Aneurysm

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Aneurysm

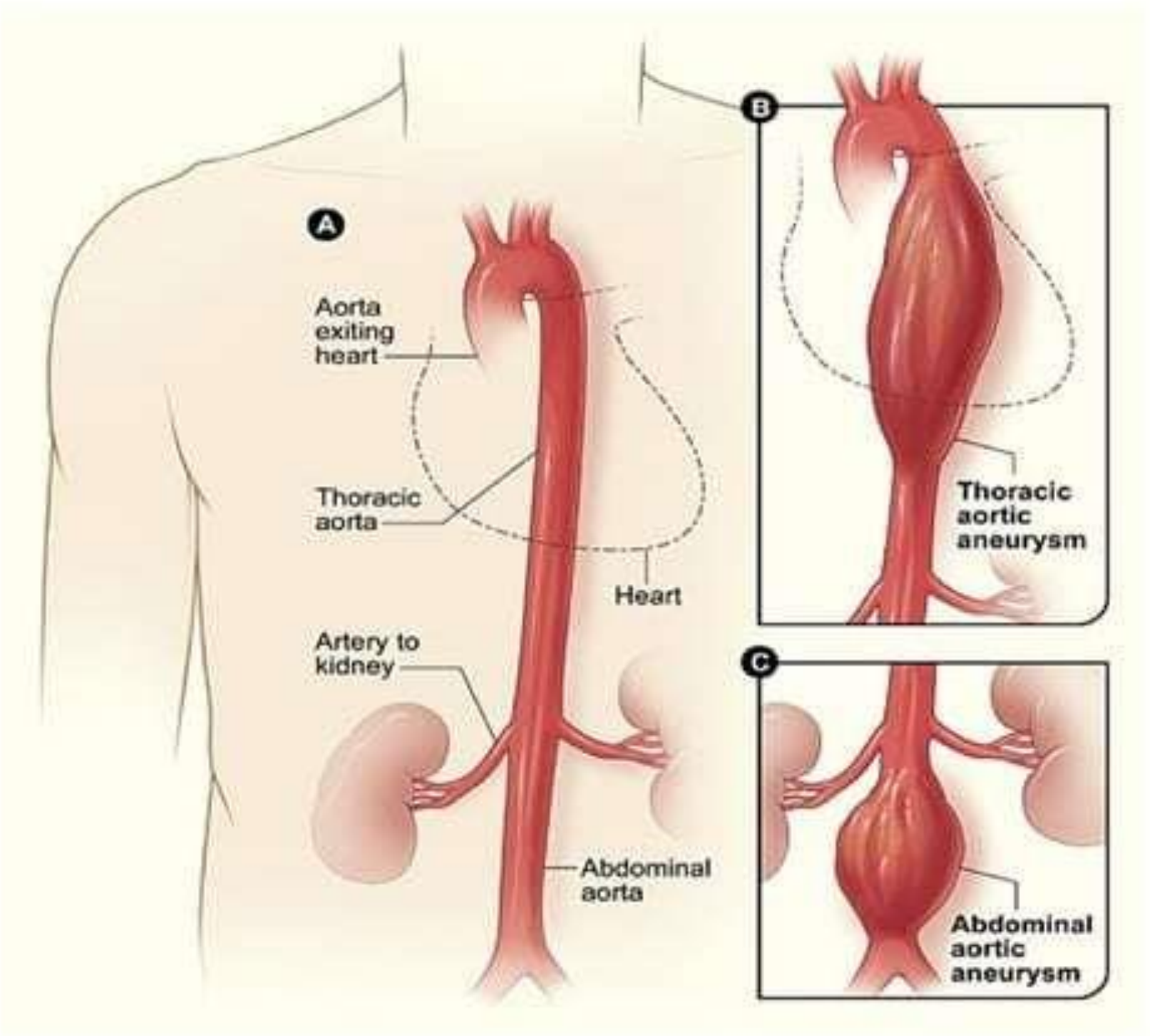
An aneurysm is a distention of an artery brought by a weakening/ destruction of the arterial wall.

An aneurysm is a balloon-like bulge in an artery.

