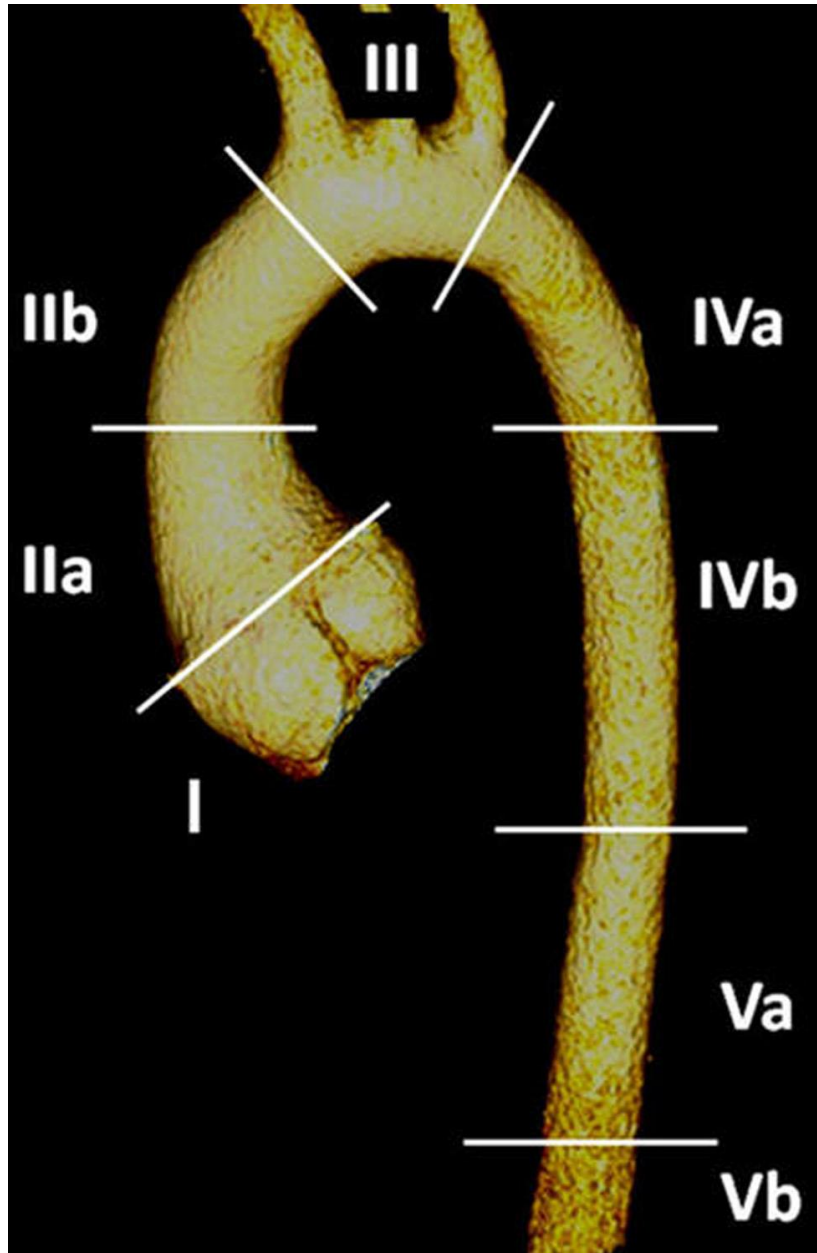


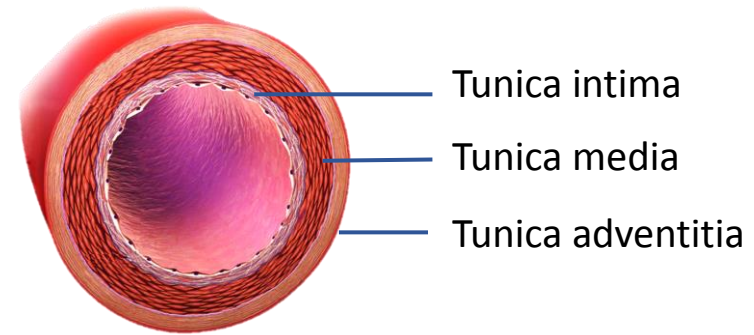
HN 1708550
HN 1733867



Blunt aortic injury: BAI

segment I = aortic root; segment II = tubular ascending aorta (subdivided into IIa [STJ to the pulmonary artery level] and IIb [from the pulmonary artery level to the brachiocephalic artery]); segment III = aortic arch; segment IV = descending thoracic aorta (subdivided into IVa [from the left subclavian artery to the level of the pulmonary artery] and IVb [from the level of the pulmonary artery to the diaphragm]); and segment V = abdominal aorta (subdivided into Va [upper abdominal aorta from the diaphragm to the renal arteries] and Vb [from the renal arteries to the iliac bifurcation]).

