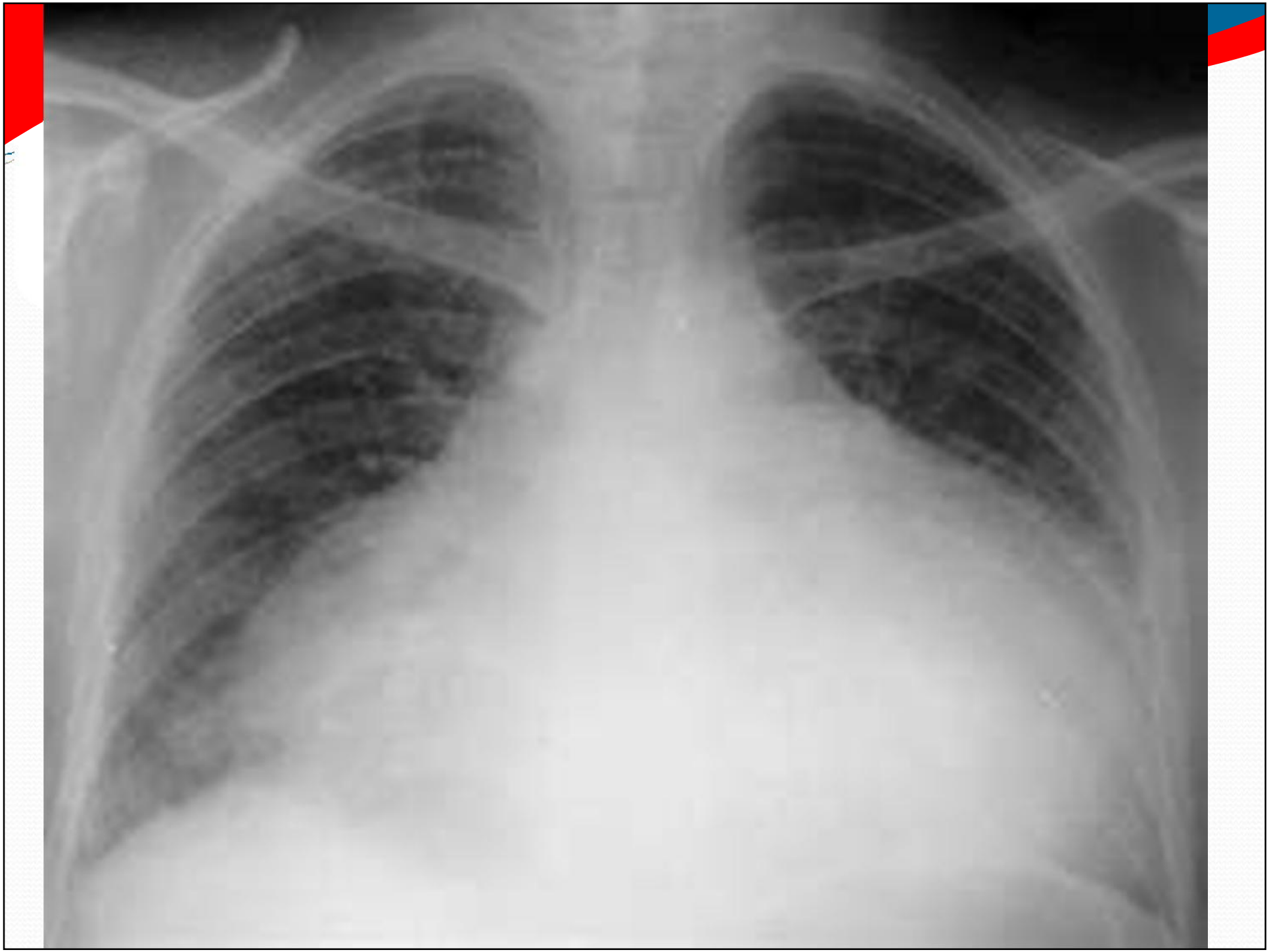
Pediatric Congenital Hematologic
Disorders Research Center
مرکزتحقیقات بیماری های خونی مادرزادی کودکان

