NO DISCLOSURES

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TOPICS

- SVC SYNDROME
- PULMONARY EMBOLISM
- CARDIAC TAMPONADE
- MALIGNANT TENSION HYDROTHORAX
SUPERIOR VENA CAVA SYNDROME
SVC SYNDROME: DEFINITION

- Symptom complex caused by obstruction of blood flow in the SVC limiting return of blood from the head, neck, and upper trunk to the right heart
- Results in symptoms of face, neck, chest wall and arm swelling, prominence of neck veins and plethora
SVC OBSTRUCTION: CLASSIFICATION

- LUMEN OBSTRUCTION: bland or malignant thrombus with pacemaker leads or catheter related thrombosis
- EXTRINSIC COMPRESSSION: CA, fibrosing mediastinitis, aneurysm, goiter
SUPERIOR VENA CAVA SYNDROME:

- Pre or supra-azygous
- Post or infra-azygous

**Manifestations of supra-azygous SVC obstruction**
- Distended arm and neck veins
- Edema of neck, face and arms
- Congested mucous membranes (mouth)
- Dilated, tortuous vessels on upper chest and back
SUPERIOR VENA CAVA SYNDROME:

- Pre or supra-azygous
- Post or infra-azygous
SUPERIOR VENA CAVA SYNDROME:

- Pre or supra-azygous
- Post or infra-azygous

Manifestations of infra-azygous SVC obstruction:
- More severe symptoms but all of the features for obstruction distal to entrance of SVC
- Dilatation of collateral vessels on anterior and posterior abdominal wall with downward blood flow into IVC, then back to heart
COLLATERAL CIRCULATION BETWEEN SVC AND IVC

- Internal mammary veins
- Vertebral veins
- Azygos route
- Lateral thoracic veins
SVC OBSTRUCTION: CLINICAL FEATURES

- Engorged veins of neck and upper chest wall-multiple collaterals in chest and upper abdomen
- Laryngeal edema, cyanosis, papilledema, MS changes, stupor, coma, LAD
- Bending forward worsens the venous engorgement
SVC OBSTRUCTION: ETIOLOGY

- Small cell lung cancer
- Squamous cell lung cancer
- Lymphoma
- Metastases from breast CA, melanoma
SVC OBSTRUCTION: ETIOLOGY

- Indwelling catheters
- Pacemaker wires
- Mediastinitis: TB, histoplasmosis
- Thoracic aortic aneurysm
MALIGNANT SVC OBSTRUCTION: TREATMENT

- STEROIDS
- RADIATION THERAPY (lung cancer, lymphoma, germ cell tumors)
- CHEMOTHERAPY
- STENTING
- SURGERY – BYPASS GRAFTING
BENIGN SVC OBSTRUCTION: TREATMENT

- ANTICOAGULATION-THROMBOLYSIS
- CATHETER REMOVAL, LEAD EXPLANTATION
- STENTING
- TREATMENT OF INFECTIOUS ETIOLOGY
- SURGERY – BYPASS GRAFTING
SVC OBSTRUCTION: PROGNOSIS

- Poor prognosis for malignant conditions
- NSCLC resistant to CXRT < 6 mo survival
- Benign etiology, stents or surgery have a 90% patency rate; need anti-coagulation
SVC OBSTRUCTION: DIAGNOSTIC YIELD FOR CA

- Bronchoscopy: 50-70%
- TTNB: 75%
- Mediastinoscopy or mediastinotomy: >90%
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INCIDENTAL PULMONARY EMBOLISM

- 1.8% overall
- 3.3% progressive cancer
- 2.5% stable cancer
- 0.7% NED
- 1.0% non-oncology patients

Hui GC JCAT 32: 783-787, 2008
INCIDENTAL PULMONARY EMBOLISM IN INPATIENTS

- PE in 5.7%
- 9.2% > 70 years
- 16.7% > 80 years
- Most are peripheral >30% missed initially

*Ritchie Thorax 62: 470-472, 2007*
INCIDENTAL PULMONARY EMBOLI ON NON PE MDCT

- 4.0% inpatient prevalence
- 0.9% outpatient prevalence
- 70.0% with unsuspected emboli had cancer
- Wide window settings allow for better embolus detection

