SNS COLLEGE OF ALLIED HEALTH SCIENCES

SNS Kalvi Nagar, Coimbatore - 35

Affiliated to Dr MGR Medical University, Chennai

DEPARTMENT: ALLIED HEALTH SCIENCES

COURSE NAME: PATHOLOGY

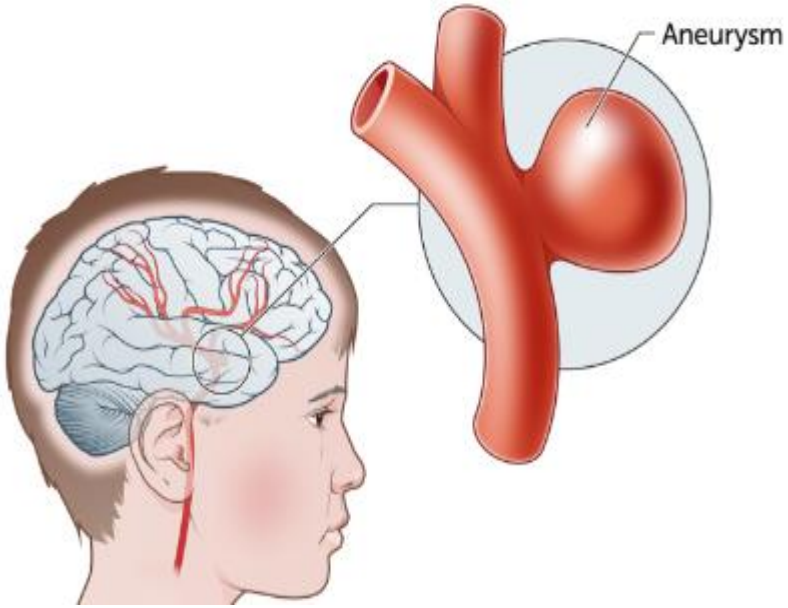
Topic: Aneurysm

CASE SCENARIO

- A 41 Year old male underwent MRI for evaluate of a suspected brain tumor due to complaints of loss of balance assosiated with diplopia. He was found to have an aneurysm in the left internal carotid artery. He underwent a catheter cerebral angiogram to assess 3-D structure of the aneurysm and plan further management
- How will you Manage the Patient ?

Introduction

DEFINITION- An aneurysm is a bulging, weakened area in the wall of a blood vessel resulting in an abnormal widening or ballooning greater than 50% of the vessel's normal diameter (width). An aneurysm may occur in any blood vessel, but is most often seen in an artery rather than a vein.