Dr Goudarzipour

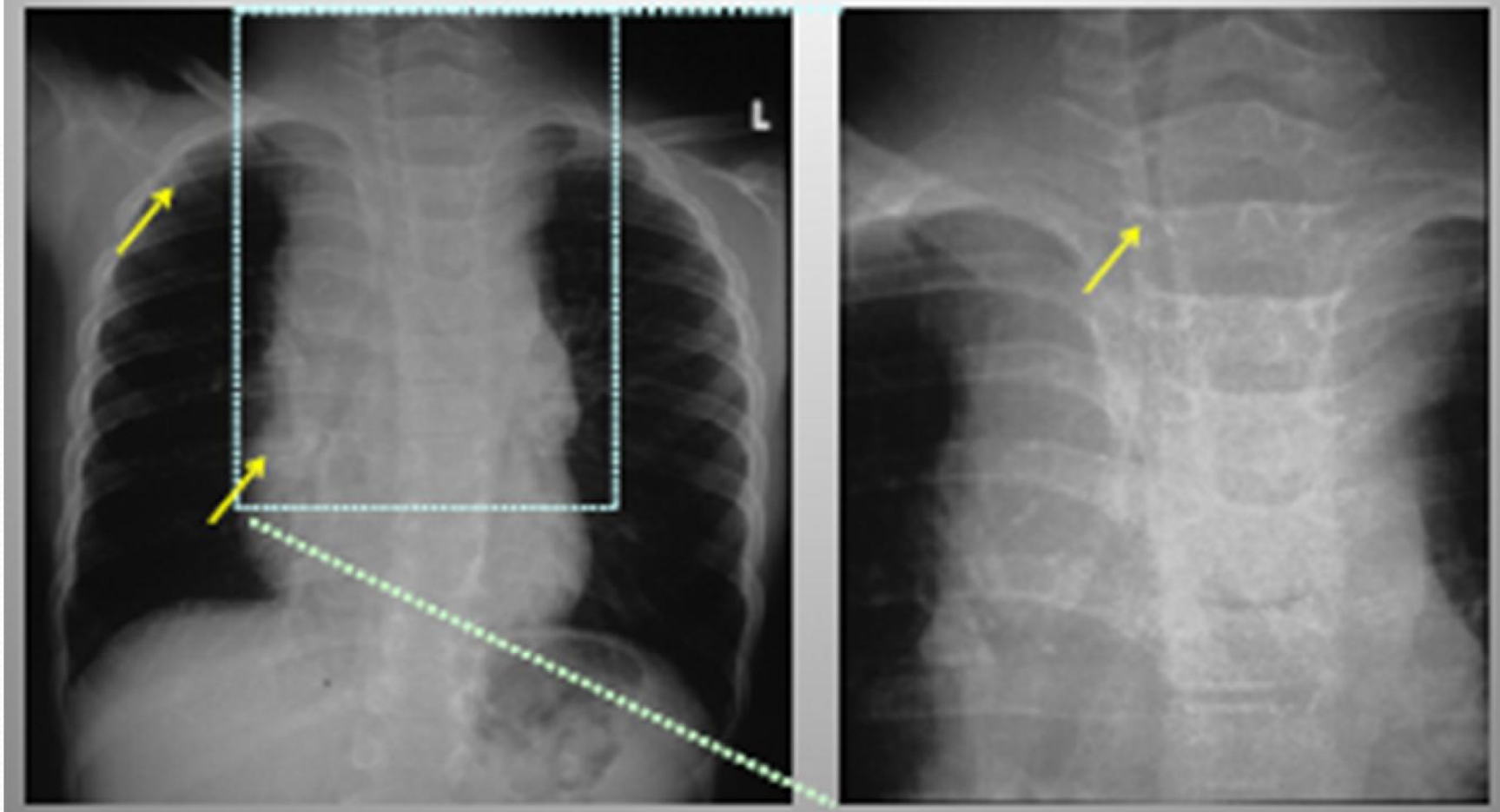
Oncologic emergency

Pediatric Congenital Hematologic
Disorders Research Center
مرکزتحقیقات بیماری های خونی مادرزادی کودکان