BAI



- Damaged from the inside to the outside: from intima to the adventitia
- **Most common location:** aortic isthmus (distal to left SCA) > supravalyvular portion of ascending aorta
- 75% from vehicle accident (speeds > 40 mph)

Box 17.1 Blunt aortic injury

Mechanism of injury

- Rapid deceleration in motor vehicle accidents, plane crashes, and falls

Mechanics of injury

- Shearing and twisting forces concentrated at points of aortic fixation: root, isthmus, and diaphragmatic hiatus
- The 'osseous pinch' mechanism

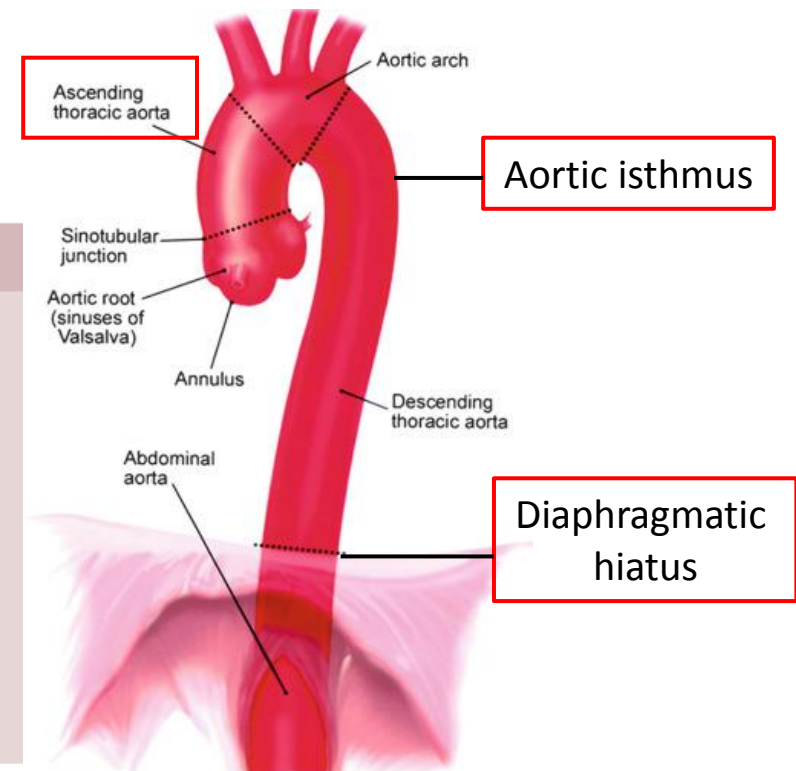
Site of injury

- 95% at the aortic isthmus
- <5% in the ascending aorta

- 1% in the distal descending aorta
- Rarely in the abdominal aorta

Survival statistics

- 85% die at the accident site
- Of the survivors:
 - 30% die within 6 hours
 - 50% die within 24 hours
 - 98% die within 4 months
 - 2% long-term survivors



Chest radiography

Table 20 CXR findings associated with BAIs

Widened mediastinum (>8.0 cm or mediastinum-to-chest width ratio > 0.25)

