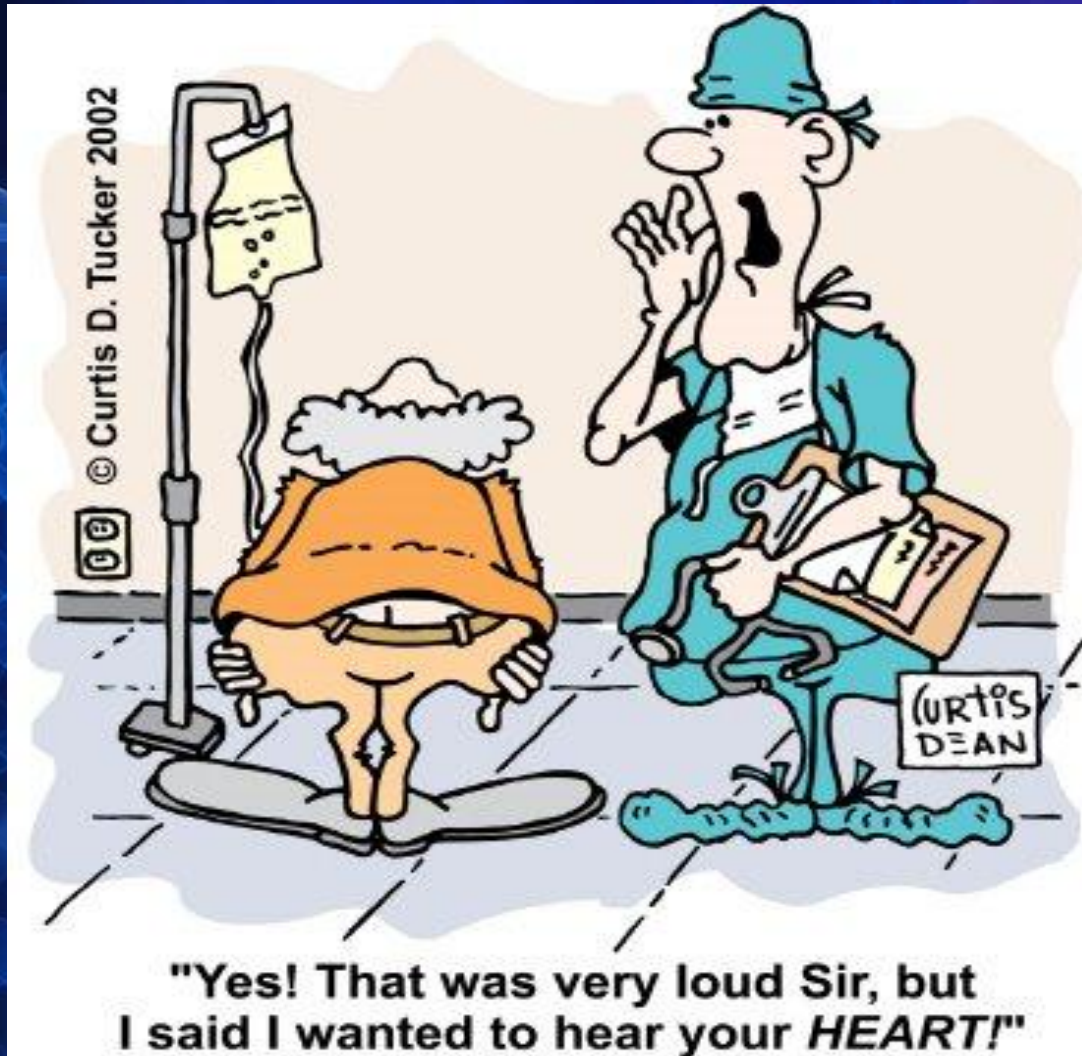




Aortic Dissections: Treatment and Management

Presented by
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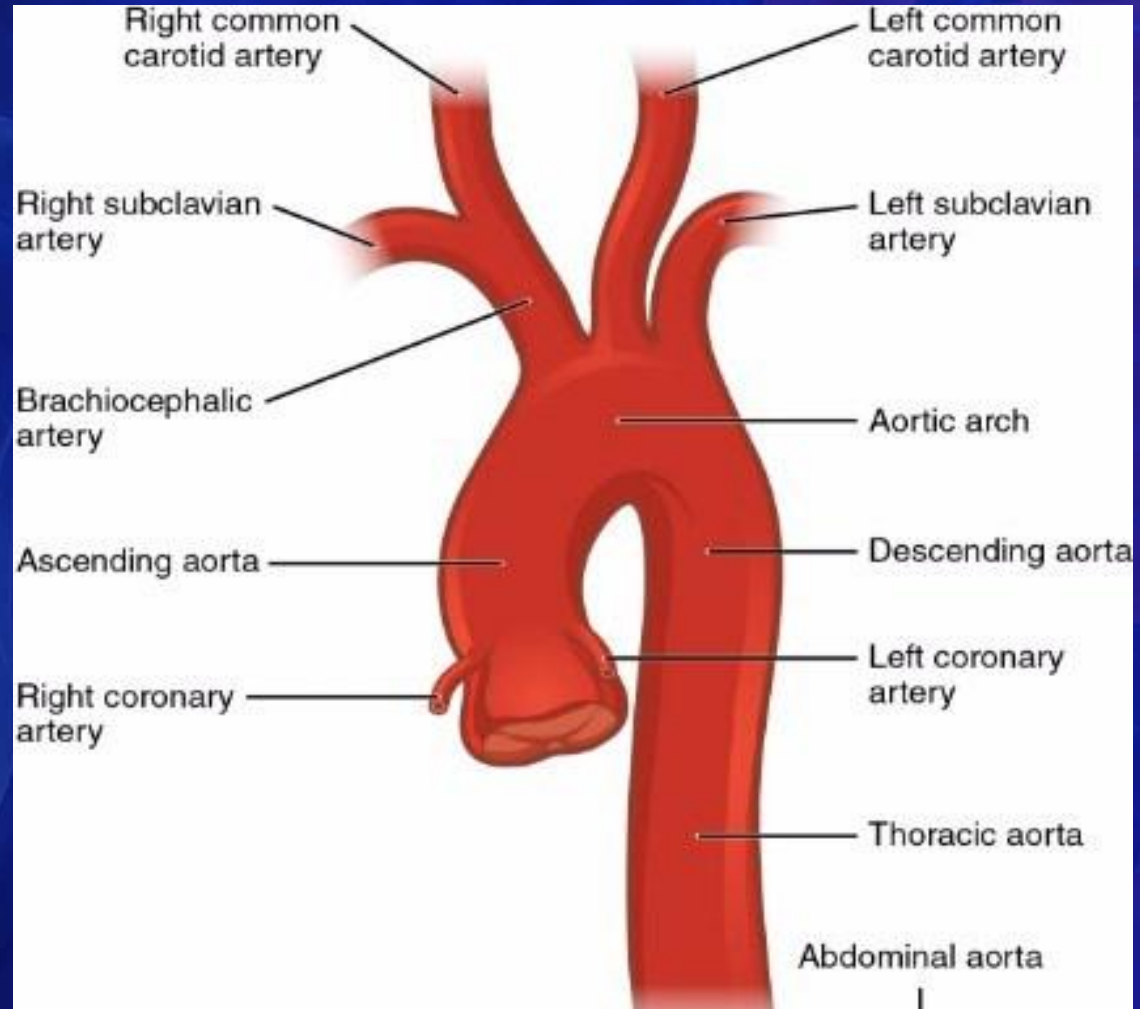