SVC syndrome

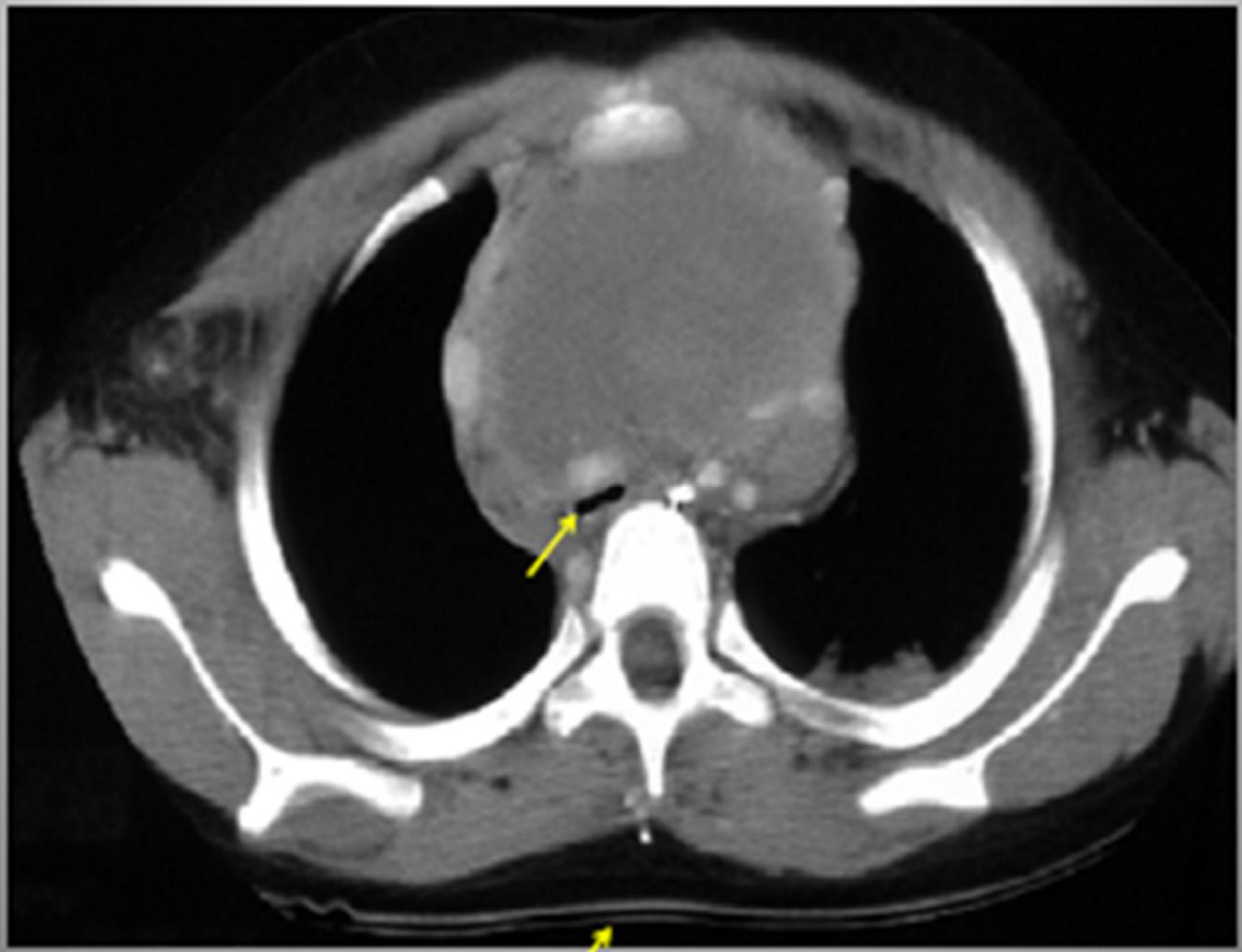


Chest X-ray



Mediastinal Mass
Tracheal Deviation and Narrowing

Tracheal Compression evident on CT



Note: patient is Supine…Gravity + Mass = more compression

SVC Syndrome Pathophysiology

