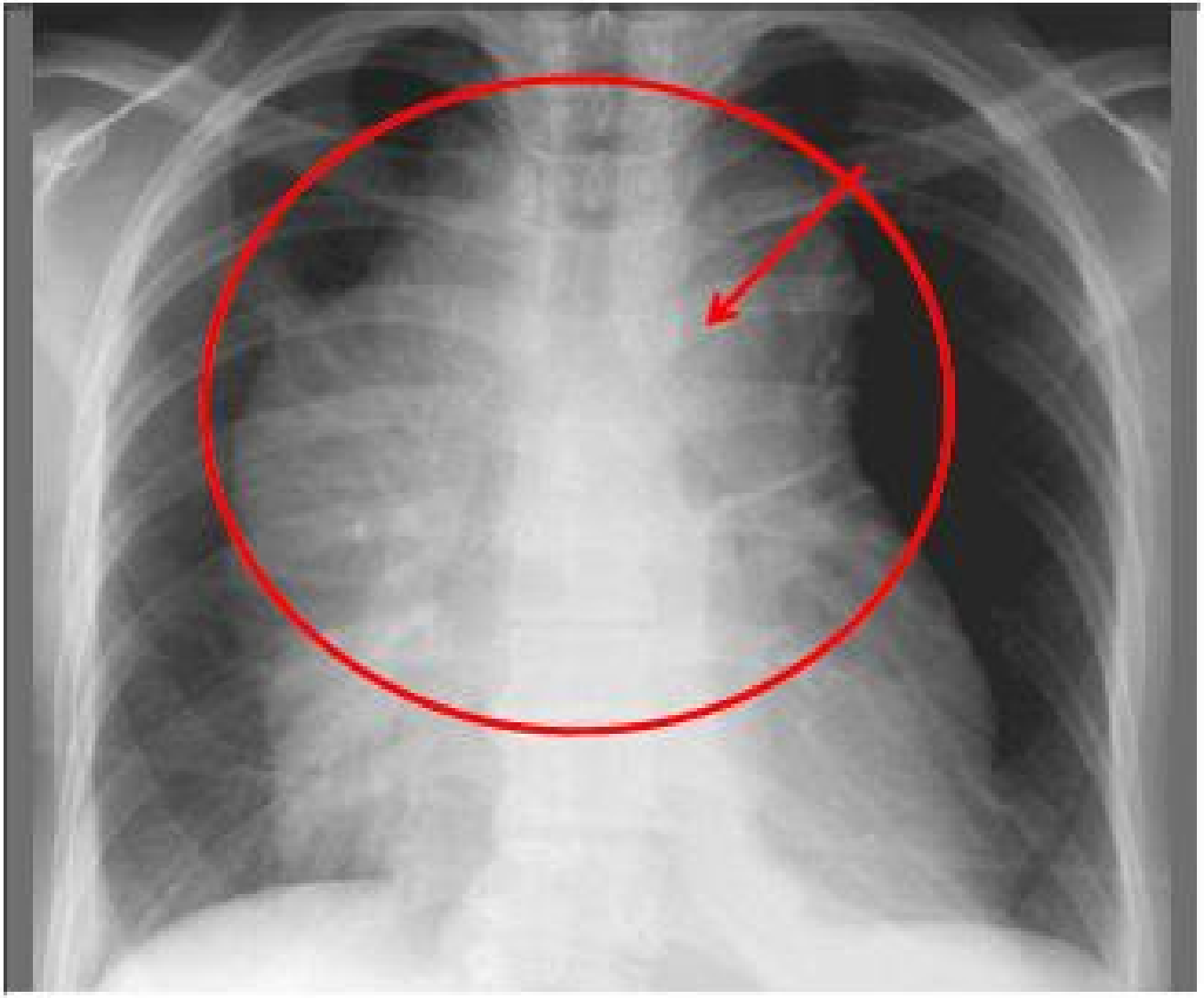
Conclusion

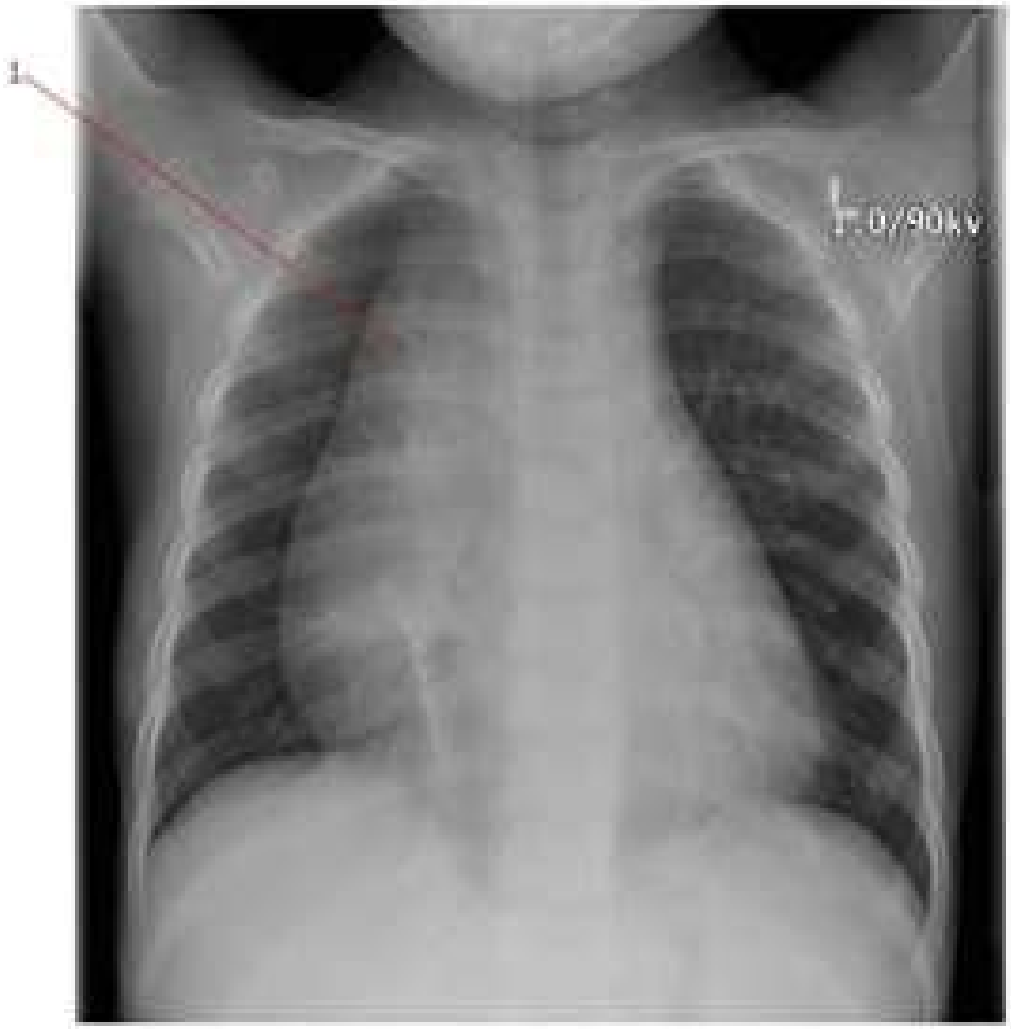
- During diagnostic approaches of mediastinal mass, it is important to:
  - Evaluate the risk of sedation / anesthesia, based on the degree of tracheal compression on CT scan.
  - Start with "less invasive" procedures upon extra-thoracic lesions, then advancing the procedures depending on the obtained result.
- For the patients with severely compromised respiration, starting empiric treatment may need to be considered.