Rightward deviation of the trachea or nasogastric tube

Obscured aortic knob

Opacification of the aortopulmonary window

Downward displacement of the left main stem bronchus

Widened right paratracheal stripe

Left apical pleural cap

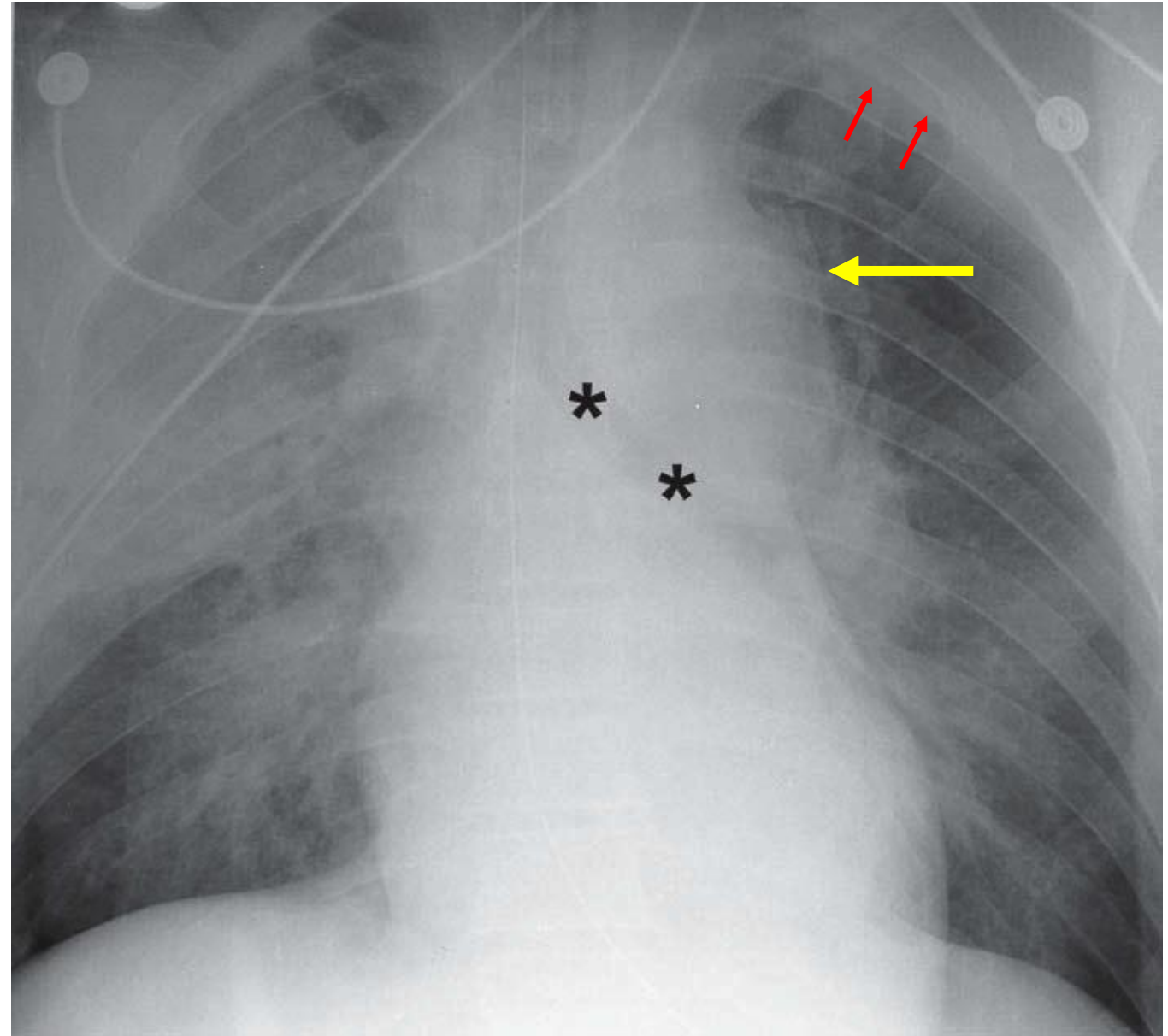
First and/or second rib fracture

Clavicle, sternal, or thoracic spine fracture

Hemothorax

Intrathoracic free air

Blunt aortic injury after a motor vehicle accident. Frontal chest radiograph shows an abnormal mediastinum. Note that the aortic arch (yellow arrow) is obscured, the left main bronchus (*) is inferiorly displaced, and there is a left apical cap (red arrows).