<http://www.heart-valve-surgery.com/Images/heart-cartoon.jpg>

Disclosures

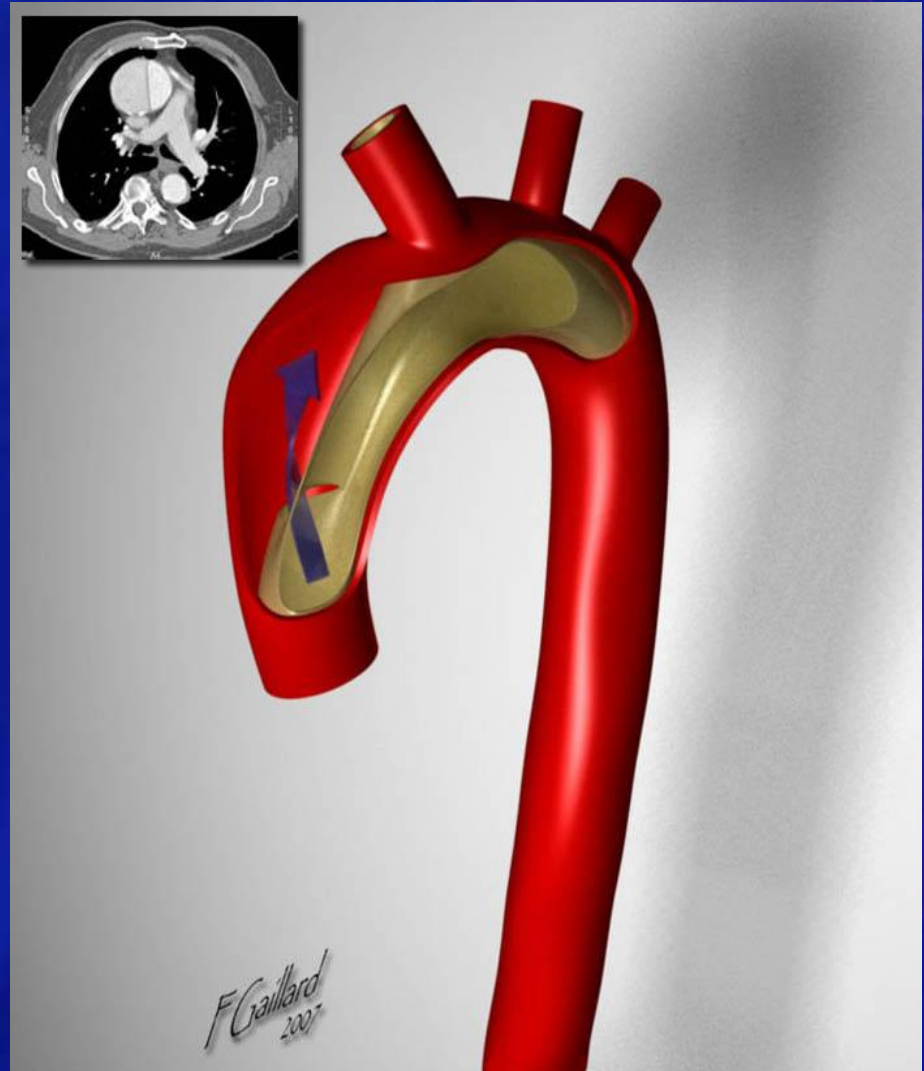


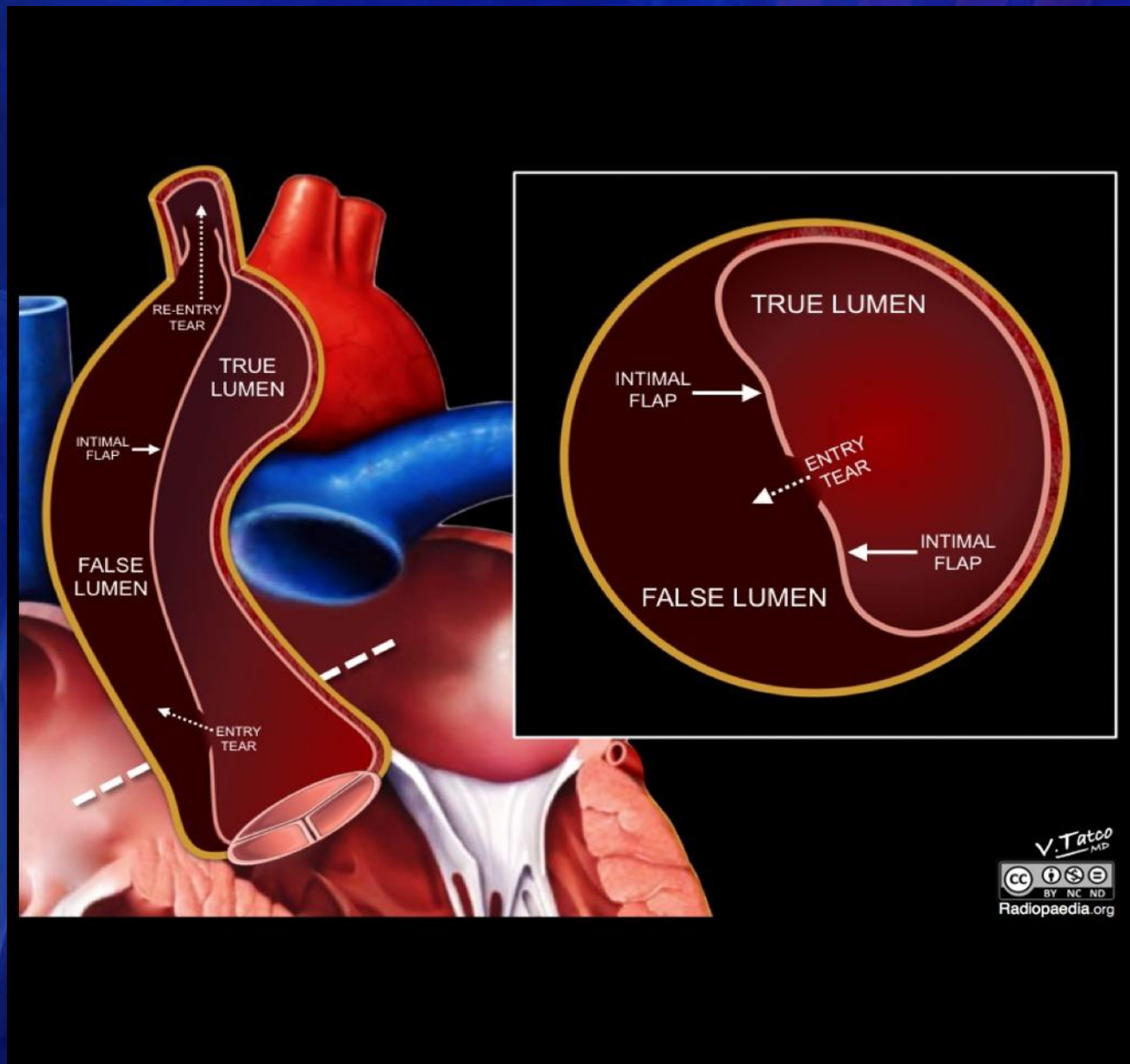
Anatomy of the Aorta

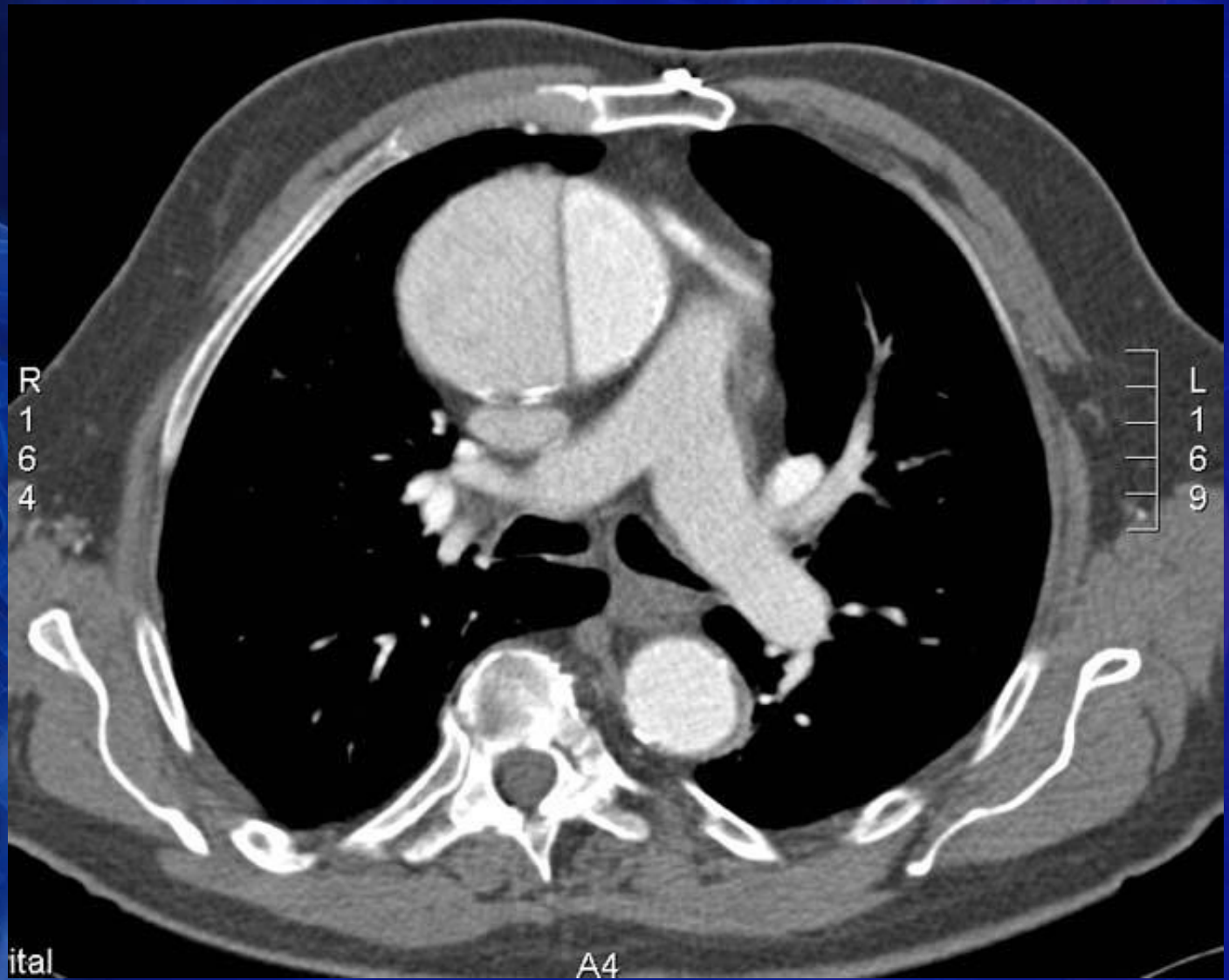


Aortic Dissection

Aortic dissection is defined as separation of the layers within the aortic wall. Tears in the intimal layer result in the spread of dissection (proximally or distally) secondary to blood entering the intima-media space.