Shalkow J. Apr 15, 2010

A CASE

- 18 yo boy
- Visited PCP for 2 wks of back pain, fatigue, and feeling hot.
- On ROS: night sweats, coughing while lying on L side, epistaxis 2-3 times.

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LABS

- Labs showed: WBC 27.6, Hb 14.8gm/dL, plts 52K
- sodium 143, potassium 3.6, chloride 104, CO2 31.2, Creatinine 0.89, LDH 23,564, Uric acid 10.2, Calcium 10.1 (no phos), ALT 47, AST 125, Alk phos 65

- Mediastinal mass found on CXR.

- 4 years old wth HX of 4months cough

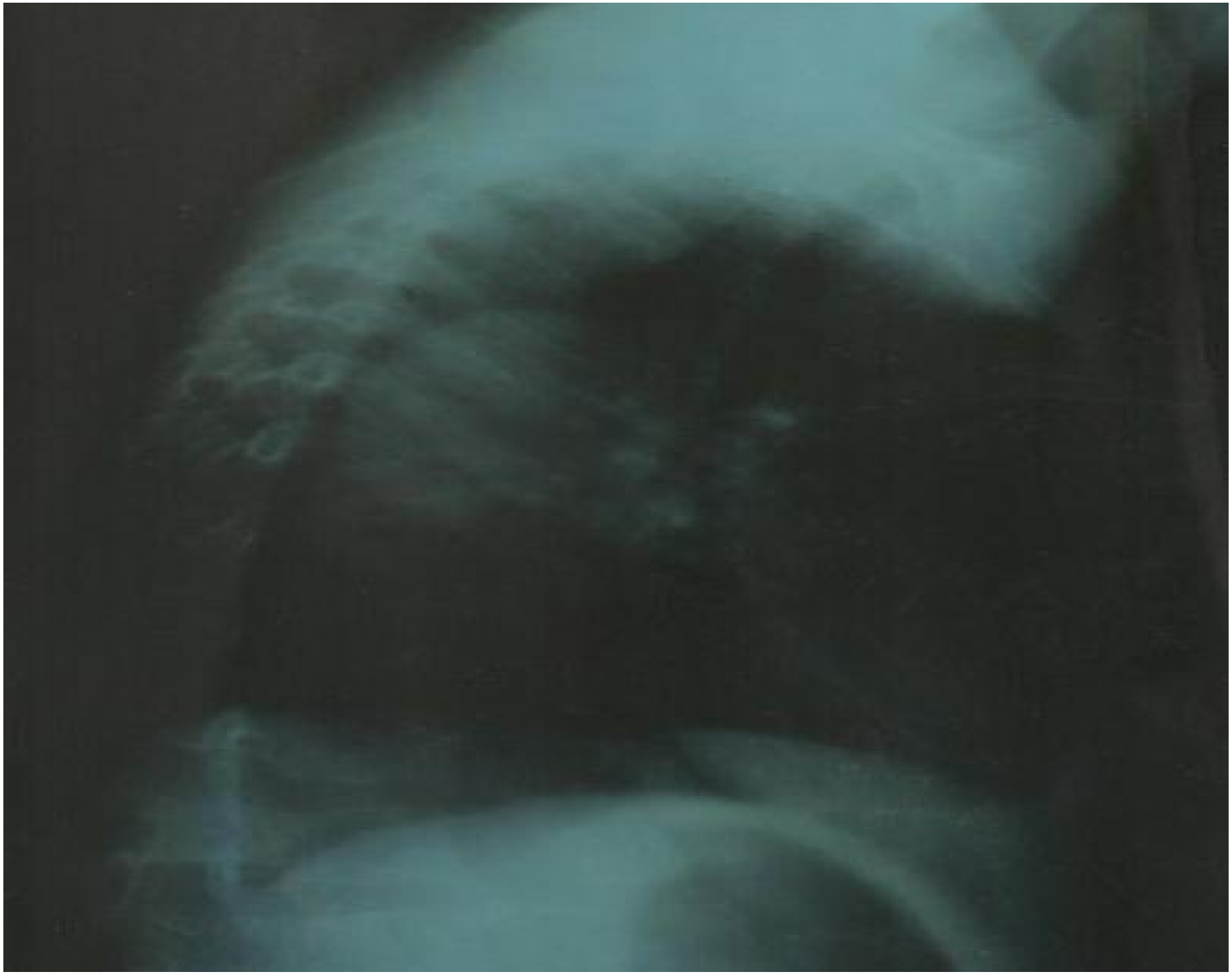
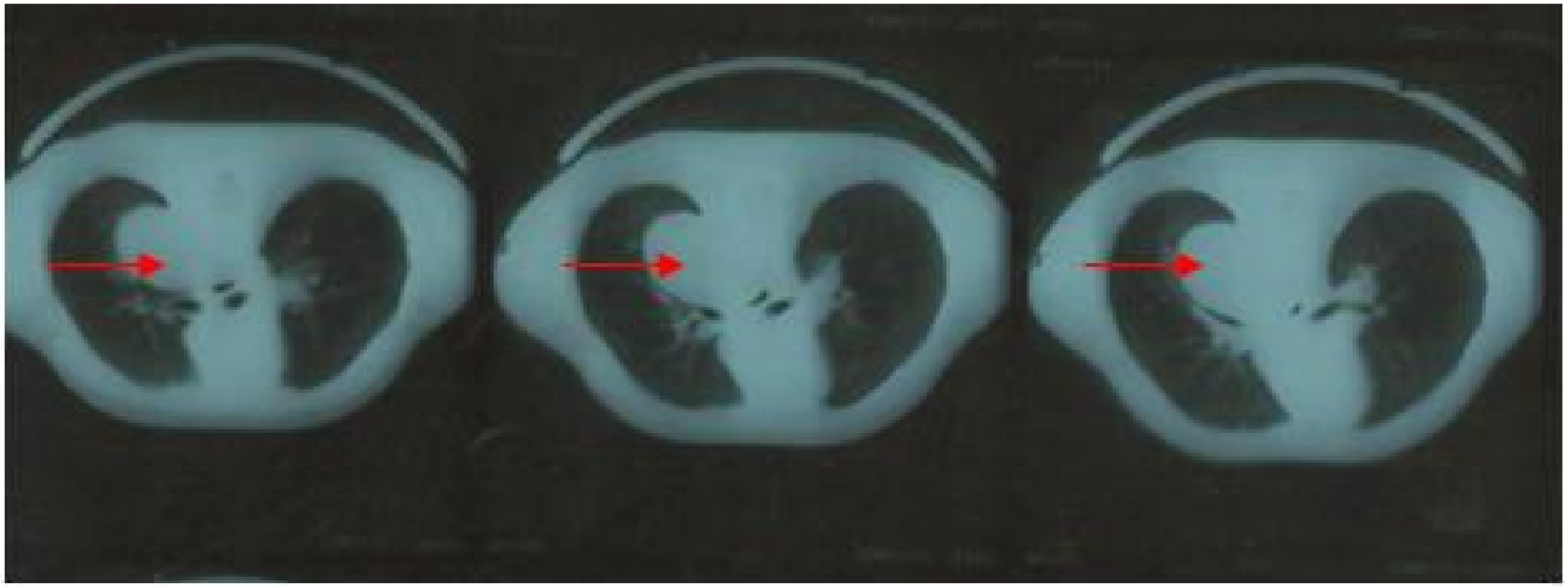