CT findings

Table 21 CT findings in blunt traumatic thoracic aortic injury

Direct signs

Contrast extravasation

Intimal flaps

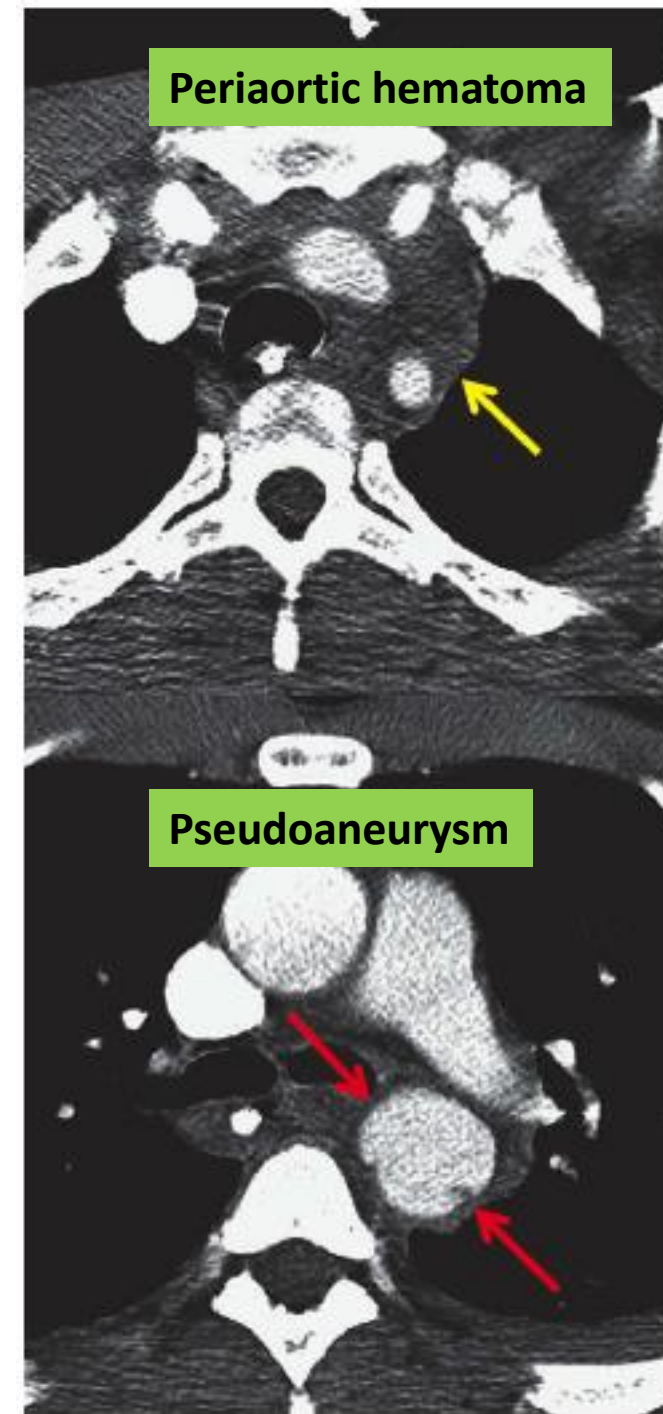
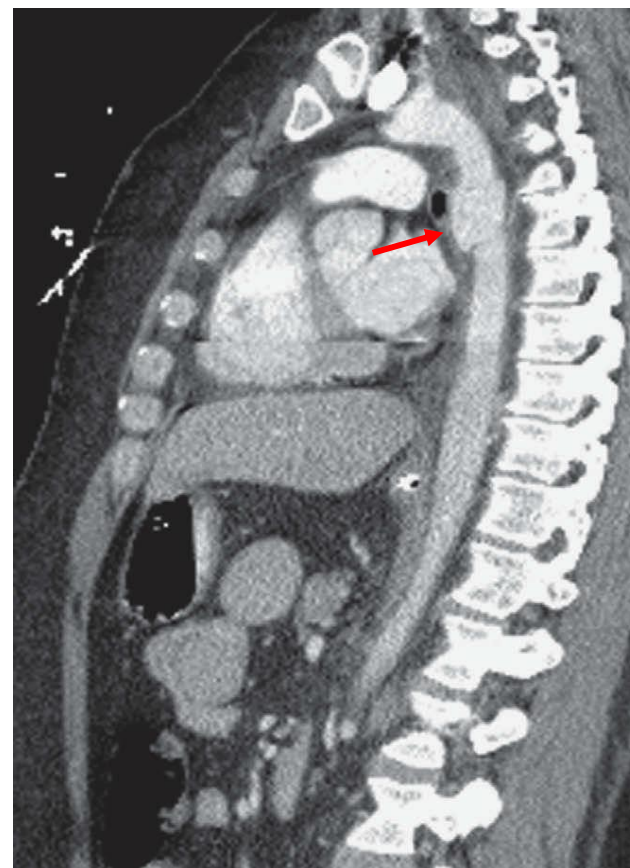
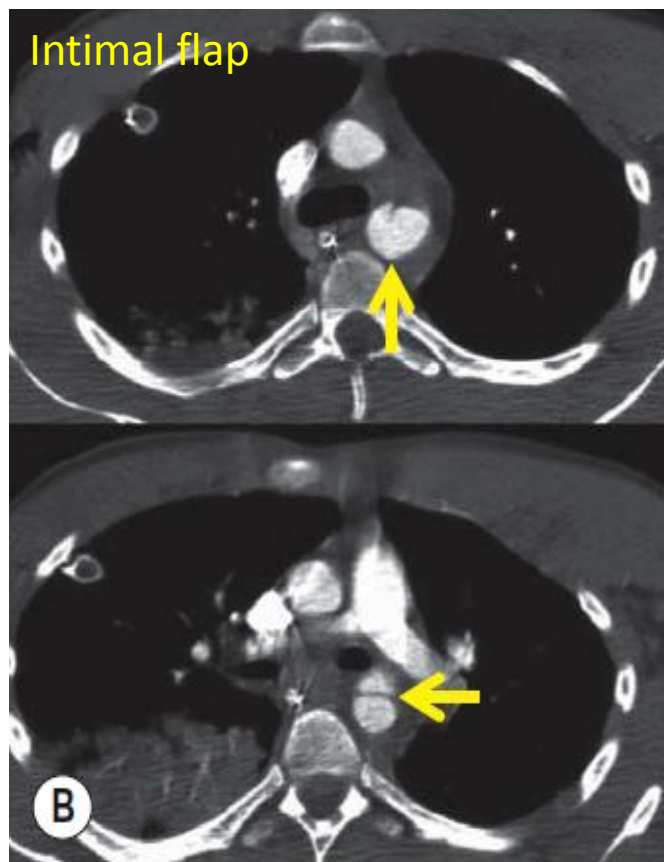
Pseudoaneurysm formation