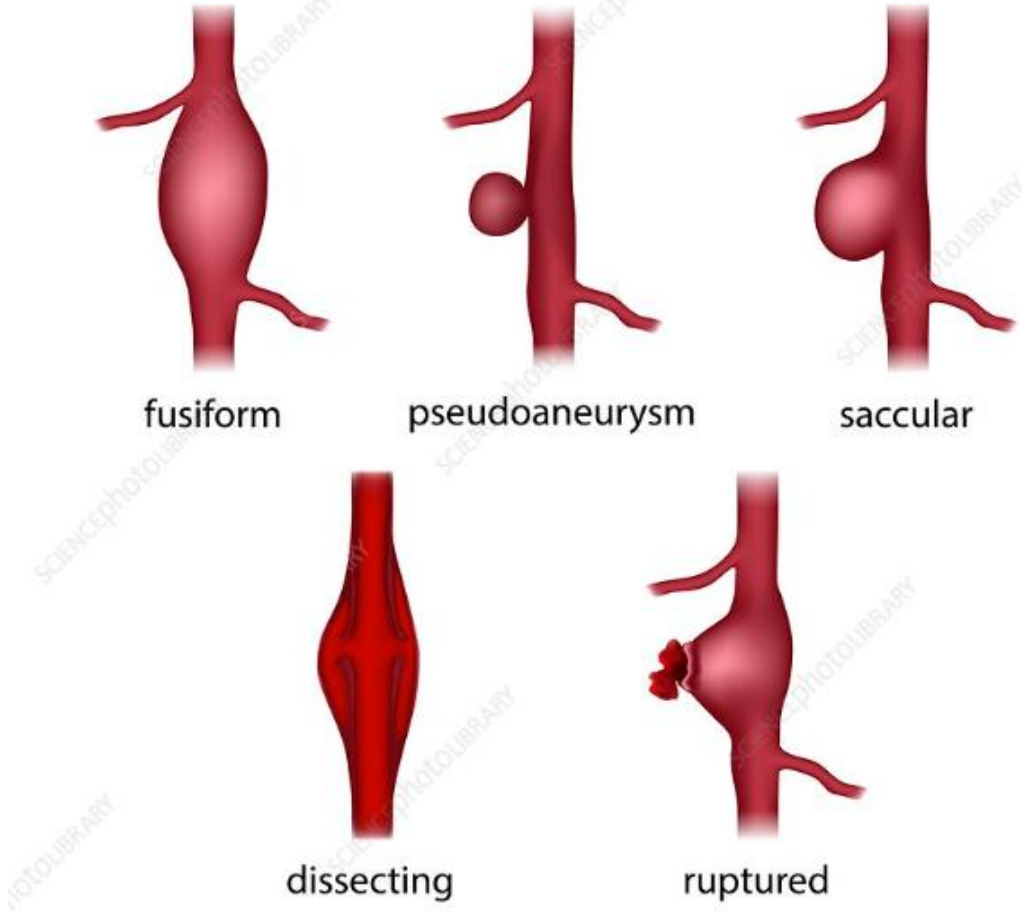
CLASSIFICATION OF ANEURYSM

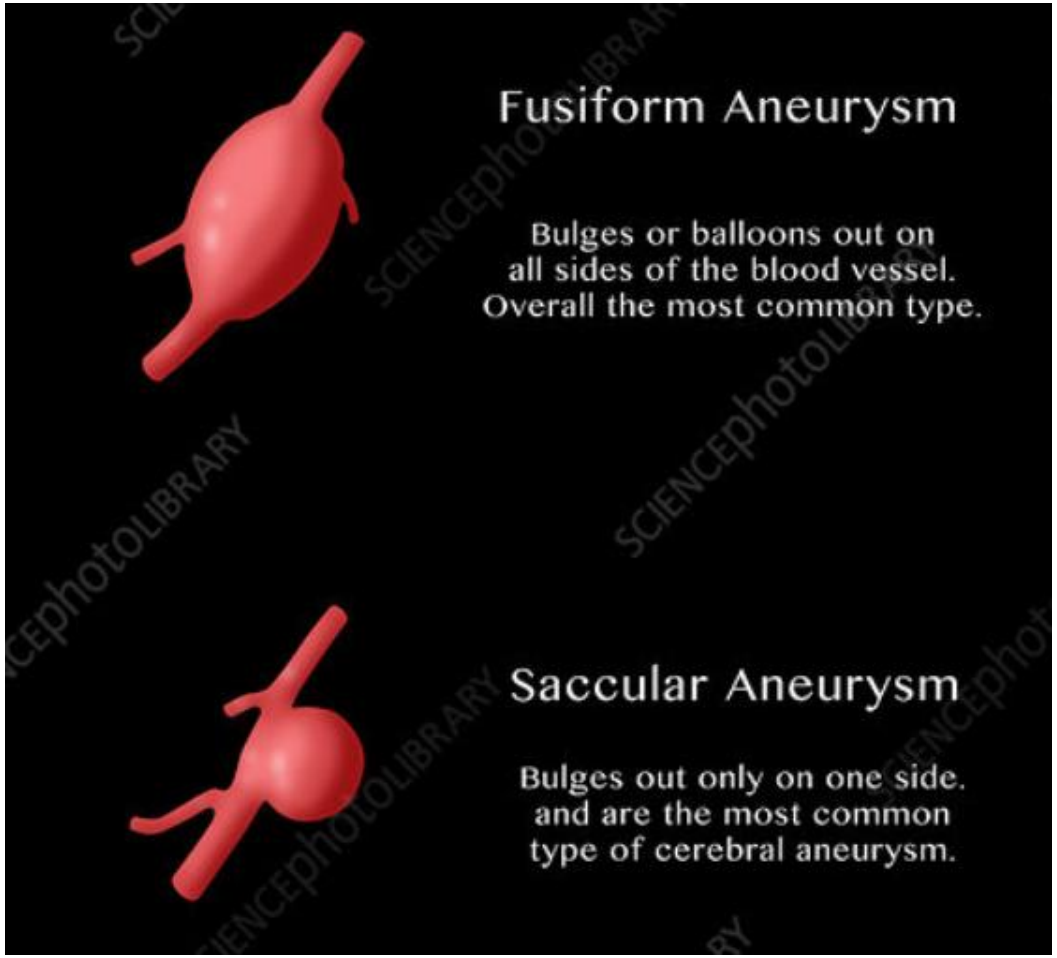
- A **true aneurysm** is one that involves all three layers of the wall of an artery (intima, media and adventitia). True aneurysms include atherosclerotic, syphilitic, and congenital aneurysms, as well as ventricular aneurysms that follow transmural myocardial infarctions (aneurysms that involve all layers of the attenuated wall of the heart are also considered true aneurysms).