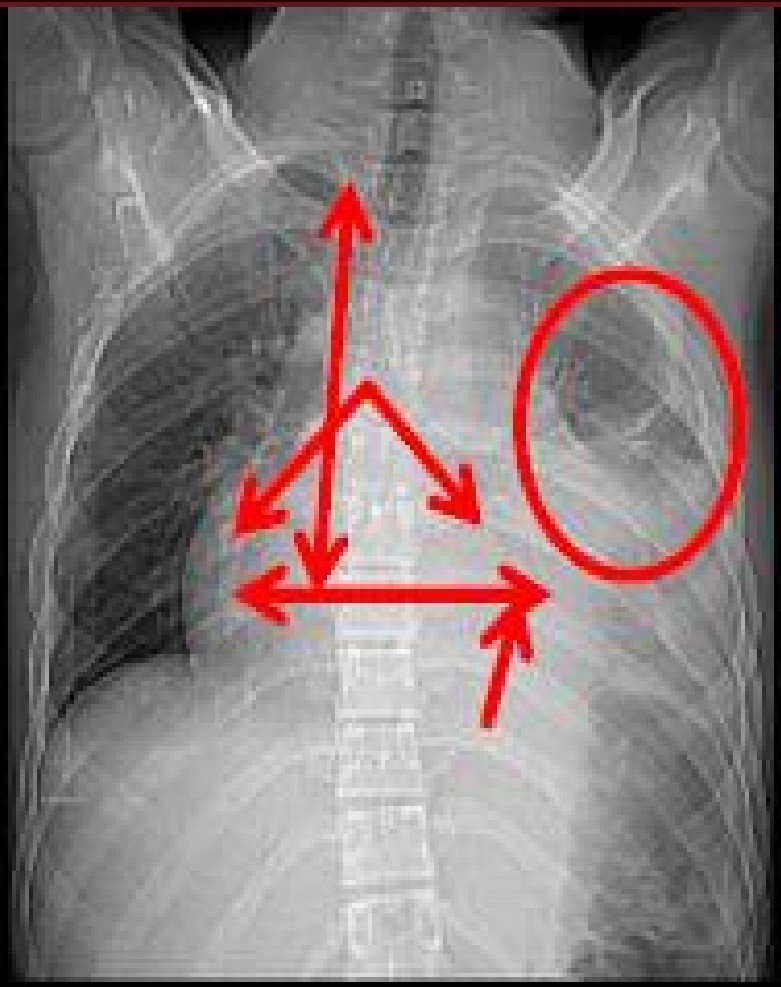
Figure 1

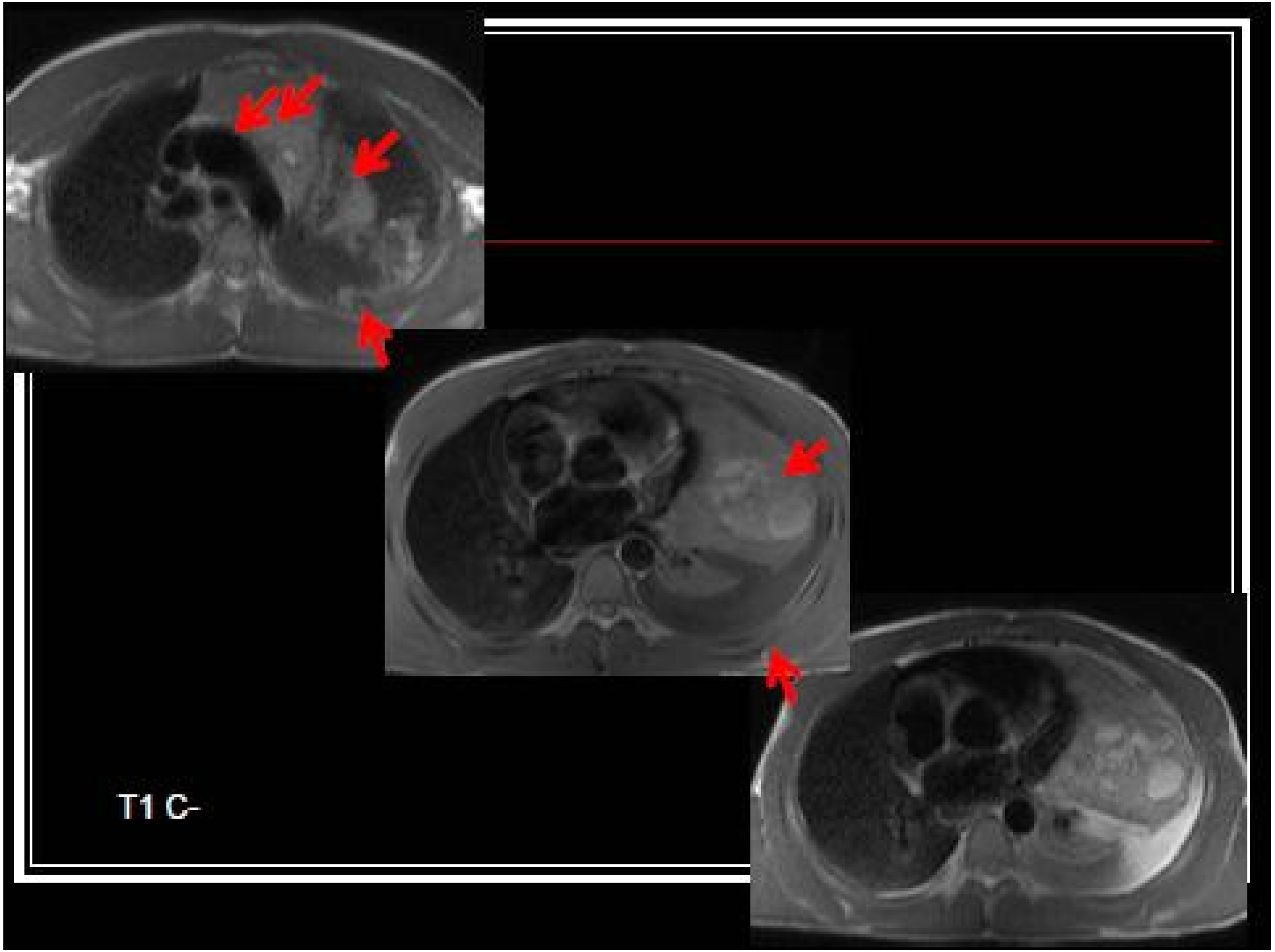
CT scan showing the rounded, well-circumscribed mediastinal mass (arrow).



Leyla Halafova, MD
Azerbaijan Medical University
Baku, Azerbaijan

- 15 yo AAM saw his pediatrician for a 2-3 month history of left shoulder pain
- His pediatrician found breath sounds to be decreased bilaterally
- On 2/27/09 he was sent to his local hospital with a diagnosis of pneumonia
- A chest X-ray revealed a large mediastinal mass