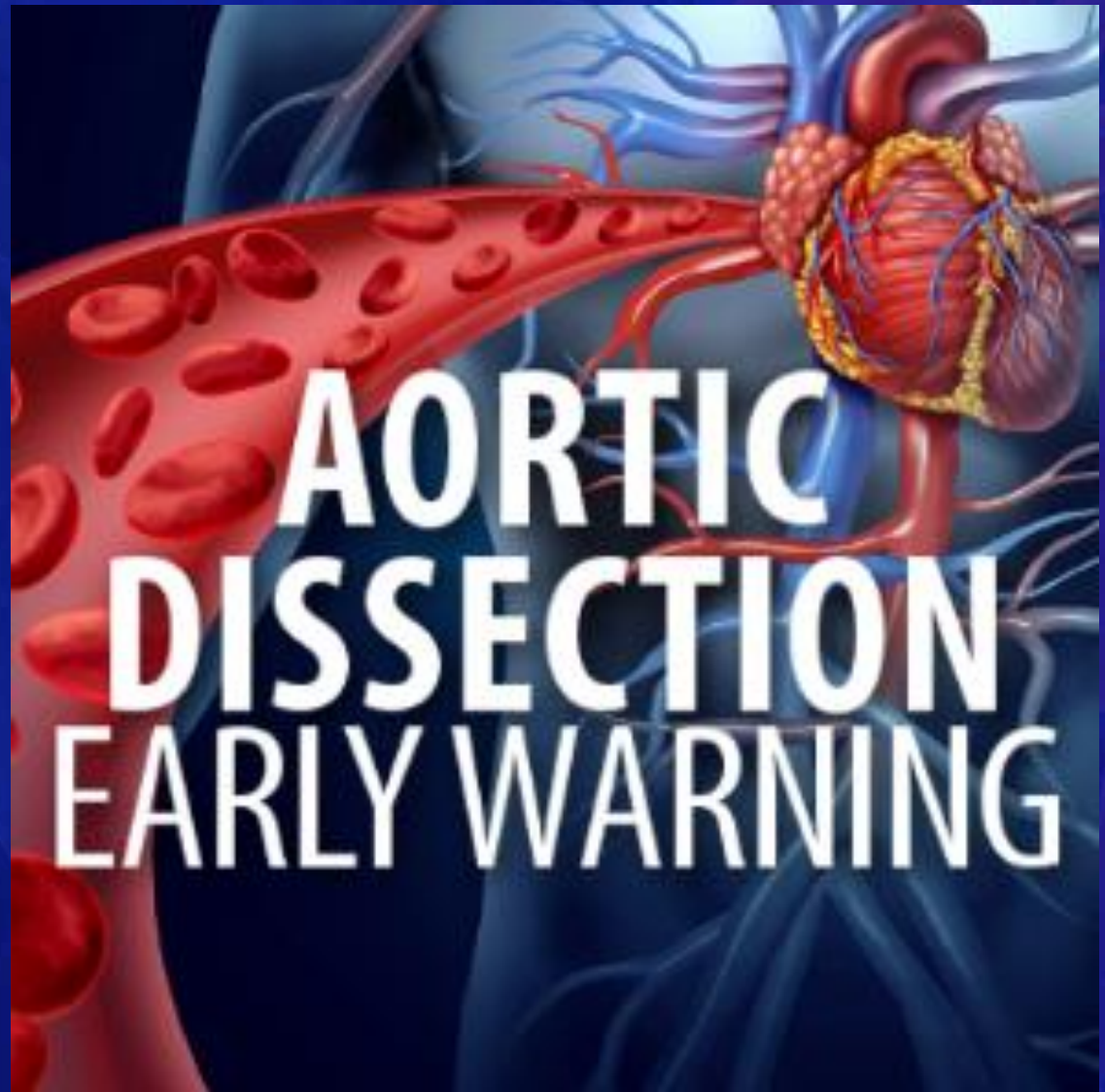


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Aortic Dissection Epidemiology

- In the United States, aortic dissection is an uncommon disease.
- The incidence of aortic dissection is estimated to be 5-30 cases per 1 million people per year.
- Aortic dissection occurs once per 10,000 patients admitted to the hospital; approximately 2000 new cases are reported each year in the United States.
- Aortic dissection is more common in blacks than in whites and is less common in Asians than in whites.
- Aortic dissection is more common in males than in females, with a male-to-female ratio of 2-3:1.
- Approximately 75% of dissections occur in those aged 40-70 years, with a peak in the range of 50-65 years.
- Patients with Marfan syndrome present earlier, usually in the 3rd or 4th decades of life.

<http://emedicine.medscape.com/article/2062452-overview#a0156> updated December 5, 2014



AORTIC DISSECTION EARLY WARNING

Aortic Dissection - Symptoms

- Sudden onset of severe and tearing chest pain, although this description is not universal.
- Some patients present with only mild pain, often mistaken for a symptom of musculoskeletal conditions located in the thorax, groin, or back. Some patients present with no pain.
- The pain is usually localized to the front or back of the chest, often the interscapular region, and typically migrates with spread of the dissection.



Aortic Dissection - Symptoms

- The pain of aortic dissection is typically distinguished from the pain of acute myocardial infarction by its abrupt onset, although the presentations of the two conditions overlap to some degree and are easily confused.
- Aortic dissection can be presumed in patients with symptoms and signs suggestive of myocardial infarction but without classic ECG findings.
- NSTEMI vs Aortic Dissection





Aortic Dissection – Laboratory

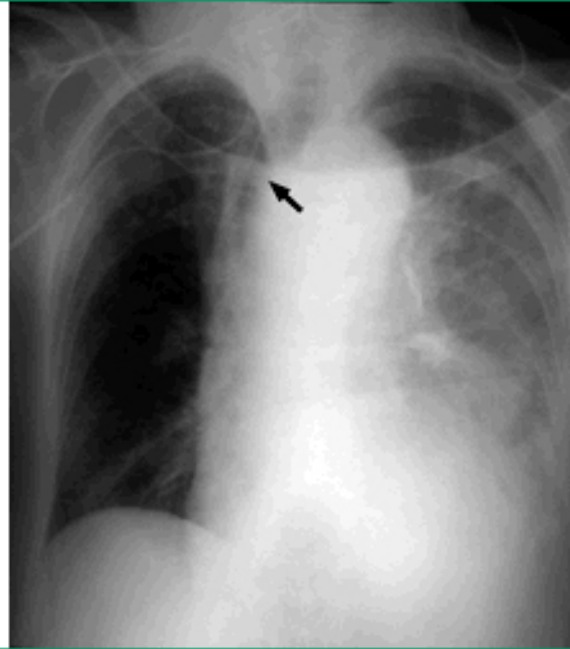
- Aortic dissection is usually diagnosed using imaging techniques before the result of blood work is interpreted.
- BUN and creatinine levels may be elevated, possibly indicating involvement of the renal arteries or prerenal azotemia resulting from blood loss or associated dehydration (mainly when the BUN-to-creatinine ratio is >20).
- Cardiac enzymes are elevated if the dissection has involved the coronary arteries and caused myocardial ischemia.

Aortic Dissection - Diagnostic tools

- Aortic dissection can be diagnosed with imaging
- Chest x-ray is the initial imaging technique and may or may not reveal any abnormality.
- Widening of the mediastinum is a classic finding
- Hemothorax may be evident if the dissection has ruptured
- An absence of mediastinal widening is observed in 40% of patients. With type A, an abnormal aortic contour is observed in a minority of patients. An absence of both is observed in 20% of patients.
- Other chest radiograph findings include deviation of the trachea to the right or pleural effusion.
- No abnormality is observed in 12% of patients.