Types of Aneurysms

There are two main types of aneurysms:

1. **Aortic aneurysm** - There are two types of aortic aneurysm
   - Abdominal aortic aneurysm and
   - Thoracic aortic aneurysm
2. **Cerebral aneurysm** - occurs in an artery in the brain.
3. **Others: Peripheral Aneurysm**


A
Aorta exiting heart
Thoracic aorta
Heart
Artery to kidney
Abdominal aorta
B
Thoracic aortic aneurysm
C
Abdominal aortic aneurysm

- ***Abdominal Aortic Aneurysms***

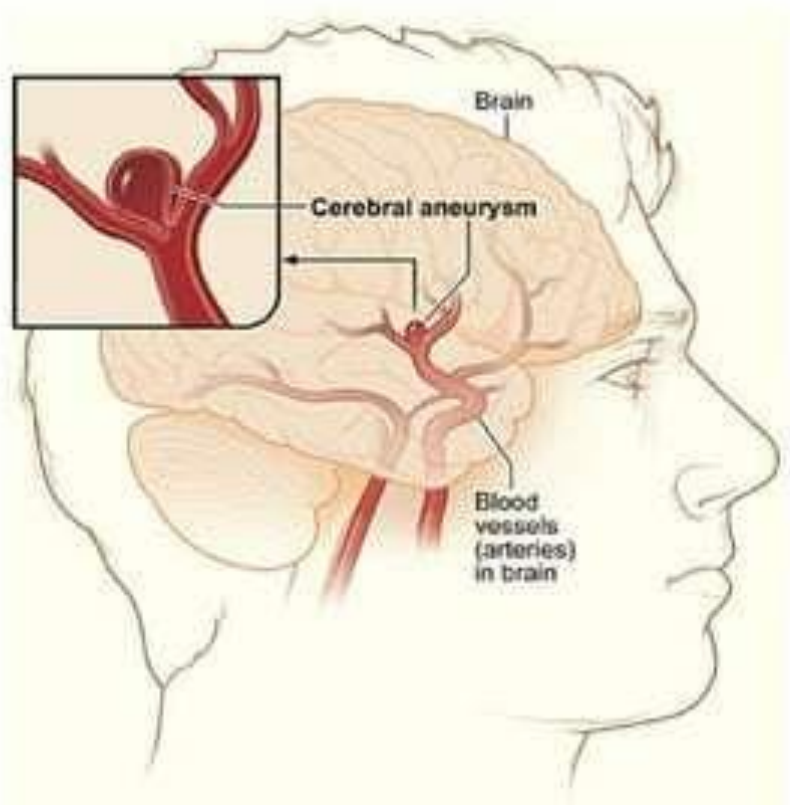
  An aneurysm that occurs in the abdominal portion of the aorta is called an abdominal aortic aneurysm (AAA). Most aortic aneurysms are AAAs.

- ***Thoracic Aortic Aneurysms***

  An aneurysm that occurs in the chest portion of the aorta (above the diaphragm) is called a thoracic aortic aneurysm (TAA).

- ***Brain Aneurysms***

  Aneurysms in the arteries of the brain are called cereberal aneurysms or brain aneurysms. Brain aneurysms also are called berry aneurysms because they're often the size of a small berry.



- ***Peripheral Aneurysms***
  - Aneurysms that occur in arteries other than the aorta and the brain arteries are called peripheral aneurysms.
  - Common locations for peripheral aneurysms include the popliteal, femoral and carotid arteries.

Causes:

Abdominal aortic aneurysm causes:

- Atherosclerosis
- Smoking
- Hypertension -
- Vasculitis (infection in the aorta) -
- Cocaine use
- Genetic factors

Thoracic aortic aneurysm causes:

About 1 in 4 aortic aneurysms occur in the thoracic area of the aorta (higher up in the chest). Causes are the same as with aortic aneurysms, plus the following below:

- **Marfan Syndrome** - this is a genetic disorder of the connective tissue; it is a much less common cause of aortic aneurysm.
- **Previous aorta injury**
- **Traumatic injury** - cause by a vehicle accident or a bad fall.

Brain (cerebral) aneurysm causes:

- **Weakness in the artery wall** (usually present since birth)
- **Hypertension**
- **Arteriosclerosis** (plaques of cholestrol, platelets, fibrin, and other substance form on the arterial wall)
- Most cerebral aneurysms develop at the forks or branches in arteries because the walls in these sections are weaker. They most commonly form at the base of the brain - but can form anywhere in the brain.