Filling defects (e.g., mural thrombus)

Indirect signs

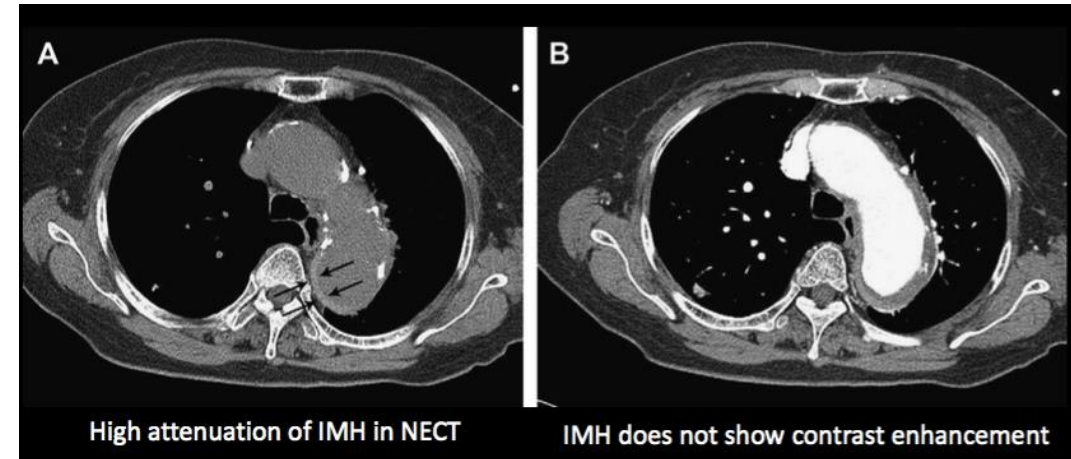
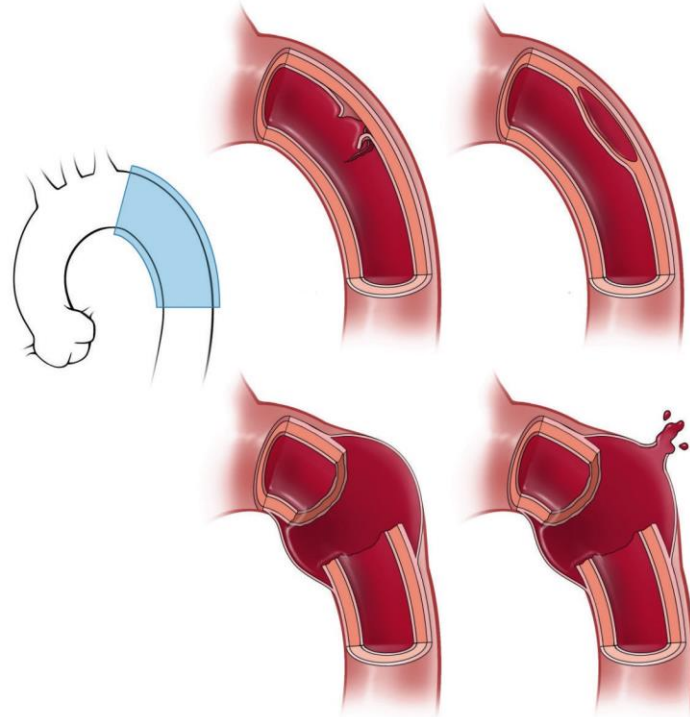
Periaortic hematomas