- **A false aneurysm**, or pseudoaneurysm, is a collection of blood leaking completely out of an artery or vein but confined next to the vessel by the surrounding tissue. This blood-filled cavity will eventually either thrombose (clot) enough to seal the leak or rupture out of the surrounding tissue.

- **Pseudoaneurysms** can be caused by trauma that punctures the artery, such as knife and bullet wounds, as a result of percutaneous surgical procedures such as coronary angiography or arterial grafting,or use of an artery for injection.

TYPES


fusiform
pseudoaneurysm
saccular
dissecting
ruptured


Fusiform Aneurysm
Bulges or balloons out on all sides of the blood vessel. Overall the most common type.
Saccular Aneurysm
Bulges out only on one side. and are the most common type of cerebral aneurysm.

Assessment 1

1. What is the Definition of an Aneurysm?

2. What are the Types of Aneurysm?

3.How Aneurysm is classified?

CAUSES

- a weakness in the blood vessel wall that is present from birth (congenital aneurysm)
- high blood pressure (hypertension) over many years resulting in damage and weakening of blood vessels
- fatty plaques (atherosclerosis) resulting in a weakness of the blood vessel wall
- inherited diseases that may result in weaker than normal blood vessel walls
- trauma, such as a crush injury to the chest
- the sexually transmitted infection (STI) syphilis, if untreated, targeting the aorta and weakening its walls
- polycystic kidney disease increasing the risk of cerebral aneurysm
- very occasionally, an infection targeting and weakening a section of blood vessel.
- The cause sometimes remains unknown.

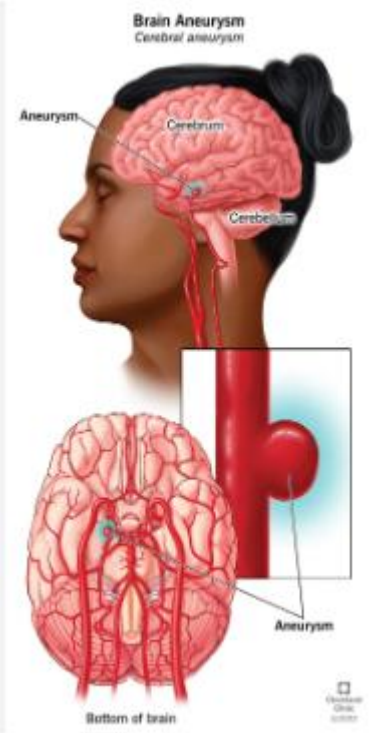
Types of aneurysms

Different types of aneurysms include
cerebral aneurysms,
thoracic aortic aneurysms and
abdominal aortic aneurysms.

Cerebral aneurysm

- A cerebral aneurysm occurs in a blood vessel in the brain. An aneurysm in the brain has no relationship to other aneurysms in the body, but in a small number of people, there is a family history. Cerebral aneurysms are more common over the age of 60.

  The aneurysm may appear like a tiny blood-filled grape attached to the blood vessel by a stalk. This is known as a saccular or berry aneurysm. These can sometimes form in clusters.Symptoms of a ruptured cerebral aneurysm include severe headache with rapid onset, neck pain and stiffness, increasing drowsiness, paralysis, seizures, impaired speech and visual problems. An unruptured cerebral aneurysm may have no symptoms related to it at all and may be discovered incidentally.