Clinical manifestation:

Abdominal Aortic Aneurysms

- A throbbing feeling in the abdomen
- Deep pain in back or the side of the abdomen
- Steady, gnawing pain in the abdomen that lasts for hours or days

If an AAA ruptures, symptoms may include :

- Sudden, severe pain in lower abdomen and back;
- Nausea and vomiting;
- Constipation
- Problems with urination
- Clammy, sweaty skin
- Light-headedness
- Rapid heart rate when standing up
- Shock

Thoracic Aortic Aneurysms

- Pain in jaw, neck, back, or chest
- Coughing and/or hoarseness
- Shortness of breath and/or trouble breathing or swallowing
- Loss of voice

<u>If a TAA ruptures or dissects</u>

- Sudden, severe, sharp or stabbing pain starting in the upper back and moving down into the abdomen.
- Pain in chest and arms, and pt. can quickly go into shock.

Cerebral (brain) aneurysm symptoms

The following symptoms may be experienced before a cerebral aneurysm ruptures:

- Very severe headache that occurs suddenly
- Nausea
- Vomiting
- Eyesight problems
- Seizures (fits)
- Loss of consciousness
- Confusion
- A drooping eyelid
- Stiff neck
- Light sensitivity
- If the cerebral aneurism bursts it will cause bleeding in the brain and a hemorrhagic stroke - it can also cause intracranial hematoma

Risk factors:

- **Male gender** - Men are more likely than women to have aortic aneurysms.
- **Age** - Abdominal aortic aneurysms are more likely to occur in people who are aged 65 or older.
- **Smoking** - Smoking can damage and weaken the walls of the aorta.
- **Family history** - People who have family histories of aortic aneurysms are at higher risk for the condition, and they may have aneurysms before the age of 65.
- **History of aneurysms in the arteries of the legs.**
- **Certain diseases** and conditions that weaken the walls of the aorta. Such as high BP and atherosclerosis
- **Having a bicuspid aortic valve** - can raise the risk of having a thoracic aortic aneurysm. A bicuspid aortic valve has two leaflets instead of the typical three.
- **Car accidents or trauma** - also can injure the arteries and increase the risk for aneurysms.

Diagnostic test:

- ***Abdominal or chest X-ray*** *may show calcification that outline aneurysm*
- ***Ultrasound and Echocardiography:*** These tests can show the size of an aortic aneurysm
- ***Computed Tomography Scan***

  A computed tomography scan, or CT scan : CT scan can show the size and shape of an aneurysm.
- ***Magnetic Resonance Imaging:*** detect aneurysms and pinpointing their size and exact location.
- ***Angiography:*** This test shows the amount of damage and blockage in blood vessels.

Management:

The goals of management may include:

- Preventing the aneurysm from growing
- Preventing or reversing damage to other body structures
- Preventing or treating a rupture or dissection
- Allowing the pt. to continue doing their normal daily activities

Medical management:

- In aortic aneurysm: Medicines are used to lower blood pressure, relax blood vessels, and lower the risk that the aneurysm will rupture (burst).
- Beta blockers and calcium channel blockers are the medicines most commonly used.

Cerebral aneurysm treatments

It help to relieve symptoms as well as managing complications:

- Painkillers - usually for headaches.
- Calcium channel blockers - these stop calcium for entering cells of the blood vessel walls. They reduce the amount of widening and narrowing of blood vessels; often a complication of a ruptured aneurysm.
- A vassopressor - this is an injected drug which raises blood pressure; widens blood vessels which have remained stubbornly narrowed. The aim is to prevent stroke.
- Anti-seizure drugs - seizures may occur after an aneurysm has ruptures. Examples include levetiracetam (Keppra), phenytoin (Dilantin, Phenytek, others) and valproic acid

- A ventricular catheter - this can reduce the pressure on the brain caused by hydrocephalus (excess cerebrospinal fluid). The catheter, which is placed in the spaces filled with fluid inside the brain, drains the excess liquid into an external bag. It may be necessary to place a shunt system - a shunt (flexible silicone rubber tube) and a valve. The shunt system is a drainage channel that starts in the brain and ends in the patient's abdominal cavity.