Mediastinal hematomas



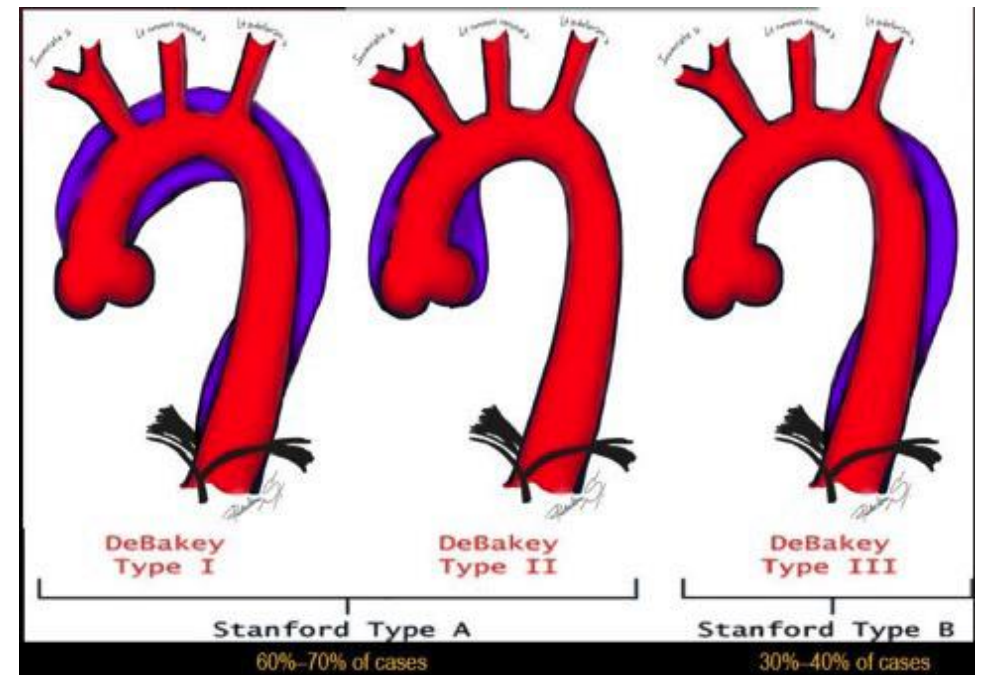
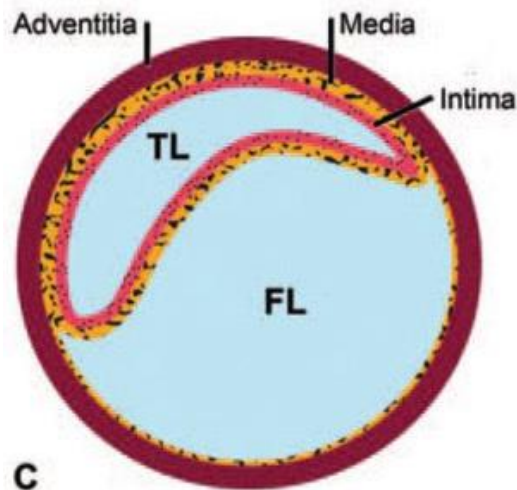
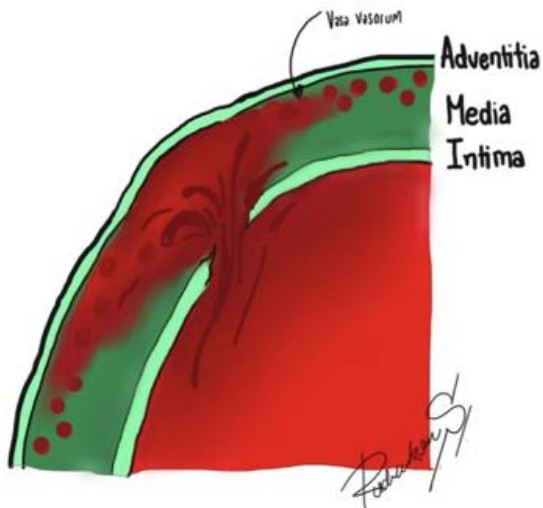
Classification system for BTAI