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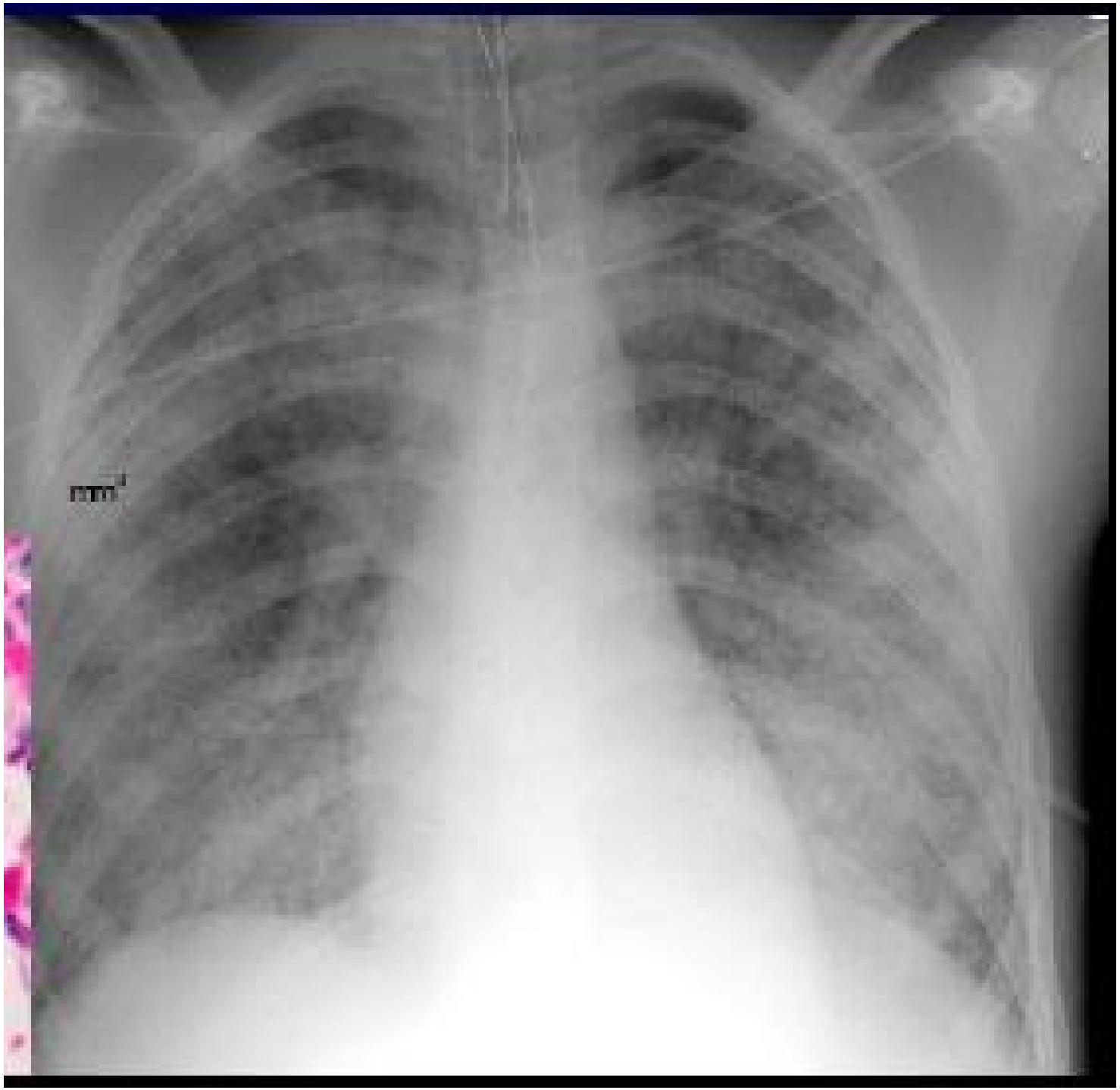
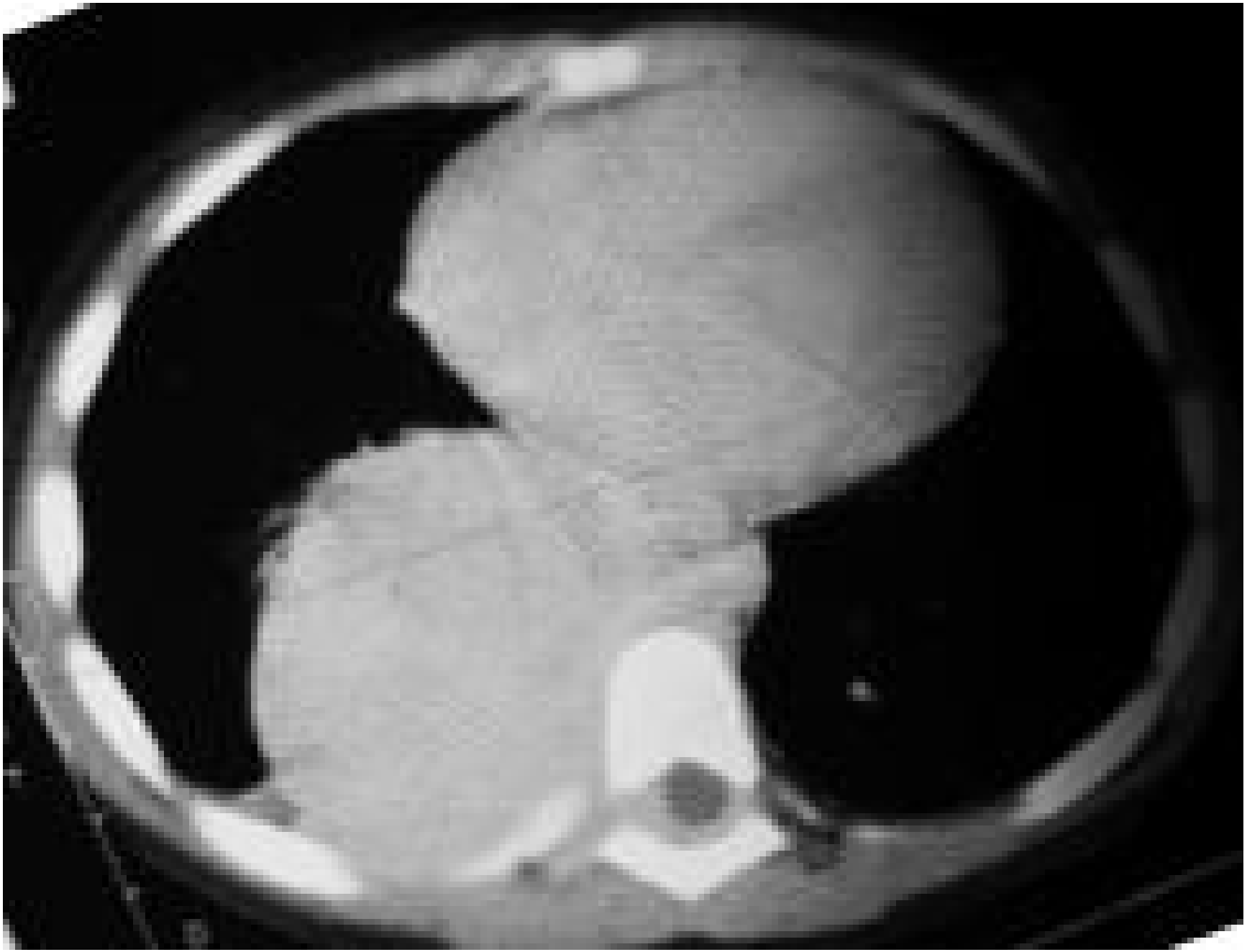