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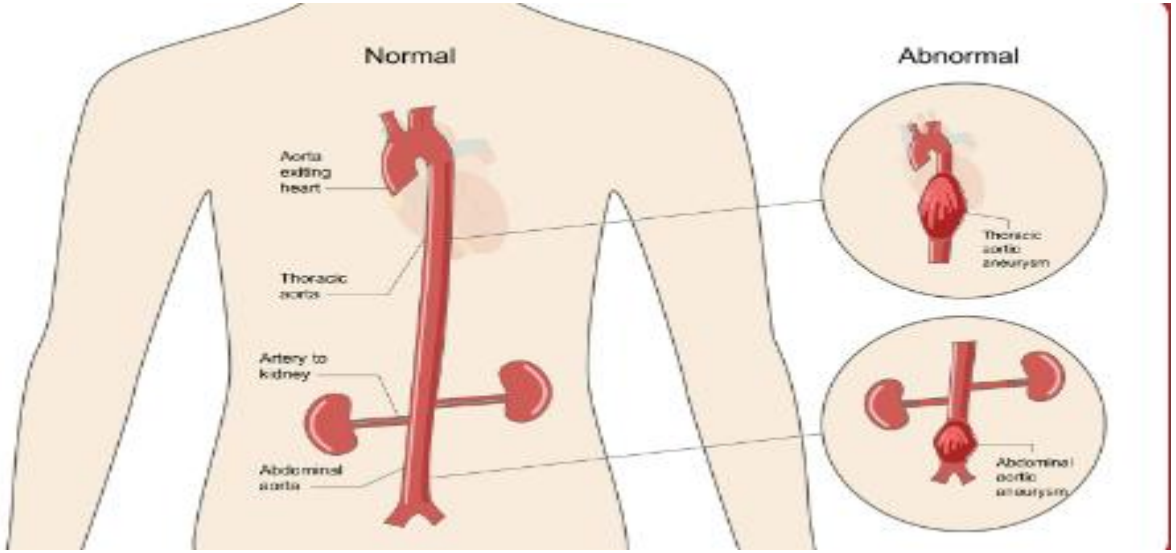
Thoracic aortic aneurysm

A thoracic aortic aneurysm affects the aorta in the chest. Symptoms of a ruptured thoracic aortic aneurysm include pain in the chest, back and neck, coughing, breathlessness, swallowing difficulties, hoarseness of the voice, swelling of the arms, and a constricted pupil and drooping of the eyelid affecting one eye.

In many cases, a thoracic aortic aneurysm doesn't cause any symptoms and is discovered by accident during medical examinations for an unrelated condition.



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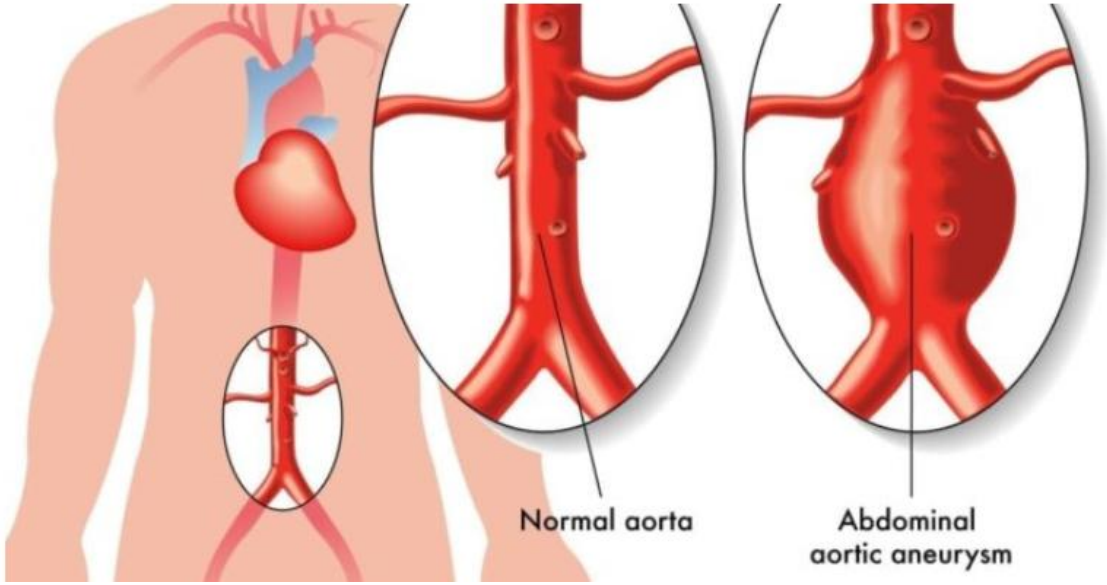
Abdominal aortic aneurysm