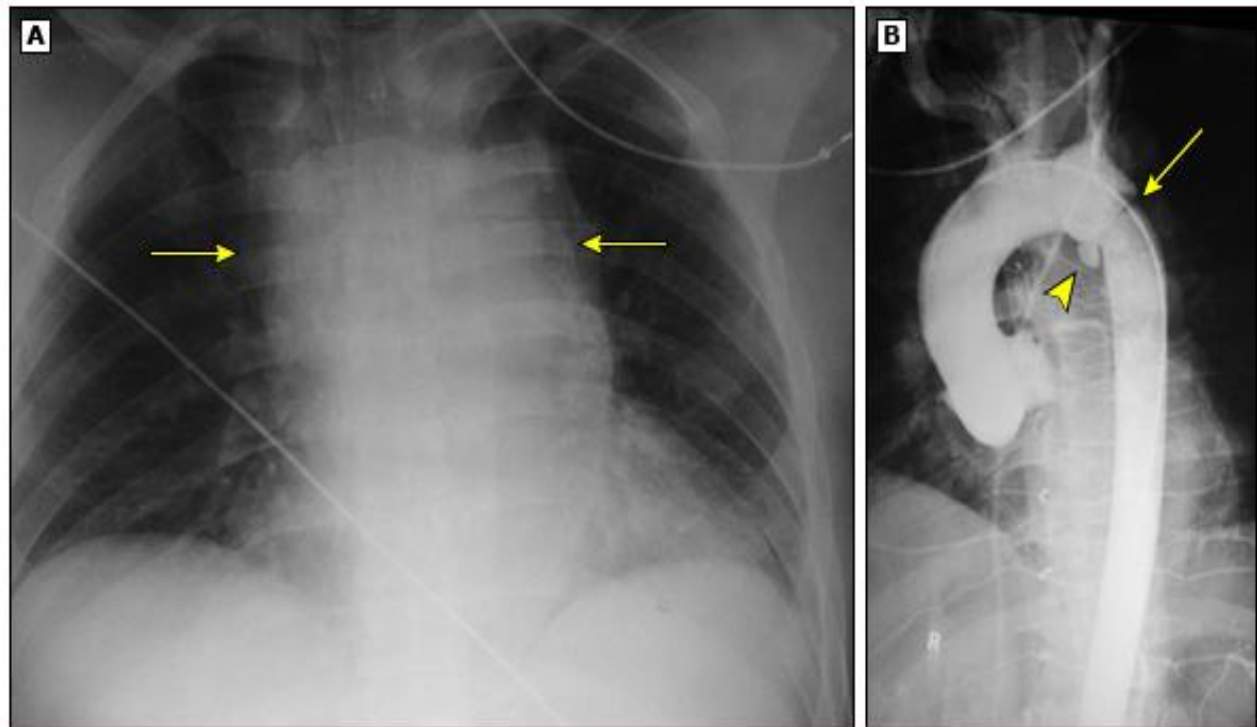


Aortic dissection

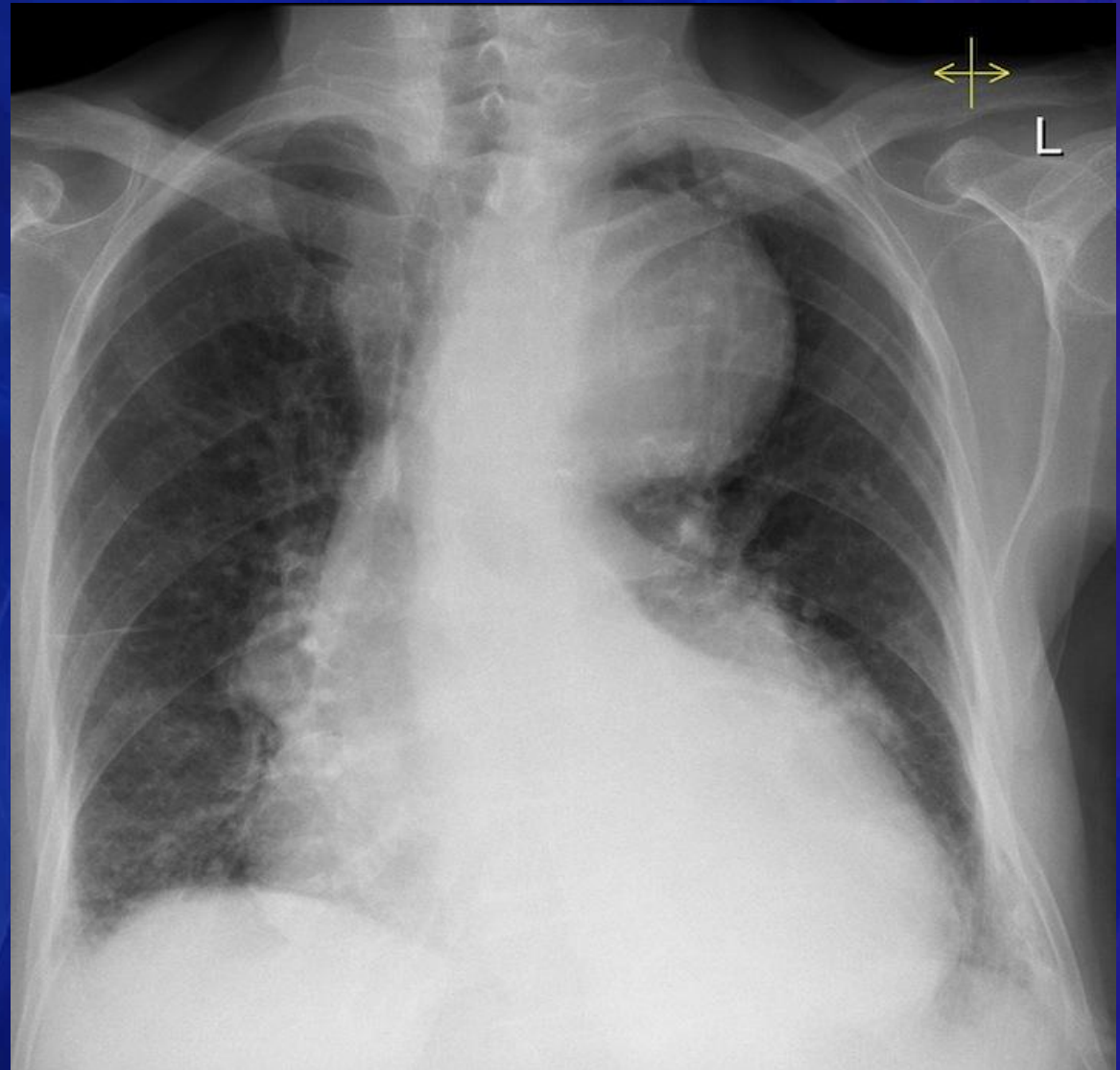


PA chest film in a patient with the sudden onset of excruciating interscapular pain and hypotension. The ascending aortic arch is dilated, displacing the trachea to the right (black arrow). A left lower lobe density is suggestive of a pleural effusion. Surgery revealed a dilated ascending aorta with a dissection approximately 3 cm distal to the aortic valve.
Courtesy of Robert A Novelline, MD.