- grade I (intimal tear/ flap)
- grade II (intramural hematoma)
- grade III (pseudoaneurysm)
- grade IV (rupture)



Aortic dissection(AD)

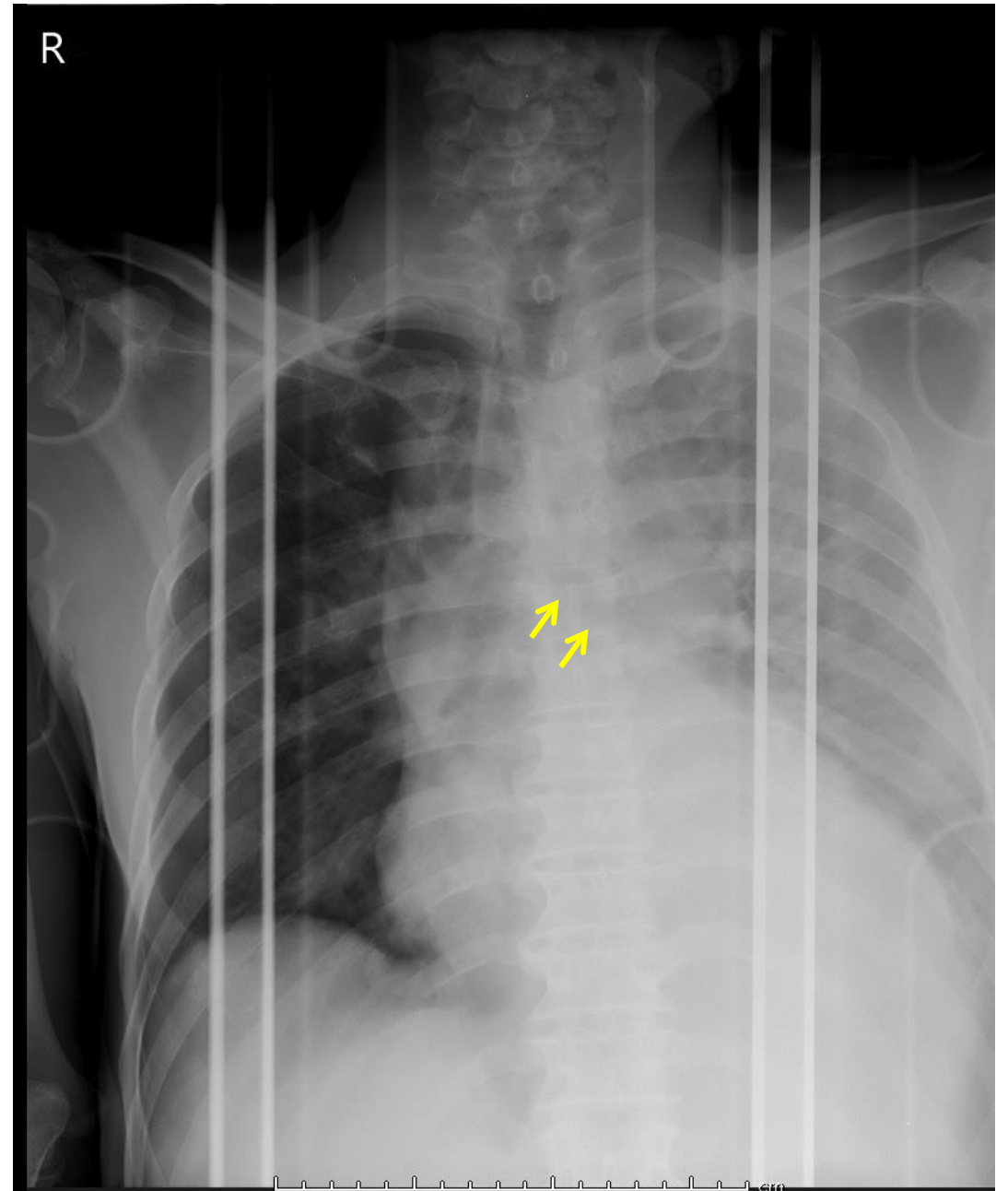
- Most common entity causing an acute aortic syndrome (70%)
- **Classification:**
 - Acute(< 2 weeks), chronic (last longer)
 - Stanford classification: Type A: require Sx, Type B: medical treatment
- Intimal tear —> intraluminal blood enter the medial layer —>two lumina: true and false lumen