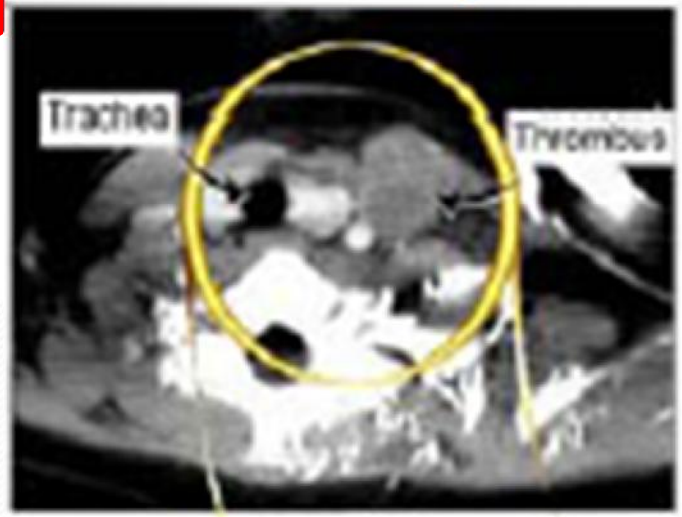


Fig 29.6

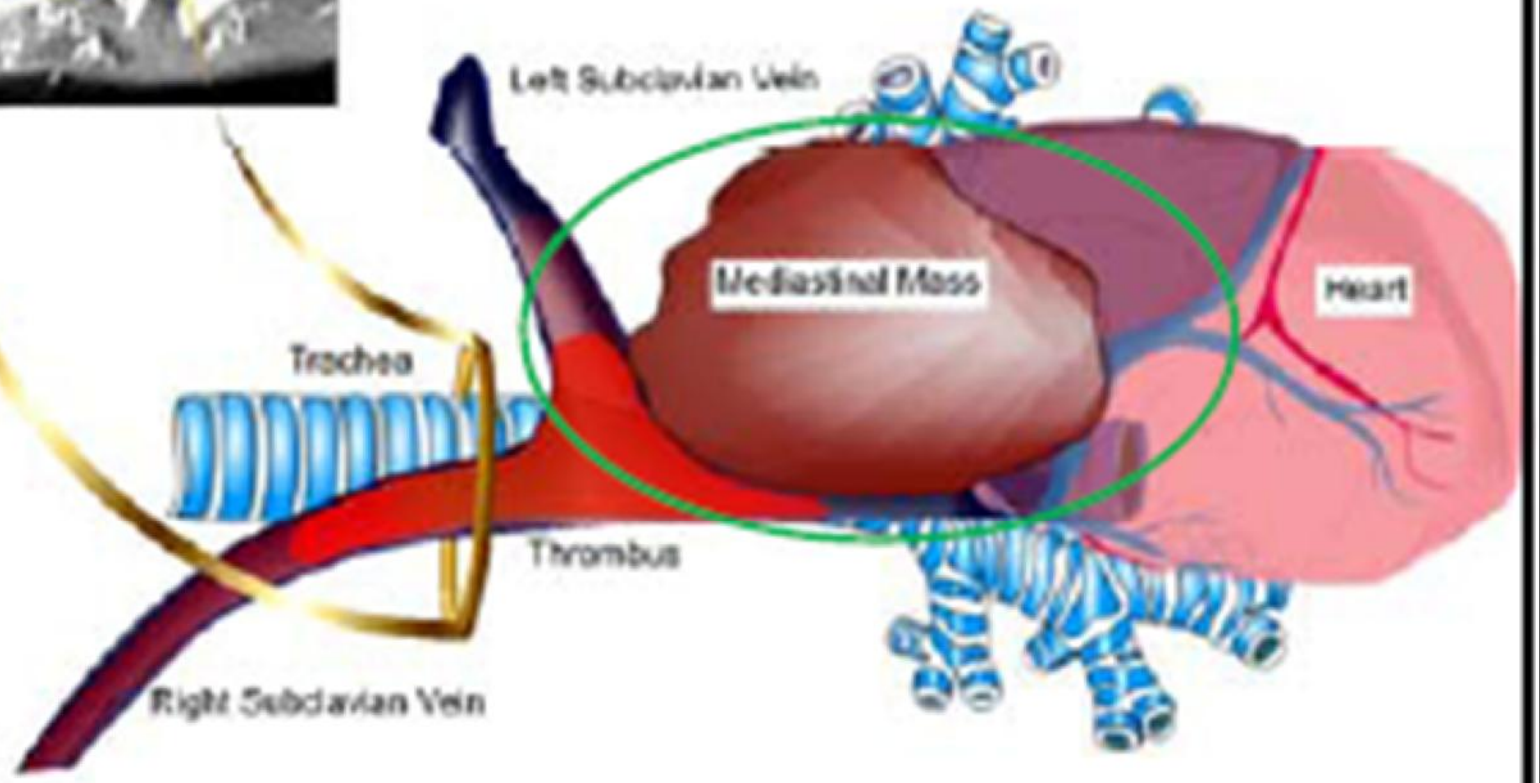
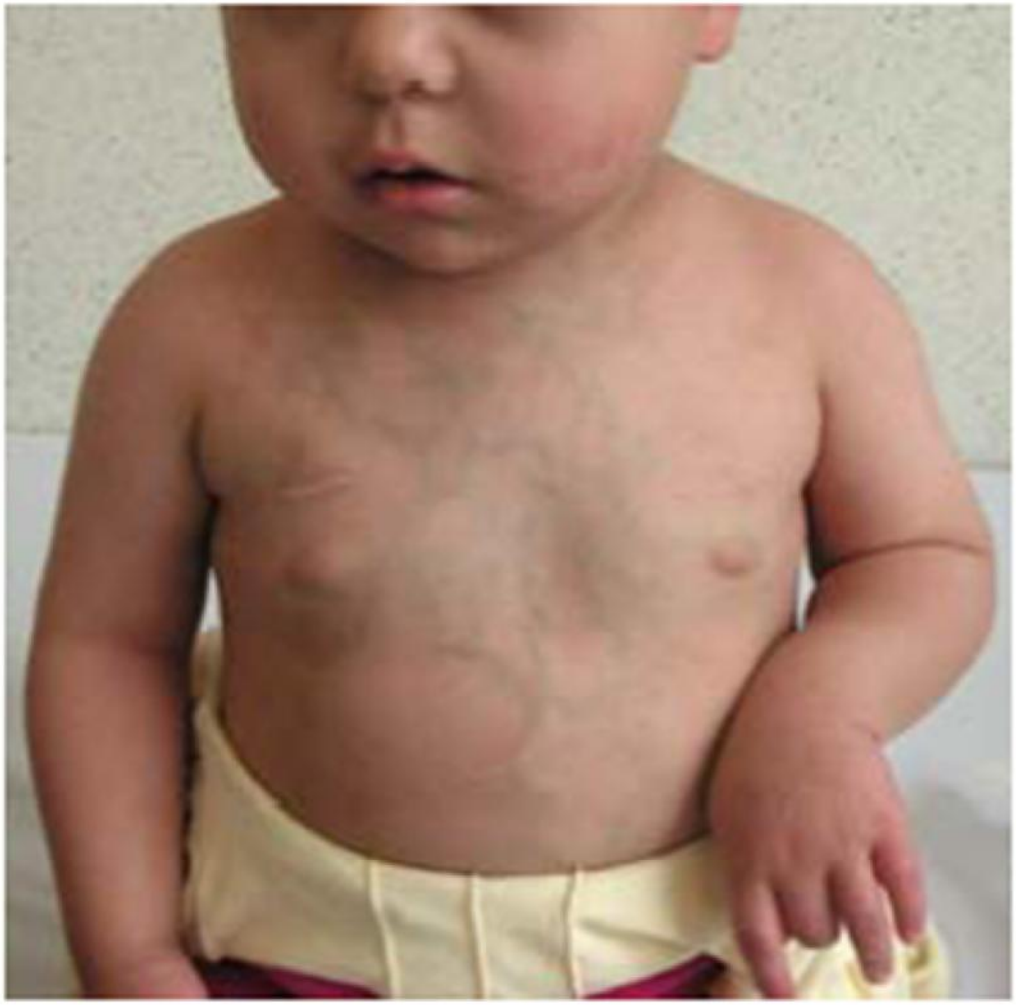


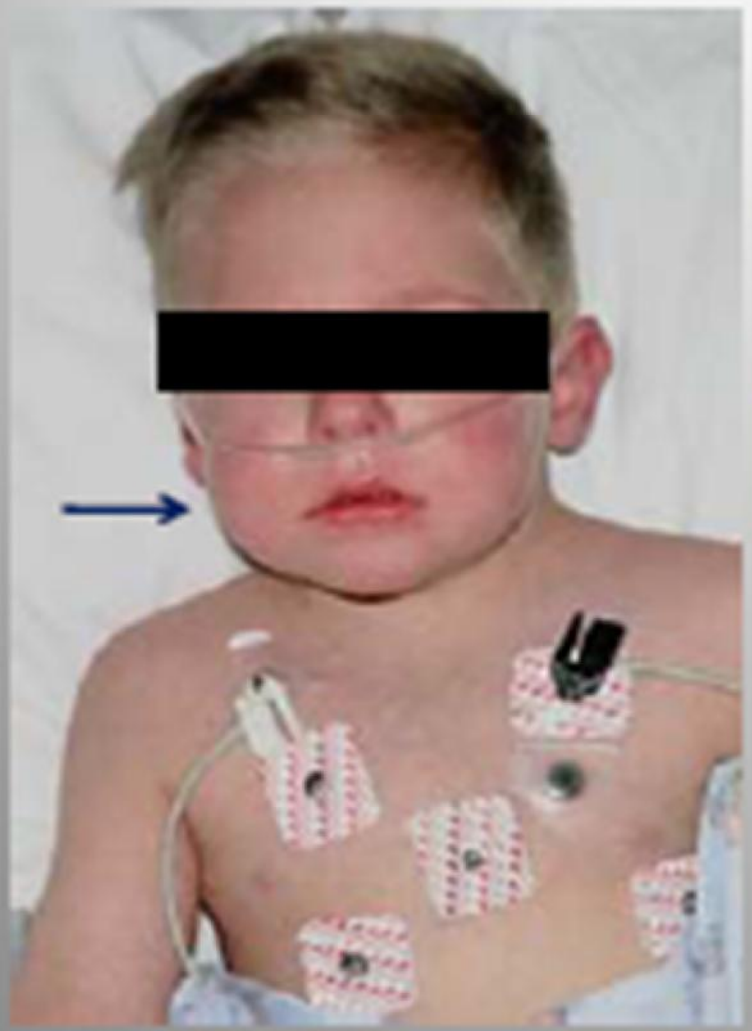
TABLE 39-2. SYMPTOMS AND PHYSICAL FINDINGS IN PATIENTS WITH SUPERIOR VENA CAVA SYNDROME AT INITIAL PRESENTATION