An abdominal aortic aneurysm affects the aorta in the abdomen. Symptoms include pain in the lower back, abdominal swelling, nausea, vomiting, rapid heart rate (tachycardia), sweating and the sensation of a pulse in the abdomen.



RISK FACTORS

RISK FACTORS-

- smoking tobacco
- hypertension, or high blood pressure
- poor diet
- inactive lifestyle
- Obesity
- Cocaine usage

Complications

- blood clots within the aneurysm
- compression of nearby nerves, if the aneurysm is large enough
- blood leaking out of the intact aneurysm into the walls of the artery (dissecting aneurysm)
- impaired blood circulation beyond the point of the aneurysm
- haemorrhage in the layers of tissue surrounding the brain (subarachnoid haemorrhage)
- water on the brain (hydrocephalus)
- stroke
- epilepsy
- paralysis
- congestive heart failure
- heart attack
- kidney failure
- sudden death.

Assessment 2

- 1. What is cerebral aneurysm?
- 2.What is thoracic aneurysm?
- 3.What is abdominal aneurysm?
- 4.What is the etiology of aneurysm?
- 5.List down the risk factors of aneurysm

PATHOPHYSIOLOGY

Due To Etiological Rasmus Like Atherosclerosis, Trauma Or Infection

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Weakening And Degeneration Of A Blood Vessel Wall

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Hypertensive Injury May Compound There Denegation And Accelerate The Expansion Of Aneurysm

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As The Aneuryus Expands

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Further Weakening Of Walls

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If Not Treated: Rupture

SYMPTOMS

An aneurysm may have no symptoms (asymptomatic) until it is either very large or it ruptures. Symptoms depend on which blood vessel is affected.

- Fatigue
- Loss of perception
- Loss of balance
- Speech problems
- Double vision

For a ruptured aneurysm, symptoms of a subarachnoid hemorrhage may present:

- Severe headaches
- Loss of vision
- Double vision
- Neck pain or stiffness
- Pain above or behind the eyes

Diagnosis

- History collection
- physical examination
- x-rays- used to detect bleeding in the particular area
- ultrasound scans
- computed tomography (CT) scans or CT angiograms- to assess size, shape and exact location of an aneurysm
- magnetic resonance imaging (MRI) or MR angiograms
- digital subtraction angiograms- to view the image of blood vessels
- examination of cerebrospinal fluid (for a diagnosis of a subarachnoid haemorrhage).