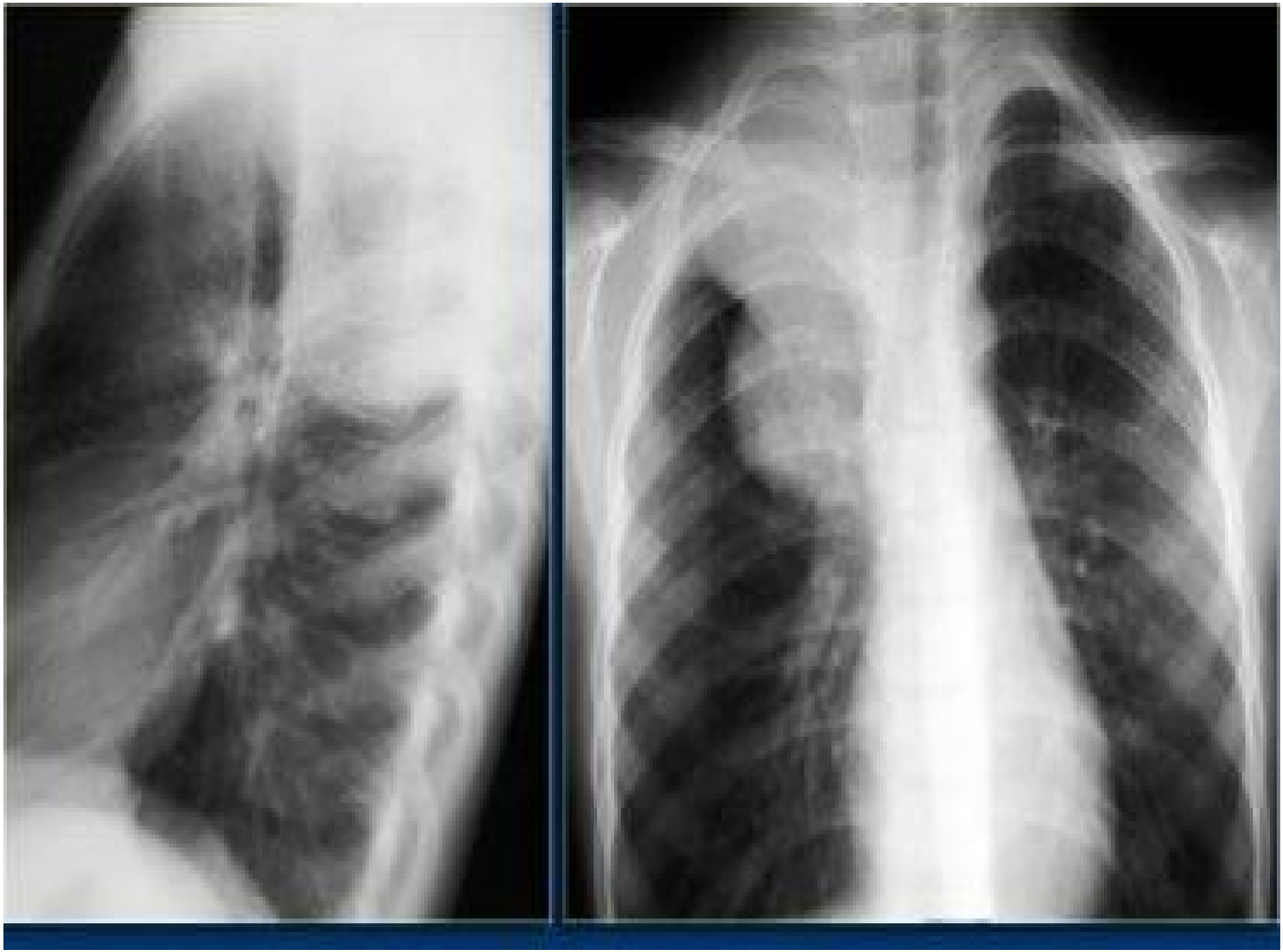
- 13 years old c cc of nose bleeding and anemia.
- P/E:ptechia in lower extremity.