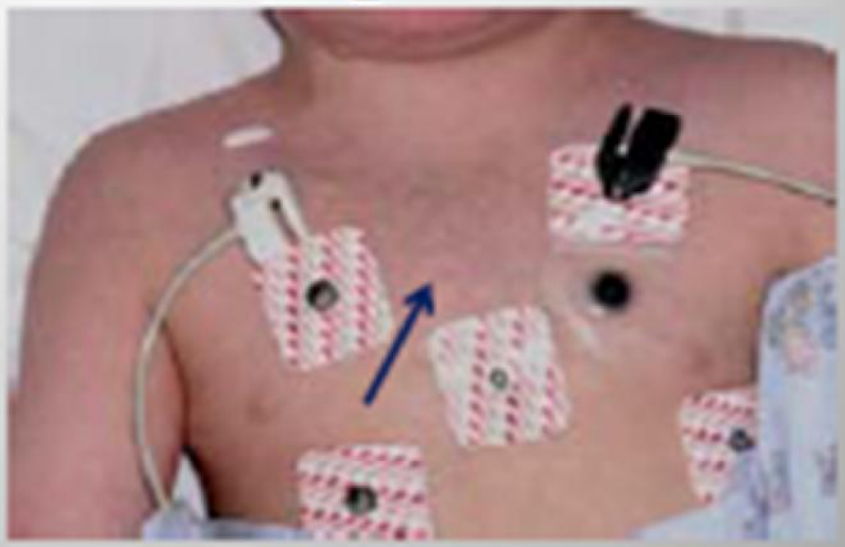
Finding	No. (%)
Cough/dyspnea	11 (68)
Dysphagia/orthopnea	10 (63)
Wheezing	5 (31)
Hoarseness	3 (19)
Facial edema	2 (12)
Chest pain	1 (6)
Pleural effusion	8 (50)
Pericardial effusion	3 (19)

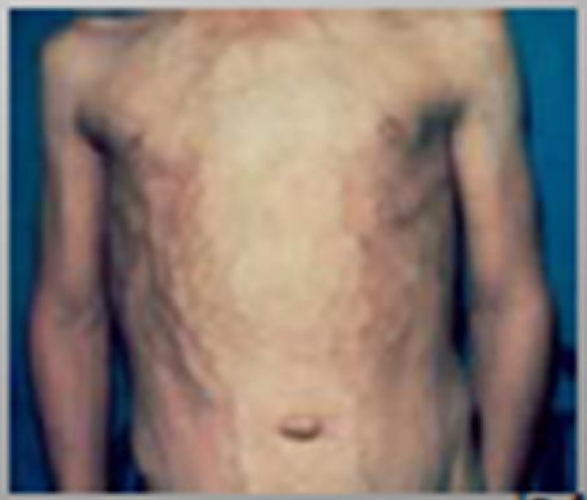


Shalkow J. Apr 15, 2010

Clinical Findings







In Adults…

Pediatric Congenital Hematologic Disorders Research Center
مرکزتحقیقات بیماری های خونی مادرزادی کودکان