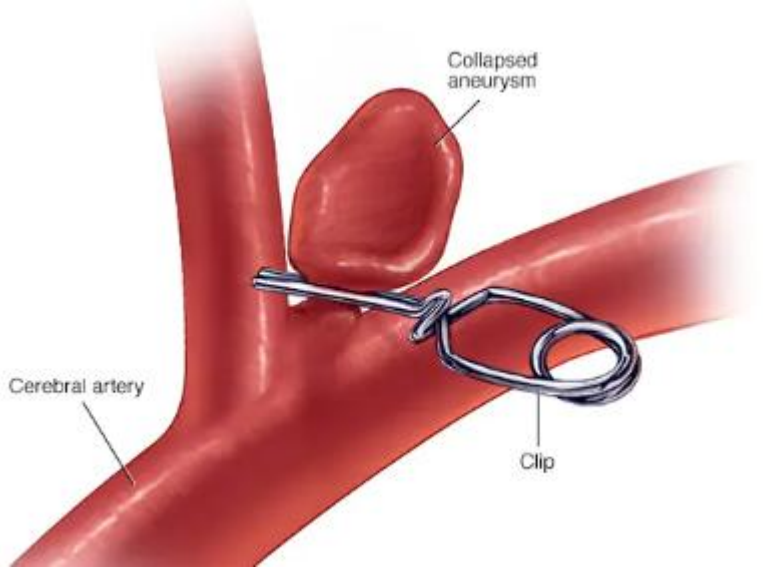
Medical management

- Medicines are used to lower blood pressure, relax blood vessels, and lower the risk of rupture of aneurysm.
- Beta blockers and calcium channel blockers are the medicines most commonly used. • Strict control of blood pressure should be maintained.
- Anti-seizure drugs (Cerebral aneurysm) :seizures may occur after an aneurysm has ruptures. Examples include levetiracetam (Keppra), phenytoin (Dilantin, Phenytek, others) and valproic acid
- **nimodipine** to reduce the risk of the blood supply to the brain becoming severely disrupted (cerebral ischaemia). Either coiling or clipping can then be used to repair the ruptured brain aneurysm.

SURGICAL TREATMENT

Treatment for an aneurysm depends on its location and severity, but may include:

- **Cerebral aneurysm** – is repaired either by coils or stent insertion, or by surgery where the aneurysm has been clipped. If the aneurysm has ruptured, then will need to stay in hospital for up to 21 days because of potential complications, including vasospasm and hydrocephalus. Around one third of all people who experience a ruptured cerebral aneurysm die, and less than 30 per cent get back to a pre-rupture state.



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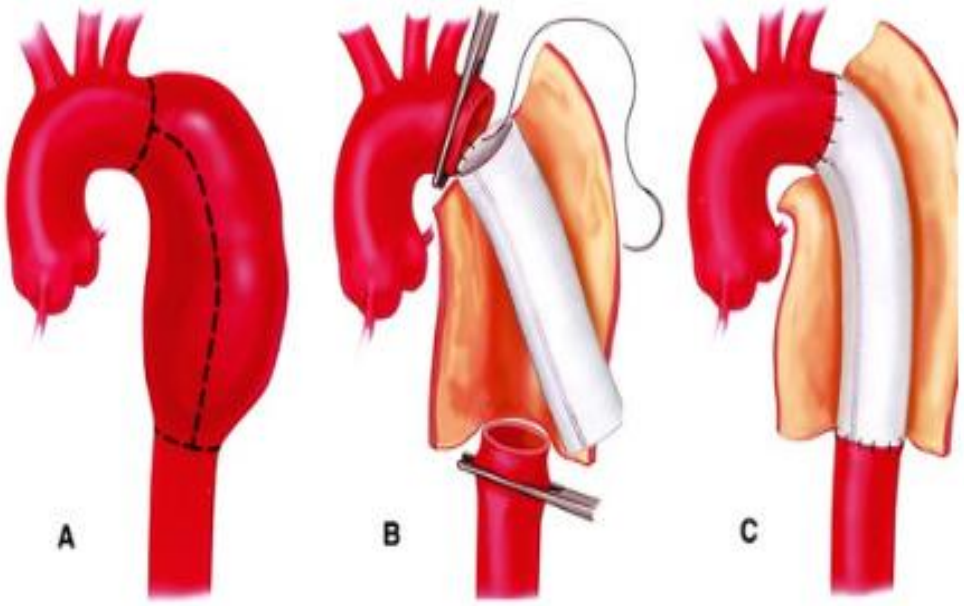
- **Thoracic aortic aneurysm** – requires drugs to control high blood pressure and surgery to repair the aneurysm if necessary. Sometimes, the nearby heart valve may also need fixing during the operation. Most people with a ruptured thoracic aortic aneurysm die within minutes.