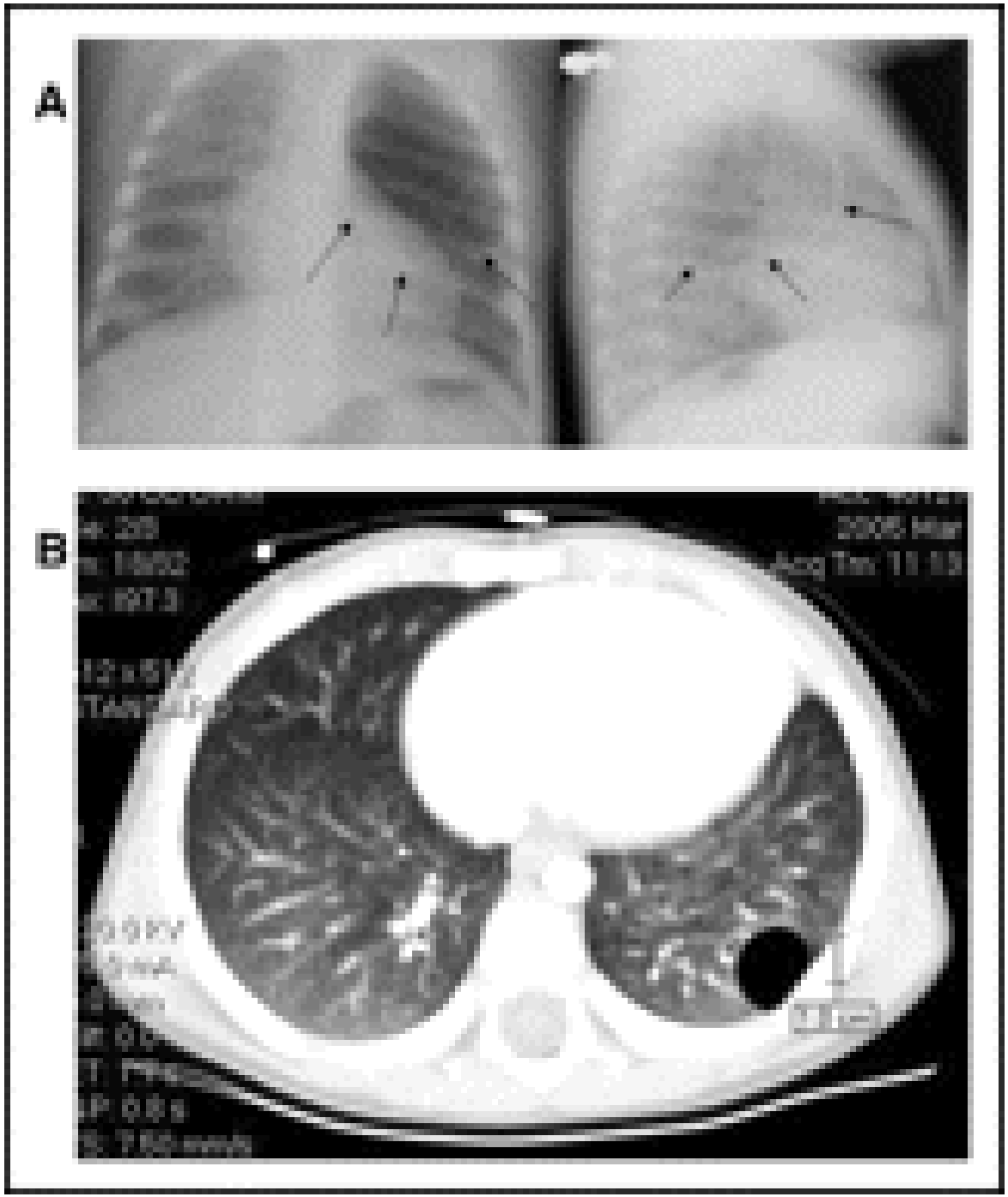


- Iab:WBC ,200,OOO
- Hb,6
- Plt,25000


R