treatment

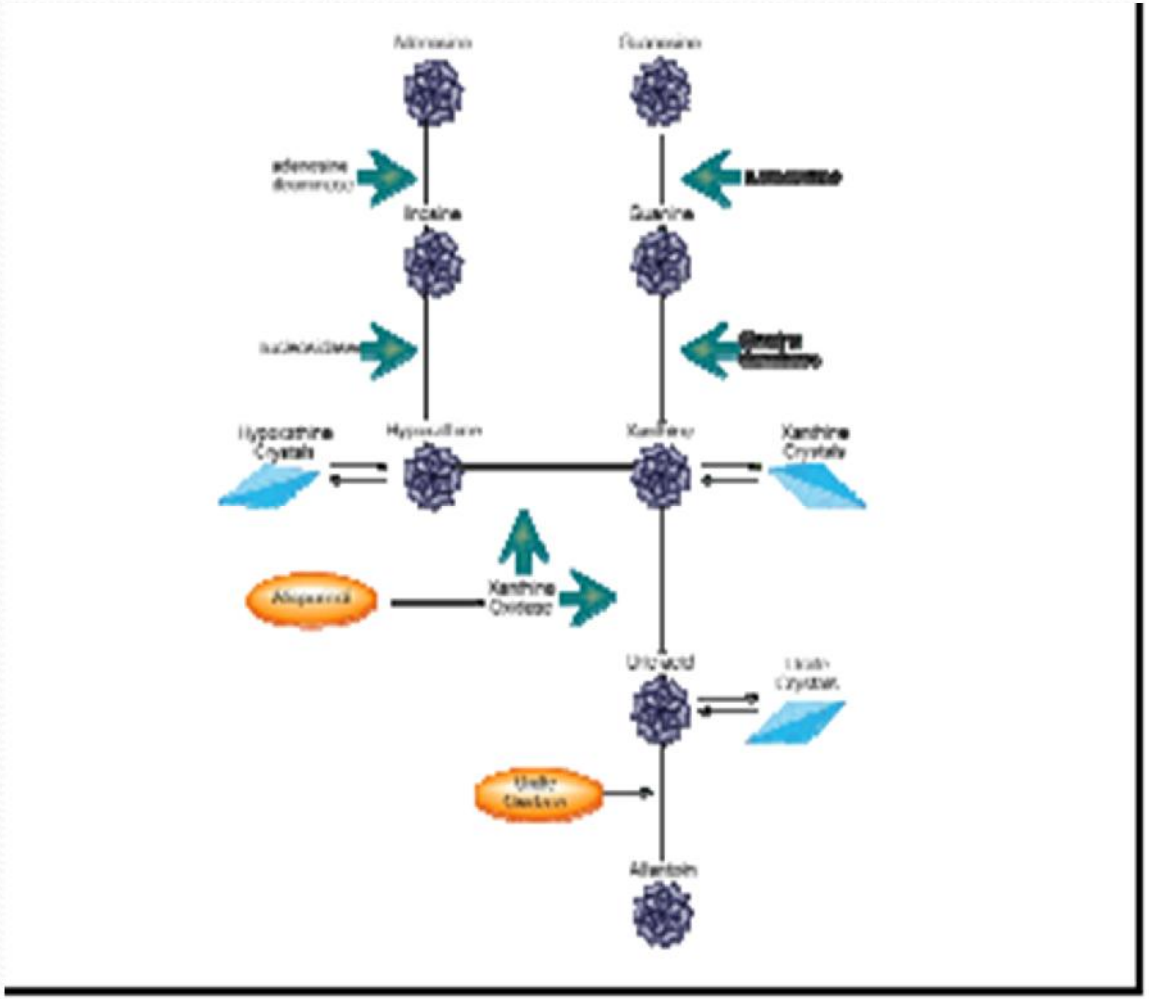
- RT
- Stroids

Pediatric Congenital Hematologic Disorders Research Center
مرکزتحقیقات بیماری های خونی مادرزادی کودکان

TLS

Pediatric Congenital Hematologic Disorders Research Center

مرکزتحقیقات بیماری های خونی مادرزادی کودکان



Pediatric Congenital Hematologic Disorders Research Center
مرکزتحقیقات بیماری های خونی مادرزادی کودکان

TABLE 2. Laboratory Definition of Tumor Lysis Syndrome Using the Cairo-Bishop Classification

LABORATORY TUMOR LYSIS SYNDROME
Uric acid $\geq$ 8 mg/dL ($\geq$ 476 μmol/L) or 25% increase from baseline
Potassium $\geq$ 6 mEq/L ($\geq$ 6 mmol/L) or 25% increase from baseline
Phosphorus $\geq$ 6.5 mg/dL ($\geq$ 2.1 mmol/L) or 25% increase from baseline
Calcium $\leq$ 7 mg/dL ($\leq$ 1.75 mmol/L) or 25% decrease from baseline
CLINICAL TUMOR LYSIS SYNDROME
Creatinine $\geq$ 1.5 times the upper limit of normal
Cardiac arrhythmia or sudden death
Seizure

NOTE. Two or more laboratory changes must be observed within 3 days before or 7 days after cytotoxic therapy.

Adapted from Cairo MS, Bishop M. Tumour lysis syndrome: new therapeutic strategies and classification. *Br J Haematol*. 2004;127:3-11, with permission from Blackwell Publishing Group.

Pediatric Congenital Hematologic Disorders Research Center
مرکزتحقیقات بیماری های خونی مادرزادی کودکان

TABLE 3. Treatment of Metabolic Derangements in TLS

PROBLEM	INTERVENTION	DOSAGES	COMMENTS
Renal insufficiency and hypovolemia	Intravenous fluids	Normal saline, 3 L/m^2 daily	Use with caution if decreased systolic function
	Dialysis		For fluid-unresponsive oliguric renal failure or patients with CHF
Hyperuricemia	Allopurinol	100 mg/m^2 per dose orally every 8 h (maximum daily dose: 800 mg)	Drug-drug interactions with 6-MP and azathioprine; only effective for prophylaxis
	Rasburicase	0.15-0.2 mg/kg/d iv	Contraindicated in pregnancy and G6PD deficiency; costly
Hyperphosphatemia	Minimize phosphate intake	Minimal consumption of dairy and bread products	
	Phosphate binders (aluminum hydroxide or aluminum carbonate)	30 mL orally every 6 h	
	Dialysis		If no response to oral therapy
Hyperkalemia	Insulin (regular)	10 U iv	
	Dextrose	50 mL of 50% dextrose iv push, then infuse 50-75 mL of 10% dextrose over 1 h	
	Albuterol	20 mg nebulized	
	Dialysis		If no response to other therapy
	Calcium gluconate	1000 mg iv	If hyperkalemic EKG changes are noted
Hypocalcemia	Calcium gluconate	1000 mg iv (no faster than 200 mg/min)	Use with caution in severe hyperphosphatemia

6-MP indicates 6-mercaptopurine; CHF, congestive heart failure; EKG, electrocardiogram; G6PD, glucose-6-phosphate dehydrogenase; iv, intravenously; TLS, tumor lysis syndrome.