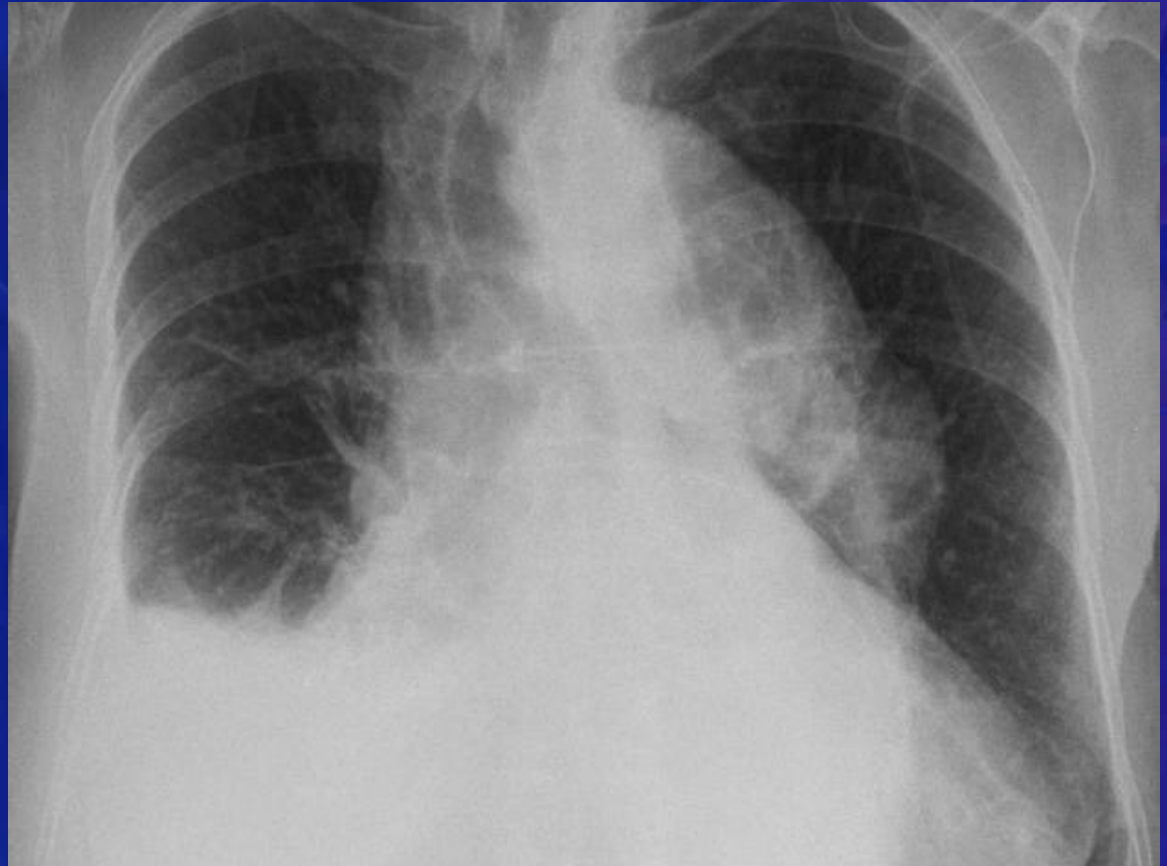
Blunt thoracic aortic tear and pseudoaneurysm



The chest x-ray (A) demonstrates a widened mediastinum following blunt injury to the chest (arrows). The aortogram in an anteroposterior projection (B) demonstrates a circumferential tear of the isthmus (arrow). A small pseudoaneurysm at the insertion site of the ligamentum arteriosum is noted (arrowhead).



<http://www.svuhradiology.ie/case-study/thoracic-aortic-aneurysm/>



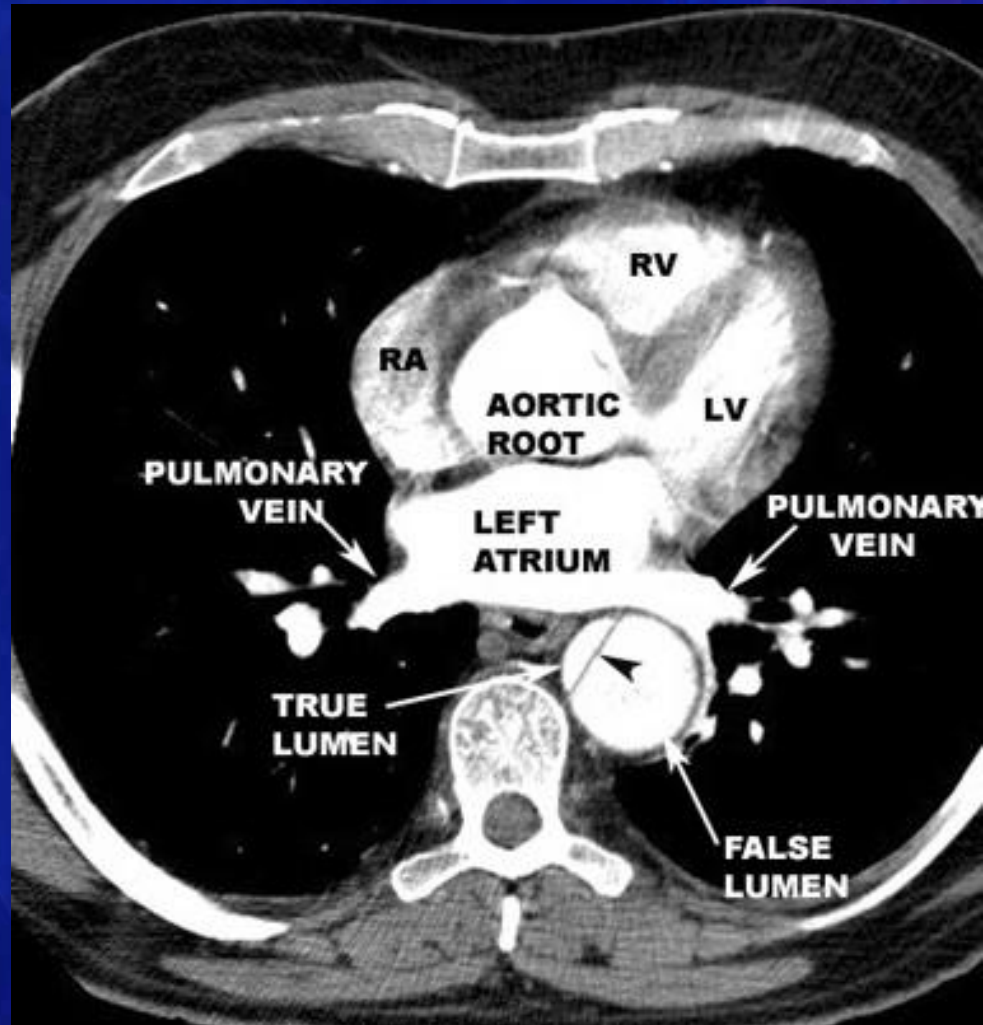
Chest radiograph demonstrates a large aneurysm of the thoracic aorta. Note the deviation of the trachea to the right. Contrast enhanced CT of the aorta confirms the radiographic findings and shows the extent of the aneurysm , as it involves the entire thoracic aorta as well as the abdominal aorta. A small right pleural effusion is also noted.