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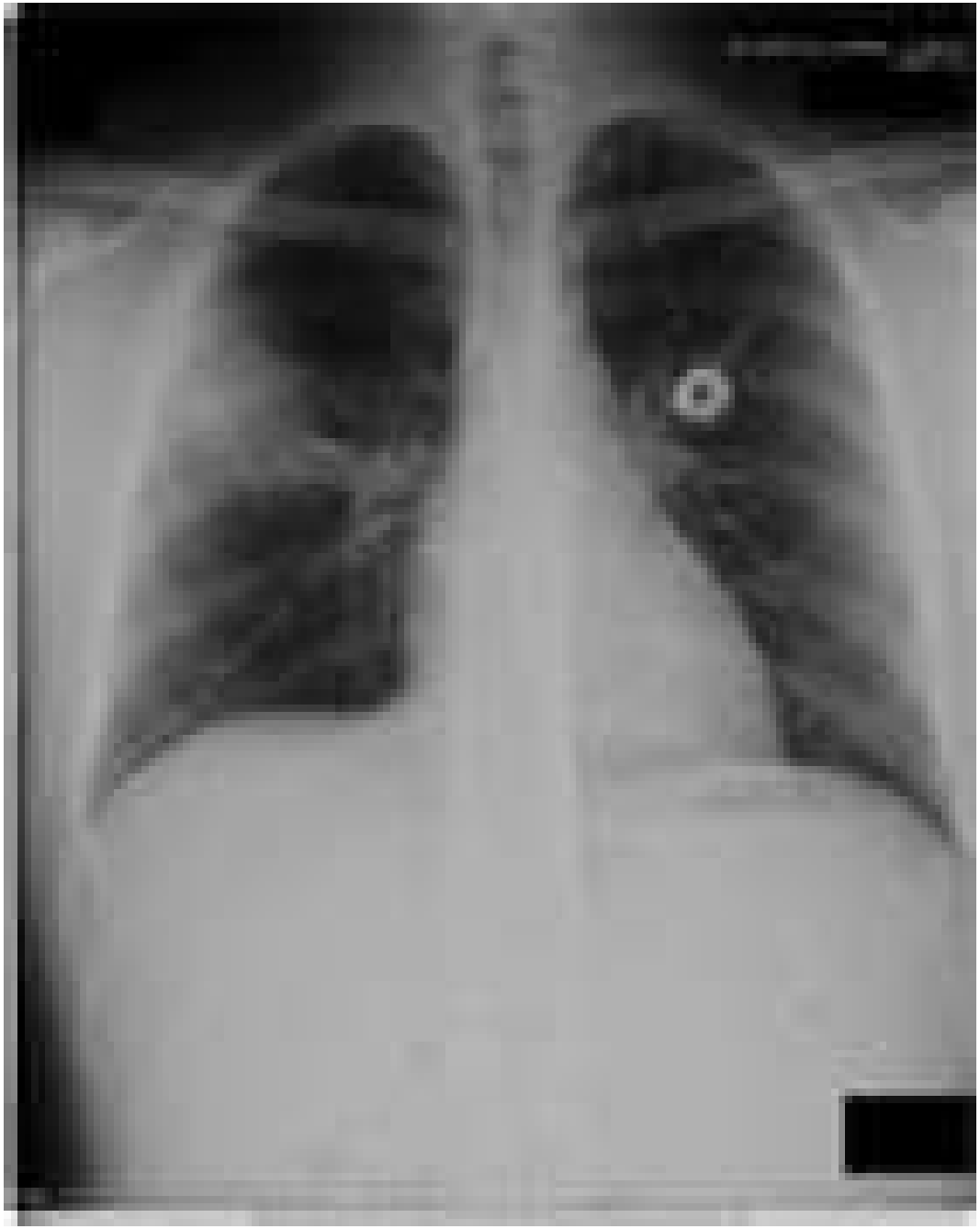