Shetty AJR 184: 264-2167, 2005
INCIDENTAL PULMONARY EMBOLISM

- PE in 3.4%
- 4% in inpatients
- 0.9% in outpatients

Storto AJR 62: 464-467, 2005
TOPICS

- SVC SYNDROME
- PULMONARY EMBOLISM
- PERICARDIAL EFFUSION-TAMPONADE
- MALIGNANT TENSION HYDROTHORAX
CARDIAC TAMPONADE

- Accumulation of pericardial fluid, blood, tumor, or air that increases intrapericardial pressure, restricts cardiac filling, and decreases cardiac output.
- Cardiac emergency that can be fatal.
CARDIAC TAMPONADE: ACUTE

- Rapid onset seen in cardiac/great vessel trauma or s/p invasive procedure
- Beck triad: hypotension, jugular venous distention, and distant heart sounds
- Effusion may be small, given the relative inelasticity of the pericardium
CARDIAC TAMponade: SUBAcutE

- More gradual process of fluid accumulation
- Allows for stretching of pericardium and much larger effusions than seen acutely
- The most common type of tamponade, seen in malignancy, TB, uremia
- S+S more subtle, some or all of Beck triad may be absent
Related to scarred pericardium and most often occurs in patients with malignancy or prior radiation exposure
CARDIAC TAMПONADE: ETIOLOGY

- CA the most common cause of tamponade
- Lung and breast cancer most common CAs
- 0-20 HU: simple serous effusion- CHF, renal failure, or non-hemorrhagic CA
- > 20 HU hemopericardium, CA, purulent exudates, or myxedematous effusion
CARDIAC TAMPONADE: DIAGNOSTIC CRITERIA

- Beck’s triad: hypotension, elevated jugular venous pressure, distant heart sounds
- Echo: RA systolic collapse, RV diastolic collapse, reciprocal respiratory ventricular inflow, IVC plethora
CARDIAC TAMПONADE: ECHO FINDINGS

- Inversion free wall RA > 1/3 systole
- RV diastolic collapse
- Pulsus paradoxus
- CXR: pericardium can hold > 200cc of fluid before an enlarged silhouette is noted
CARDIAC TAMponade: CT FINDINGS

- Enlarged SVC ≥ adjacent thoracic aorta
- Enlarged IVC > 2X adjacent aorta
- Contrast reflux into IVC, azygos vein
- Enlarged hepatic and renal veins
CARDIAC TAMPONADE: MR FINDINGS

- Hemorrhagic and proteinaceous or exudative effusions generally exhibit high signal intensity on T1W and T2W images owing to the high protein content. Hemorrhage in the pericardial space usually exhibits low signal intensity on gradient-echo images; however, its appearance changes with time due to the degradation of blood products.
CARDIAC TAMPONADE: MR FINDINGS

- Simple transudative effusions exhibit low signal intensity on T1W and high signal intensity on T2W images. The presence of septations and debris suggests a complex effusion.
CARDIAC TAMPOONADE: MR FINDINGS

- Can see as little as 30 cc fluid
- Limited role due to emergent nature
- Swinging heart and paradoxical septal bounce on short-or long-axis cine MR images
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- Limited role due to emergent nature
- Swinging heart and paradoxical septal bounce on short-or long-axis cine MR images
Patients with underlying malignancy have highest mortality

In penetrating chest trauma patients, tamponade associated with better outcomes because tamponade acts as a stabilizing force.
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MALIGNANT TENSION HYDROTHORAX

- Pleural effusions develop in 50-70% of all cancer patients
- Tension hydrothorax: unusual complication
- Marked mediastinal shift and compression of lung causes severe hypoventilation and respiratory acidosis
- Pressure on heart and great vessels inhibits central venous return causes decreased cardiac output, metabolic acidosis, and circulatory collapse
CARDIAC TAMPOONADE: CT FINDINGS

- <0 HU: chylopericardium - CA, infection
- 0-20 HU: simple serous effusion - CHF, renal failure, or non-hemorrhagic CA
- > 20 HU hemopericardium, CA, purulent exudates, or myxedematous effusion
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