

Subject:

CVS – Pathology

Topic:

Aneurysms and aortic dissection

Done by:

Noor Adnan

بجانب

Arterial dissection: Extravasation of blood that enters the wall of artery through an **intimal tear**, as a hematoma dissecting between its layers. often but **not** always aneurysmal.

Aortic dissection					
Definition	Pathogenesis	Complications/ Manifestations	Diagnosis and clinical assessment	Types	Clinical course
A catastrophic event whereby blood dissects apart the media to form a blood-filled channel within aortic wall	1- hypertension : is the major risk factor . Pressure-related mechanical injury and/ or ischemic injury 2- inherited or acquired connective tissue disorders causing abnormal vascular ECM (Marfan syndrome, Ehlers- Danlos syndrome, vit C deficiency, copper metabolic defects)	* sharp chest/ back pain * weak pulses in downstream arteries * if ruptures into pericardium → cardiac tamponade * BP difference between Rt and Lt arms * massive internal hemorrhage * hypotension * shock	Proper history taking Physical examination Radiology: chest X-ray, transesophageal echocardiogram, magnetic resonance angiography, CT angiography Microscopically using silver stain which display elastic fibers in black color	Type A dissection: More common, more dangerous Proximal to takeoff of major aortic branches involve either ascending aorta only or both ascending and descending aorta (types I and II of the DeBakey classification) Type B dissection: Distal to takeoff of major aortic branches doesn't involve ascending aorta usually beginning distal to subclavian artery Also called DeBakey type III	Previously, aortic dissection was typically fatal, but prognosis has markedly improved because of rapid diagnosis and institution of 1- antihypertensive therapy 2 - surgical procedures involving plication of aorta, wall reconstruction with synthetic graft

Marfan syndrome: the most common among inherited or acquired connective tissue disorders associated with aortic dissection. Autosomal dominant disease of **fibrillin**, an ECM scaffolding protein required for normal elastic tissue synthesis. Manifestations include skeletal abnormalities (elongated axial bones), ocular findings (lens subluxation), Cardiovascular manifestations (aortic dissection).

Aneurysm: localized abnormal dilation of artery or heart

According to shape and size / true aneurysm

[not specific for any disease or clinical manifestations]

True aneurysm:

All three layers of arterial wall or heart

Atherosclerotic, syphilitic, congenital aneurysms, ventricular aneurysm following transmural MI.

False aneurysm (pseudo-aneurysm):

a breach in vascular wall leading to hematoma communicating with intravascular space ("pulsating hematoma")

ventricular rupture after MI contained by pericardial adhesion, a leak at the junction of a vascular graft with a natural artery.

Saccular aneurysms:

spherical outpouchings -- involving **only a portion of vessel wall** -- may contain thrombi

fusiform aneurysms:

diffuse, circumferential dilation of a long vascular segment -- they vary in diameter and length and can involve extensive portions of artery

Aortic aneurysm

		Abdominal aortic aneurysm (AAA) (most common)	
<p>Causes:</p> <p>1- atherosclerosis Most common cause</p> <p>Intimal plaques compress underlying media → compromise nutrient and waste diffusion into arterial wall → media degeneration and necrosis → thinning and weakening of media → dilation of vessels</p> <p>2- cystic medial degeneration of arterial media</p> <p>causes include trauma; congenital defects (e.g., berry aneurysms); hereditary defects in structural components (Marfan); infections (mycotic aneurysms); vasculitis.</p>	<p>Symptoms:</p> <p>In many cases it is asymptomatic</p> <p>Depends on the <u>location of the aortic aneurysm</u></p> <p>(in the arch of the aorta / thoracic aorta:</p> <ul style="list-style-type: none"> - hoarseness - chest pain - dyspnea <p>(abdominal aortic aneurysm:</p> <ul style="list-style-type: none"> - deep abdominal pain or discomfort - pulsating feeling 	<p>Atherosclerotic aneurysms</p> <p>occur more frequently in abdominal aorta</p> <ul style="list-style-type: none"> * common iliacs, arch, and descending parts of thoracic aorta can also be involved <p>More common in men, <u>rarely</u> < age 50, atherosclerosis is a major cause of AAA</p> <p>Other contributors include:</p> <p>1- <u>Hereditary defects in structural components of the aorta:</u> (e.g., Marfan disease by defective fibrillin production affects elastic tissue synthesis)</p> <p>2- <u>An altered balance of collagen degradation and synthesis mediated by local inflammatory infiltrates and the destructive proteolytic enzymes</u> - (e.g. vasculitis)</p>	<p>Morphology:</p> <ul style="list-style-type: none"> * Usually below renal arteries and above bifurcation of aorta * can be saccular or fusiform * may be as large as 15 cm in diameter, and as long as 25 cm * Microscopically: atherosclerosis; thinning of media * frequently contains a laminated mural thrombus <p>Complications:</p> <ul style="list-style-type: none"> *<u>Rupture</u> → massive hemorrhage / risk is directly related to size (>=5cm) Mortality for unruptured aneurysms = 5% / if rupture mortality rate > 50% *<u>Obstruction of downstream vessel</u> → ischemic injury *<u>Compression of adjacent structures</u> (ureter or vertebrae) *<u>Abdominal mass</u> (often pulsating) *<u>Thrombosis</u> *<u>Embolism</u> → mural thrombus <p>Clinical assessment:</p> <p>Clinical history Physical examination Radiology</p>

Mycotic aneurysms

Infection of a major artery that weakens its wall is called a mycotic aneurysm

can originate from:

- (1) embolization of a septic thrombus (infective endocarditis)
- (2) extension of adjacent suppurative process
- (3) circulating organisms infecting arterial wall

Syphilitic aneurysm

Caused by the spirochetes *T. pallidum*

A rare complication (early recognition and treatment of syphilis)

Tertiary stage of syphilis can cause **obliterative endarteritis of vasa vasorum of aorta**

ischemic medial injury

aneurysmal dilation of aorta and aortic annulus

eventually **valvular insufficiency** (aortic regurgitation)

Both true and false aneurysms as well as dissections can rupture, often with catastrophic consequences