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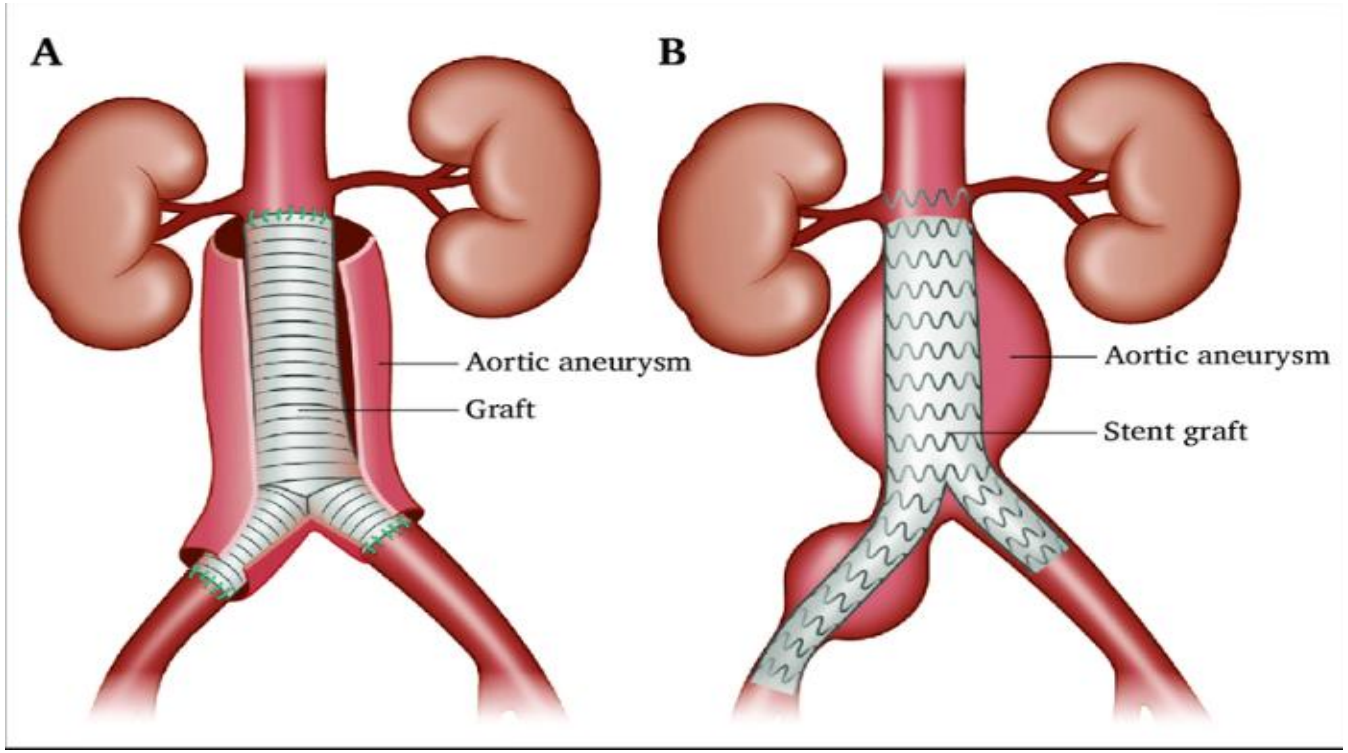
- **Abdominal aortic aneurysm** – requires drugs to control high blood pressure and surgery to repair the aneurysm if necessary. The mortality rate is more than 50 per cent if the aneurysm ruptures.



Thoracic & Abdominal aneurysm-Procedure

Endovascular procedure

- ✓ Newer method for non emergency treatment
- ✓ 2 small incision are made in the groin and a vascular graft is guided into the aorta
- At the tip of catheter are deflated balloon and a tightly wrapped polyester cloth.
- When Properly positioned, graft is placed by inflating the balloon.

Open Repair

- The traditional and most common type of surgery.
- Involves abdominal or open chest repair.
- An incision is made in the chest or abdomen from xiphoid process to symphysis pubis.
- Aneurysm is exposed and aorta is clamped just above and below to stop the blood flow.
- Aneurysm is opened and a dacron graft is then placed within the aneurysm

Cerebral Aneurysm-Procedure

- Surgical Clipping
- > Aneurysm is identified through craniotomy. After aneurysm is identified it is carefully separated from surrounding tissue.
- ➢ A small metal clip is then applied to the neck of aneurysm.
- Normal blood vessel anatomy is physically restored.

- Endovascular Coiling
- ➢ Non invasive procedure to treat cerebral aneurysm without opening the skull or performing brain surgery.
- The Coil refers to a thin wire which is coiled within the aneurysm .The Coil prevents further blood flow into aneurysm.

Reference

- The Text Book of Pathology author Nithin chawla
- For further reference –YouTube animated videos on surgical management on aneurysm