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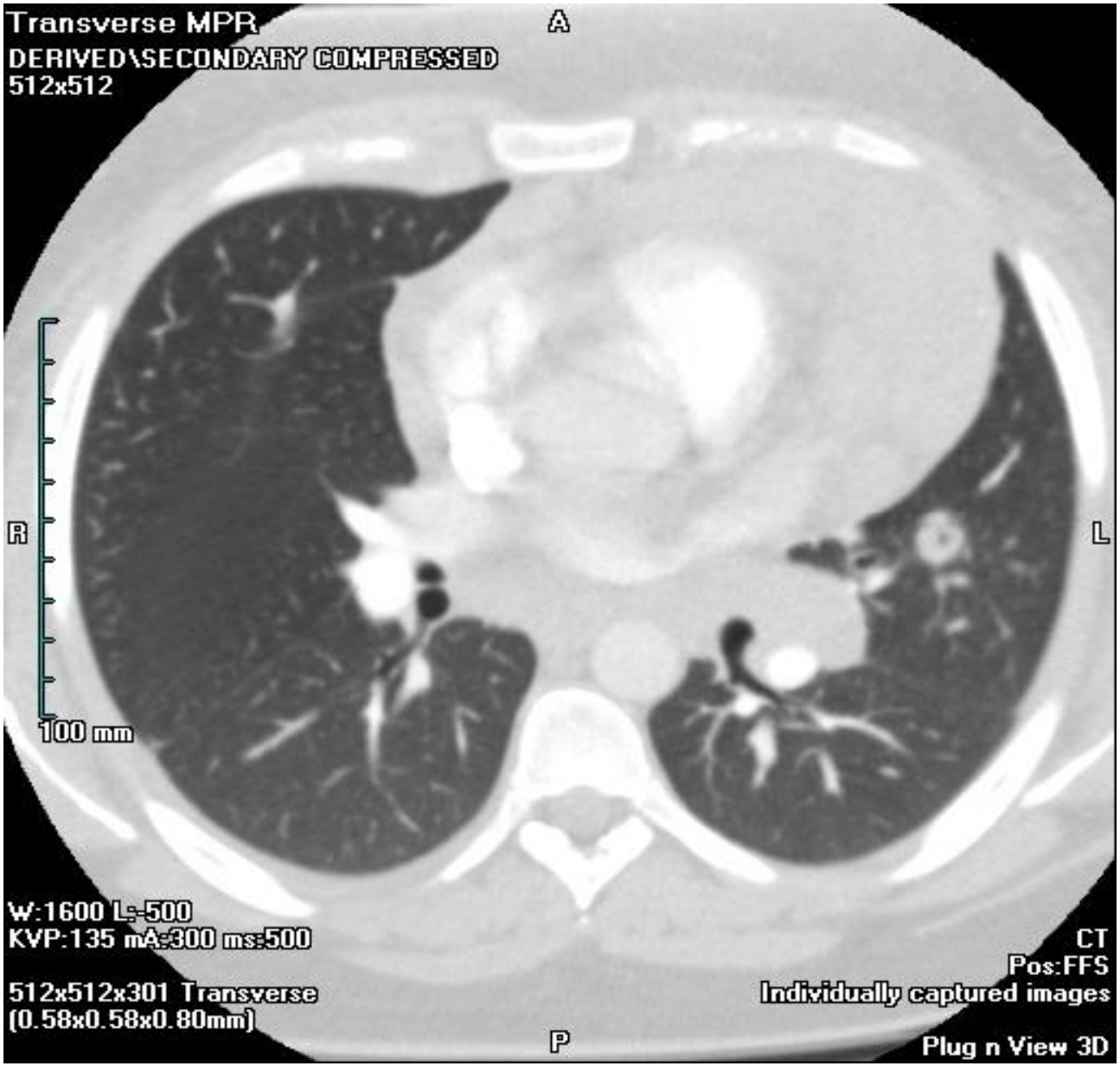
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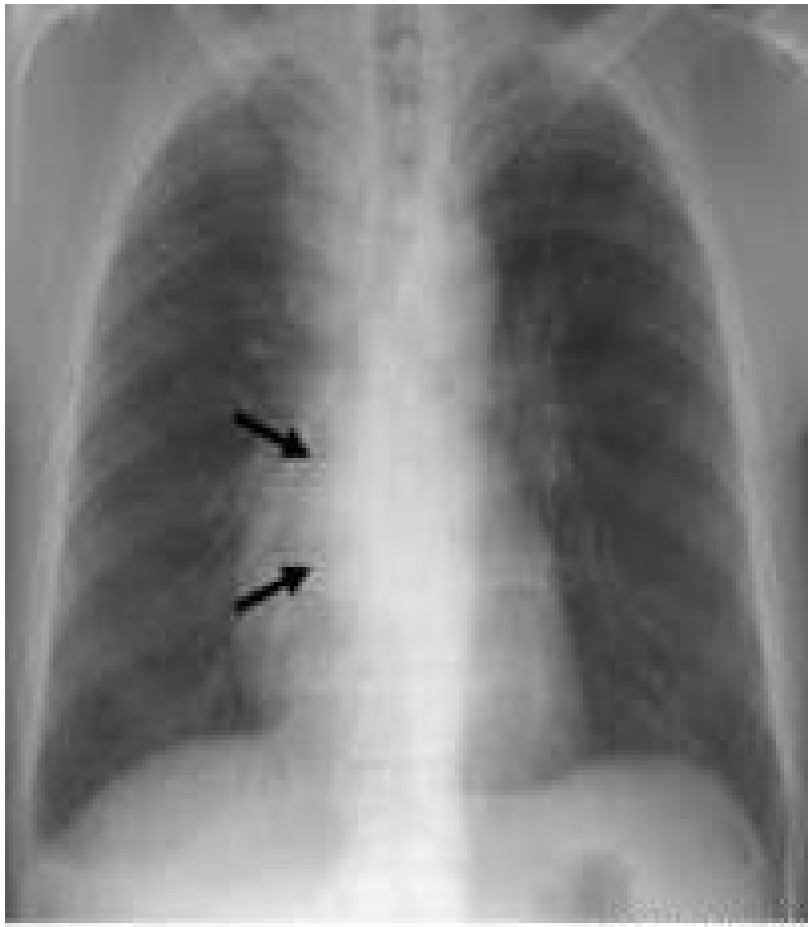


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