Typhlitis

- AKA = NEUTROPENIC ENTEROCOLITIS
  - Bowel wall inflammation, usually cecum
- PRESENTATION: RLQ abdominal pain
  - Nausea, fever, diarrhea
  - Most common in patients being treated for leukemia and lymphoma, especially after Ara-C
- DIAGNOSIS/MANAGEMENT:
  - Serial abdominal exams
  - AXR/US: pneumatosis, paucity of air, bowel wall edema +/- Confirm with CT (usually US is sufficient)
  - NPO
  - IV antibiotics: cover anaerobic and gram-negatives

Pediatric Congenital Hematologic Disorders Research Center
مرکزتحقیقات بیماری های خونی مادرزادی کودکان

Important clues

- Chemotherapy beyond 1 week
- Mucositis
- Some of them with out neutropenia

- Surgery:if not response to AB,free air in abdomen

Cerebrovascular Accident

- ETIOLOGY
  - Hyperleukocytosis, Thrombocytopenia, Coagulopathy, Treatment related (L-asparaginase, methotrexate, radiation induced fibrosis
- PRESENTATION
  - Sudden change in motor skills or speech; may have seizures or severe mental status changes
- DIAGNOSIS
  - Head CT w/contrast, brain MRI, MRA/MRV
- MANAGEMENT
  - If depleted factors (L-asp): platelet & FFP transfusions
  - Thrombosis: administer heparin

Pericardial Effusion and Cardiac Tamponade

- Malignant pericardial effusions develop through direct or metastatic involvement of the pericardial sac.
- Direct extension is most common

Presentation

- asymptomatic,
- Beck triad: hypotension, elevated jugular venous pressure, and a muffled precordium,however minority of patients actually demonstrate all 3 signs.
- Most patients complain dyspnea and chest discomfort.
- Tamponade physiology can arise from volumes of as little as 100 mL if they accumulate rapidly
- hiccup

Diagnosis

- Tachycardia
- pulsus paradoxus
- Chest x-rays may show cardiomegaly and the classic water bottle" cardiac silhouette

Pediatric Congenital Hematologic Disorders Research Center

مرکزتحقیقات بیماری های خونی مادرزادی کودکان

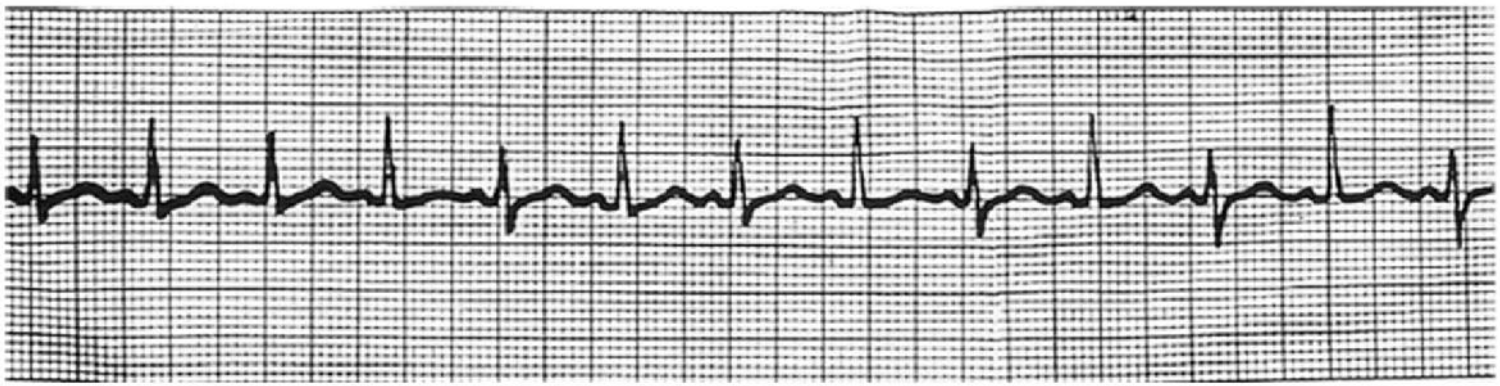


FIGURE 1. Electrical Alternans in the Setting of Pericardial Effusion.

Treatment

- Pericardiocentesis
- Not use diuretics

Pediatric Congenital Hematologic Disorders Research Center
مرکزتحقیقات بیماری های خونی مادرزادی کودکان

Hyperviscosity

- Hyperviscosity syndrome (HVS) refers to the clinical sequelae caused by increased blood viscosity. Increased serum viscosity (SV) is a result of excess proteins, usually immunoglobulins (Igs),
- When hyperviscosity results from elevated white blood cells, it is referred to as hyperleukocytosis or if symptomatic leukostasis.

- The “classic triad” of HVS includes neurologic abnormalities, visual changes, and bleeding, although all 3 need not be present to make the diagnosis.
- headache, altered mental status, nystagmus, vertigo, ataxia, paresthesias seizures, or even coma.

- Mucosal bleeding and purpura are also common clinical manifestations of HVS, with proteins coating the platelets and hindering their function
- CHF, acute tubular necrosis, and pulmonary edema.