Chest radiography

Table 3 Plain CXR findings in aortic dissection

1. Mediastinal widening
2. Abnormalities in region of aortic knob
 1. Enlargement (expansion of aortic diameter)
 2. Presence of double density (due to enlargement of false lumen)
 3. Irregular contour
 4. Blurred aortic knob (indistinct aortic margin)
3. Displacement of intimal calcium
4. Discrepancy in diameters of ascending and descending aorta
5. Displacement of trachea, left main bronchus, or esophagus
6. Pleural effusion (more common on the left)

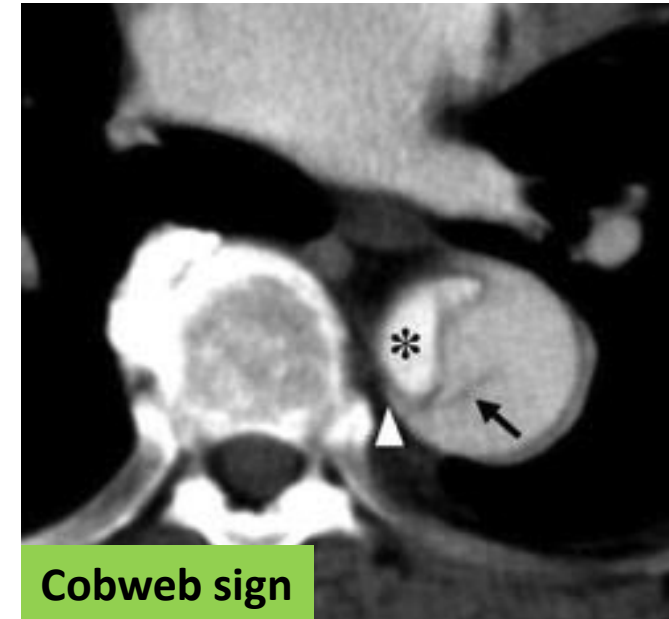


CTA findings

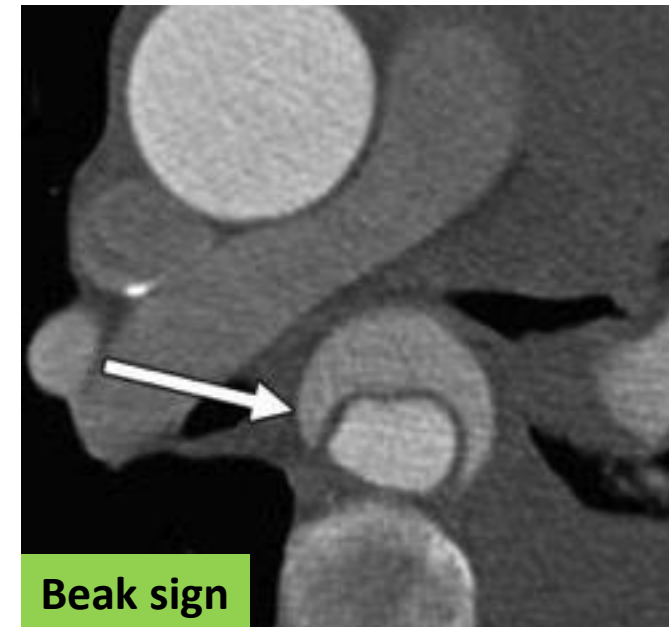
	True lumen	False lumen
Size	smaller	larger
Configuration	Round/oval (Gibbous moon)	Crescentic
Wrapping around	Inner	Outer
Intimal flap curvature	Concave	Convex
Cobweb sign	Never	100% specificity
Beak sign	Concave	100% specificity
Thrombosis	Rare	Common
Outer wall calcification	Very specific	Absent (may be in chronic)
Enhancement	Early	Delayed

Complication

- Acute aortic regurgitation, hemopericardium, cardiac tamponade, coronary involvement
- Major branch aortic obstruction



Cobweb sign



Beak sign