- Rehabilitation therapy - sometimes a subarachnoid hemorrhage causes brain damage, resulting in impaired speech and bodily movements. Rehabilitation therapy helps the patient relearn vital skills.

Surgical management:

The two main types of surgery to repair aortic aneurysms are:

1. Open Abdominal or Open Chest Repair

- In aortic aneurysms, open abdominal or open chest repair. This surgery involves a major incision (cut) in the abdomen or chest.
- General anesthesia is used during this procedure. During the surgery, the aneurysm is removed. Then, the section of aorta is replaced with a graft made of material such as Dacron or Teflon

2. Endovascular Repair

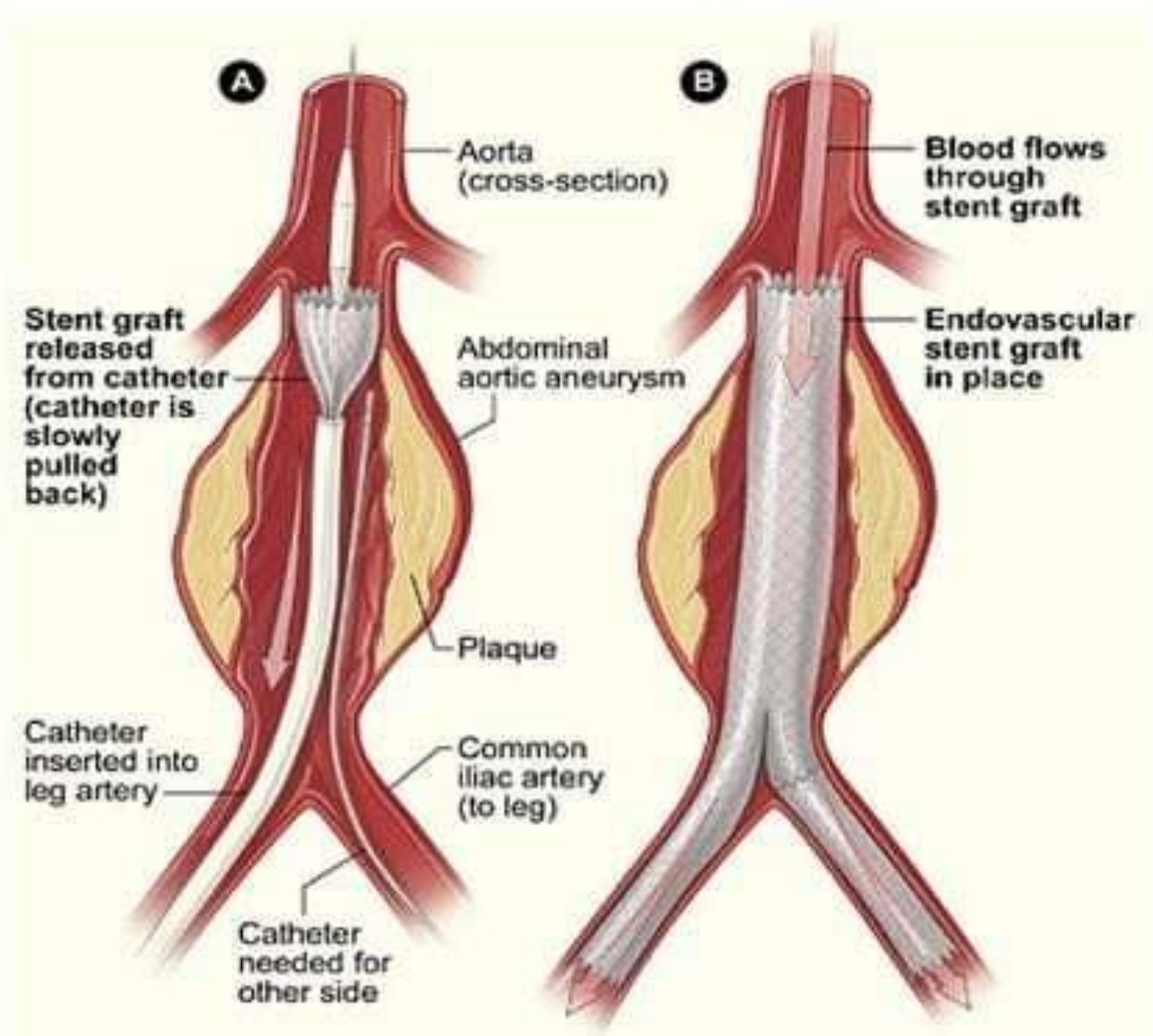
- In endovascular repair, the aneurysm isn't removed. Instead, a graft is inserted into the aorta to strengthen it.
- The surgeon first inserts a catheter into an artery in the groin (upper thigh) and threads it to the aneurysm. Then, using an x ray to see the artery, the surgeon threads the graft (also called a stent graft) into the aorta to the aneurysm.
- The graft is then expanded inside the aorta and fastened in place to form a stable channel for blood flow. The graft reinforces the weakened section of the aorta. This helps prevent the aneurysm from rupturing.