Complications of Hyperviscosity

- Sludging of viscous blood cells in vessels
  - CNS: change in mental status, coma
  - Pulmonary: hypoxia, trouble breathing
  - Metabolic
  - Renal: renal insufficiency
- REMEMBER your differential diagnosis
  - Pneumonia, CHF, renal infiltration w/lymphoma (chloroma), infection, intoxication…

Pediatric Congenital Hematologic Disorders Research Center
مرکزتحقیقات بیماری های خونی مادرزادی کودکان

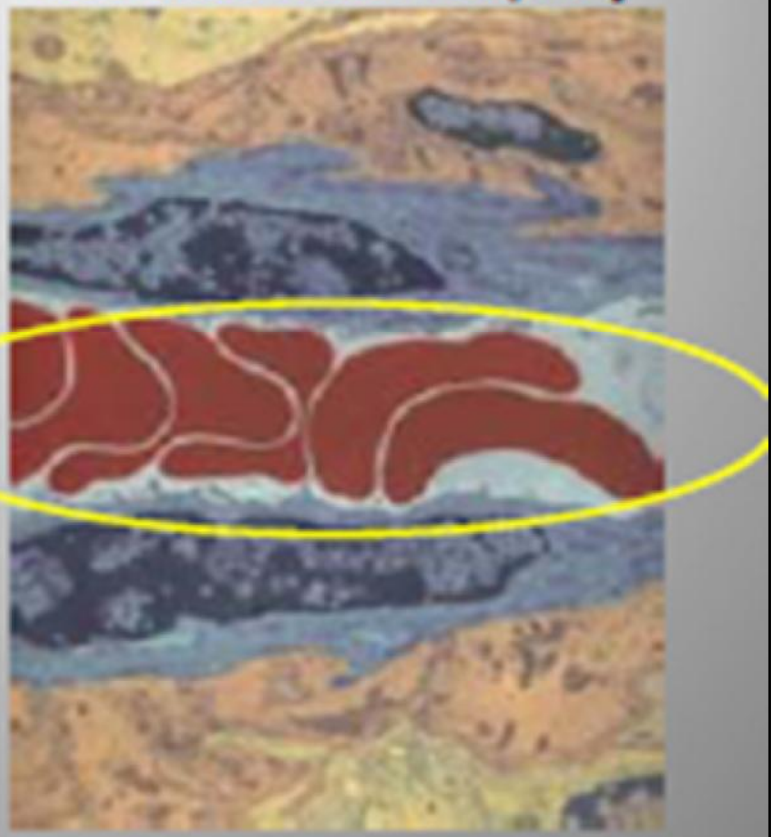
treatment

- plasmaphresis

Hyperleukocytosis

- Definition: >100,000 cells/mm^3
- Associated with both ALL and AML
- Risk of Hyperviscosity and/or Tumor Lysis Syndrome (TLS)
  - Risk of hyperviscosity greater in **AML**

    Myeloid cells are "less malleable" and "stickier"
  - Risk of TLS greater in **ALL**



- respiratory failure, intracranial hemorrhage and early death.
- risk factors:younger age (with presentation in infants being most common); ALL with 11q23 rearrangement or the Philadelphia chromosome; and AML subtypes M3, M4, and M5.

Pediatric Congenital Hematologic Disorders Research Center
مرکزتحقیقات بیماری های خونی مادرزادی کودکان

The pathophysiology of leukostasis is not completely understood. There is believed to be a component of "sludging" by the leukemic blasts in the microvasculature secondary to increased whole blood viscosity. On average, the leukemic myeloblasts have a mean cell volume that is almost twice that of the leukemic lymphoblasts and therefore the manifestations are more common in patients with AML than those with ALL. There is also differential expression of adhesion molecules on the lymphoblast and myeloblast cells that has been implicated in the higher incidence of leukostasis noted in patients with AML versus patients with ALL.[174,183] Evidence also suggests that there are leukemic blast/endothelial cell interactions that lead to vascular wall disruption as well as complement-induced granulocyte aggregation.[174]

Pediatric Congenital Hematologic Disorders Research Center
مرکزتحقیقات بیماری های خونی مادرزادی کودکان

Presentation

- dyspnea to severe respiratory distress.
- Arterial blood gases should be interpreted with caution, especially if the sample is not immediately placed on ice, because pseudohypoxia with artifactually low arterial oxygen tension may be seen secondary to the rapid consumption of plasma oxygen from the abundant leukocytes.

- headache, dizziness , tinnitus, blurred vision, or visual field defects Intracranial hemorrhage can present with focal neurologic deficits.
- myocardial infarction, limb ischemia, renal vein thrombosis, and disseminated intravascular
- Fever is almost always seen and can be greater than 39C.
- Thrombocytopenia is also usually present and underestimated because WBC fragments can be counted as platelets in some automated cell counters.

Pediatric Congenital Hematologic Disorders Research Center
مرکزتحقیقات بیماری های خونی مادرزادی کودکان

Diagnosis

- The diagnosis of leukostasis is made by the combination of patient symptoms and the WBC.

Treatment

- Rapid cytoreduction is the initial treatment in these patients.
- These patients are at very high riskTO TLS.
- LeukaLeukapheresis
- is usually initiated when the blast count is greater than 100,000/m3 or regardless of blast count in the presence of symptoms. In patients with ALL leukapheresis is usually not done unless symptoms develop or the WBC is greater than 200,000/m

- Hydroxyurea can be given at doses of 1 to 2 g every 6 hours and can reduce the WBC by 50% to 80% within 24 to 48 hours.
- Pediatric CML,more than 300,0000.