<http://radiopaedia.org/cases/thoracic-aortic-aneurysm-3>

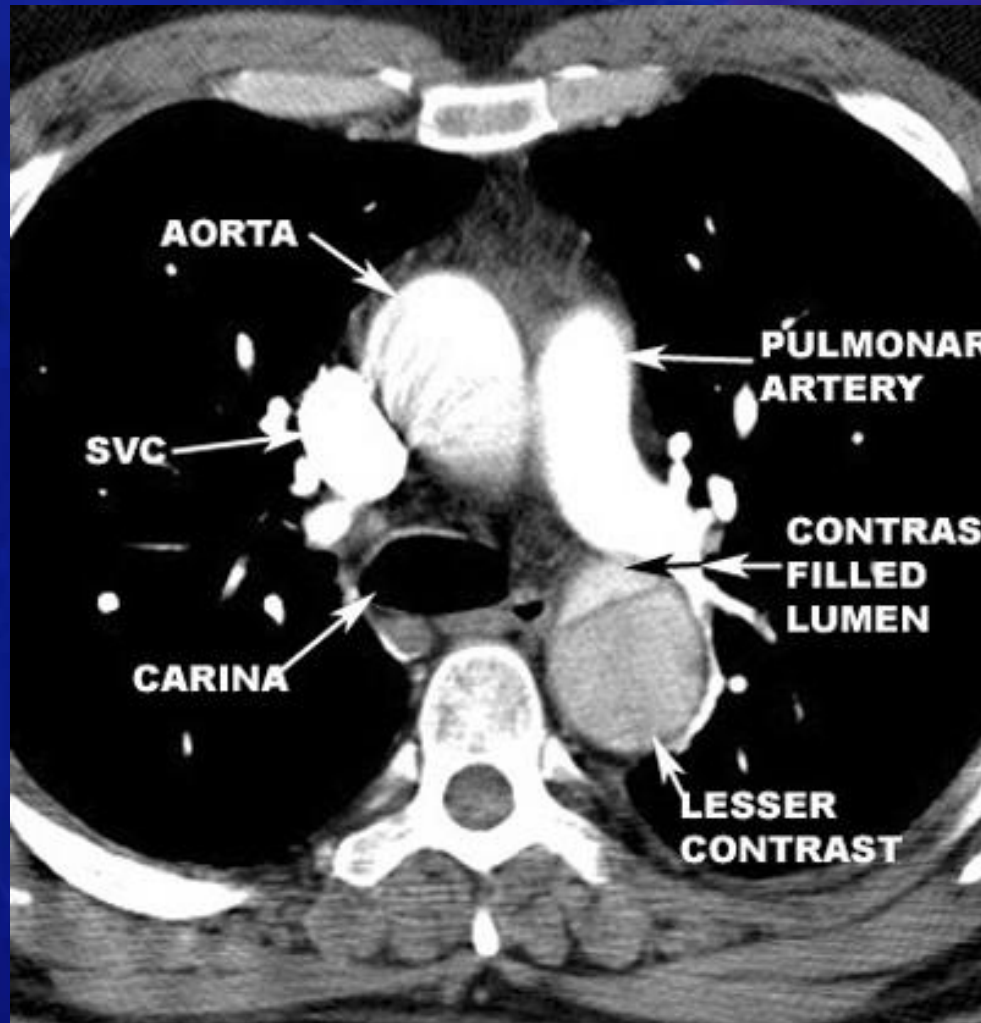
Aortic Dissection - Diagnostic tools



- CT scanning with contrast is used most frequently.
- Echocardiography is an important imaging modality for detecting aortic dissection.
- MRI is as accurate as CT scanning in the diagnosis of aortic dissection.
- Twelve-lead ECG most frequently demonstrates a nonspecific abnormality and normal results .






http://www.meddean.luc.edu/lumen/MedEd/Radio/curriculum/Surgery/dissecting_aorta.htm



http://www.meddean.luc.edu/lumen/MedEd/Radio/curriculum/Surgery/dissecting_aorta.htm

Classification of aortic dissection

De Bakey Type I	Type II	Type III
		
Stanford	Type A	Type B
<p>De Bakey</p> <p>Type I Originates in the ascending aorta, propagates at least to the aortic arch and often beyond it distally</p> <p>Type II Originates in and is confined to the ascending aorta</p> <p>Type III Originates in the descending aorta and extends distally down the aorta or, rarely, retrograde into the aortic arch and ascending aorta</p> <p>Stanford</p> <p>Type A All dissections involving the ascending aorta, regardless of the site of origin</p> <p>Type B All dissections not involving the ascending aorta</p>		

Aortic Dissection - Treatments

- Admit to ICU for assessment of hemodynamic stability, pain control, BP control and consult CV surgeon.
- Intubate hemodynamically unstable patients.
- Control BP:
 - Systolic 100–120 mm Hg, or lowest tolerated
 - IV beta blocker (Esmolol and Labetalol) to achieve HR 60, alternatively can use a calcium channel blocker (Cardene, Verapamil, Diltiazem)
- Consider placement of central venous catheter and/or arterial line
- For medical management start oral medications as soon as possible for B/P and pain control
- Changing Esmolol to Labetalol after 24 hours can saved the hospital thousands of dollars

Aortic Dissection - Treatments



If hypotensive, avoid inotropes.