Brain aneurysms:

Brain aneurysms have two options if the aneurysm has ruptured:

- **Surgical clipping** - the aneurysm is closed off. The surgeon removes a section of the skull to get to the aneurysm and finds the blood vessel that feeds it. A tiny metal clip is placed on the neck of the aneurysm to block off the blood flow to it.
- ***Endovascular Repair***

Endovascular Repair



Prevention

- A large percentage of aneurysms are caused by arteriosclerosis. The following steps will help prevent the development of arteriosclerosis and aneurysms:
- Quit smoking
- Keep blood pressure under control
- Keep blood cholesterol levels under control
- Eat a healthy, well balanced diet, rich in fruit and vegetables, unrefined carbohydrate, dietary fiber, good quality fats, and lean protein
- Keep bodyweight within the ideal limits for height
- Get at least 7 hours of good quality sleep each night
- Keep yourself physically active (check with your doctor that this is OK for you)

Complications

- Haemorrhage leading to shock and even death
- Myocardial ischemia
- Stroke
- Paraplegia due to interruption of anterior spinal artery
- Abdominal ischemia
- Graft occlusion
- Graft infection
- Acute renal failure
- Lower extremity ischemia A cerebral aneurysm rupture causes :

Nursing management:

Nursing assessment:

1. In pt. with thoracoabdominal aortic aneurysm, be alert for sudden onset of sharp, ripping or tearing pain located in anterior chest, epigastric area, shoulders or back, indicating acute dissection or rupture.
2. In pt. with abdominal aortic aneurysm, assess for abdominal (particular left lower quadrant) pain and intense lower back pain caused by rapid expansion. Ne alert for syncope, tachycardia, and hypotension which may be followed by fatal haemorrhage due to rupture

Nursing Dx:

- Ineffective tissue perfusion (Vital organs) r/t aneurysm or aneurysm rupture
- Risk for infection r/t surgery
- Acute pain r/t pressure of aneurysm on nerves and postoperatively

Nursing interventions:

Maintaining perfusion of vital organs:

- Preoperatively:

1. Assess for chest pain and abdominal pain
2. Prepare patient for diagnostic studies or surgery as indicated
3. Monitor for s/s of hypovolemic shock
4. Examine neurovascular distal extremities

Postoperatively

1. Monitor vital signs frequently
2. Assess for s/s of bleeding

- Hypotension, tachycardia, tachypnea, daiphoresis

3. Monitor laboratory values as ordered
4. Monitor urine output hourly
5. If throracoabdominal aneurysm repair has been performed , monitor for s/s of spinal cord ischemia:
   - pain, numbness, paresthesia, weakness

Preventing infection:

- Monitor temperature
- Monitor changes in WBC count
- Monitor incision for signs of infection
- Administer antibiotics as ordered

Relieving pain:

- Provide diversional therapy like listening music, reading newspaper etc.
- Place the patient in comfortable position
- Administer pain medication as ordered
- Keep head of bed elevated no more than 45 degrees for the first 3 days postoperatively to prevent pressure on incision site
- Assess abdomen for bowel sounds and distention.

Patient education:

- Instruct pt. about medications to control BP and the importance of taking them
- Discuss disease process and s/s of expanding aneurysm or impending rupture, or rupture to be reported
- For postsurgical pt. discuss warning signs of postoperative complicaitons (fever, inflammation of operative site, bleeding and swelling)

- Encourage adequate balanced intake for wound healing
- Encourage patient to maintain an exercise schedule postoperatively