Determine etiology of hypotension:

- Rupture
- Blood loss
- Tamponade
- Heart failure
- Not titrating medications correctly

Careful observation:

- Neurologic assessment for changes in mentation and neurologic signs
- Evidence of organ dysfunction, foley catheter to follow urine output
- Pain control

Type A Dissection Treatment

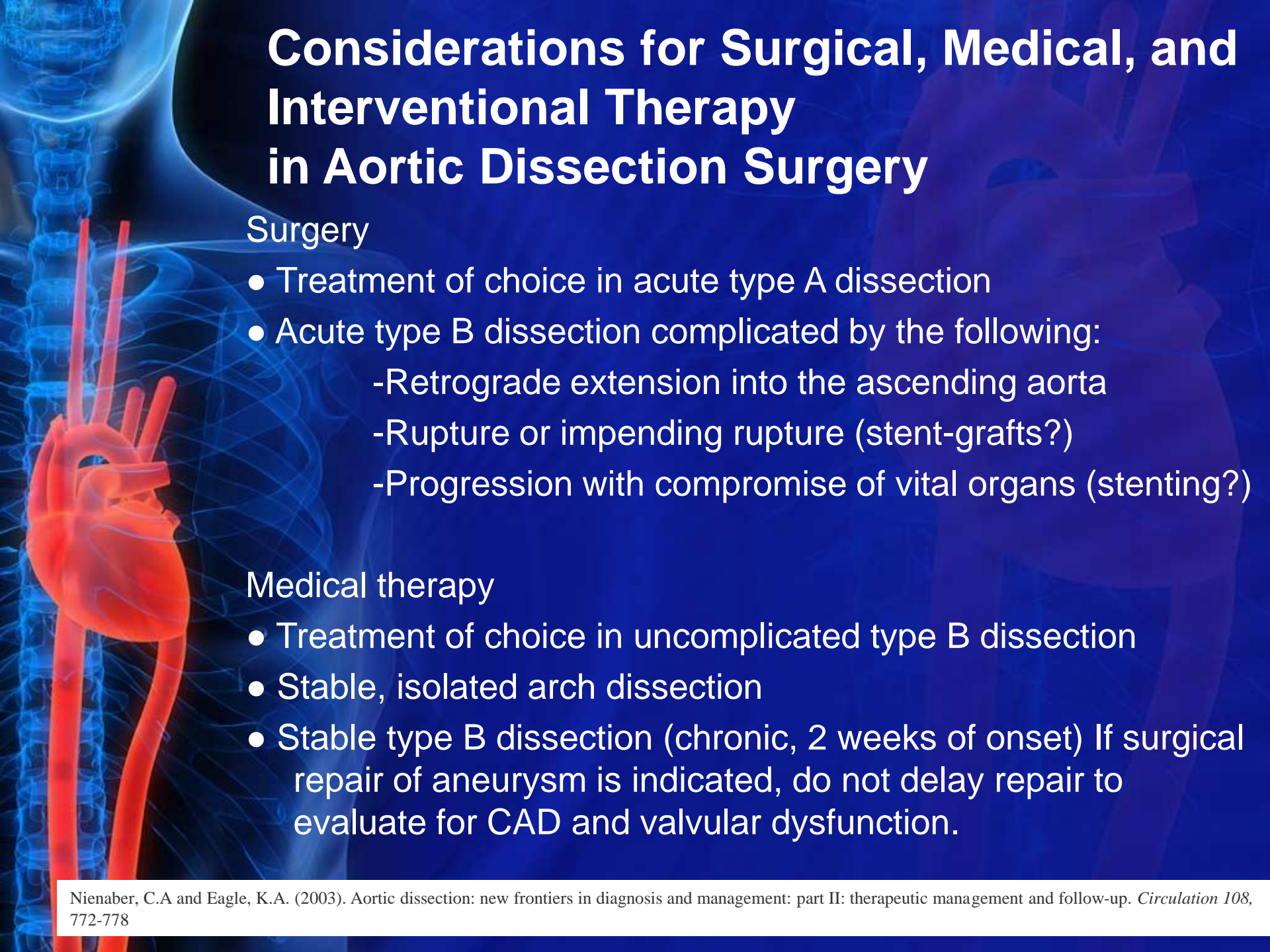
- Surgery is the treatment of choice for dissections of the ascending aorta (80% treated surgically)
- Dissection of the ascending aorta is a surgical emergency because of risk of aortic regurgitation, cardiac tamponade, myocardial infarction
- Hemorrhagic stroke is relative contraindication to surgical repair due to risk posed by intra-operative anticoagulation





Surgical indications for Type B Dissection

- Extension of dissection
- Continued aortic expansion
- Impending rupture
- Occlusion of major aortic branch
- Inability to control pain
- Bleeding into pleural space



Considerations for Surgical, Medical, and Interventional Therapy in Aortic Dissection Surgery

Surgery

- Treatment of choice in acute type A dissection
- Acute type B dissection complicated by the following:
 - Retrograde extension into the ascending aorta
 - Rupture or impending rupture (stent-grafts?)
 - Progression with compromise of vital organs (stenting?)

Medical therapy

- Treatment of choice in uncomplicated type B dissection
- Stable, isolated arch dissection
- Stable type B dissection (chronic, 2 weeks of onset) If surgical repair of aneurysm is indicated, do not delay repair to evaluate for CAD and valvular dysfunction.



Outcomes of Medical Management of Acute Type B Aortic Dissection

- Conclusions—Medical management for acute type B aortic dissection is associated with acceptable outcomes.
- Outcomes of other management strategies such as endovascular stenting for acute type B aortic dissection need to be compared with open repair and medical management.



Long Term Management

- Three main management issues in patients who have survived the initial dissection: medical therapy to minimize aortic wall shear stress; serial imaging to detect signs of dissection progression, re-dissection, or aneurysm formation and reoperation when indicated.
- **Medical therapy** — All patients should receive life-long therapy with an oral beta blocker to reduce systemic blood pressure and the rate of rise in systolic pressure, both of which will minimize aortic wall stress. A target systolic blood pressure of less than 120 mmHg. Combination antihypertensive drug therapy is usually required.
- Avoidance of strenuous physical activity is also recommended as another method to minimize aortic shear stress.



Long Term Management

- **Serial imaging** — A baseline thoracic MRI or chest CT scan prior to discharge with follow-up examinations at 3, 6, and 12 months, even if the patient remains asymptomatic. Subsequent screening studies are then performed every one to two years if there is no evidence of progression.
- **Reoperation** — Repeat surgery is required in 12 to 30 percent of patients, usually because of extension or recurrence of dissection at the previous site of intervention, localized aneurysm formation remote from the site of repair, graft dehiscence or infection, or aortic regurgitation.

An anatomical illustration of the human heart and circulatory system. The heart is shown in a bright red color, positioned in the center of the chest. It is connected to a network of red and blue blood vessels that branch out across the body. The background is a dark blue gradient, with a faint, semi-transparent image of a human torso and skeletal structure. The text "Questions and Comments" is centered in the middle of the image in a white, sans-serif font.

Questions and Comments



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