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(SUST)
College of Medical Radiological Sciences

Assistant Professor

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Angiography {Arteriography}

Quick Anatomical Review

Quick Anatomical Review

Introduction:

Blood Vascular System:

The blood vascular system consists basically of the:

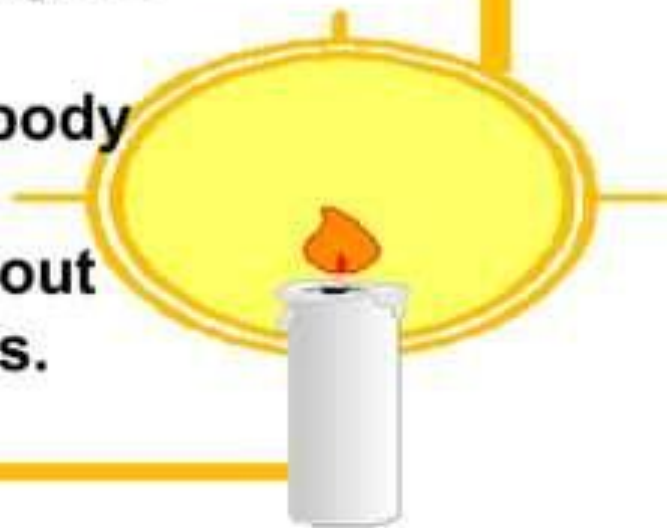
Heart.
Arteries.
Capillaries. (arterioles / Venules)
Veins.

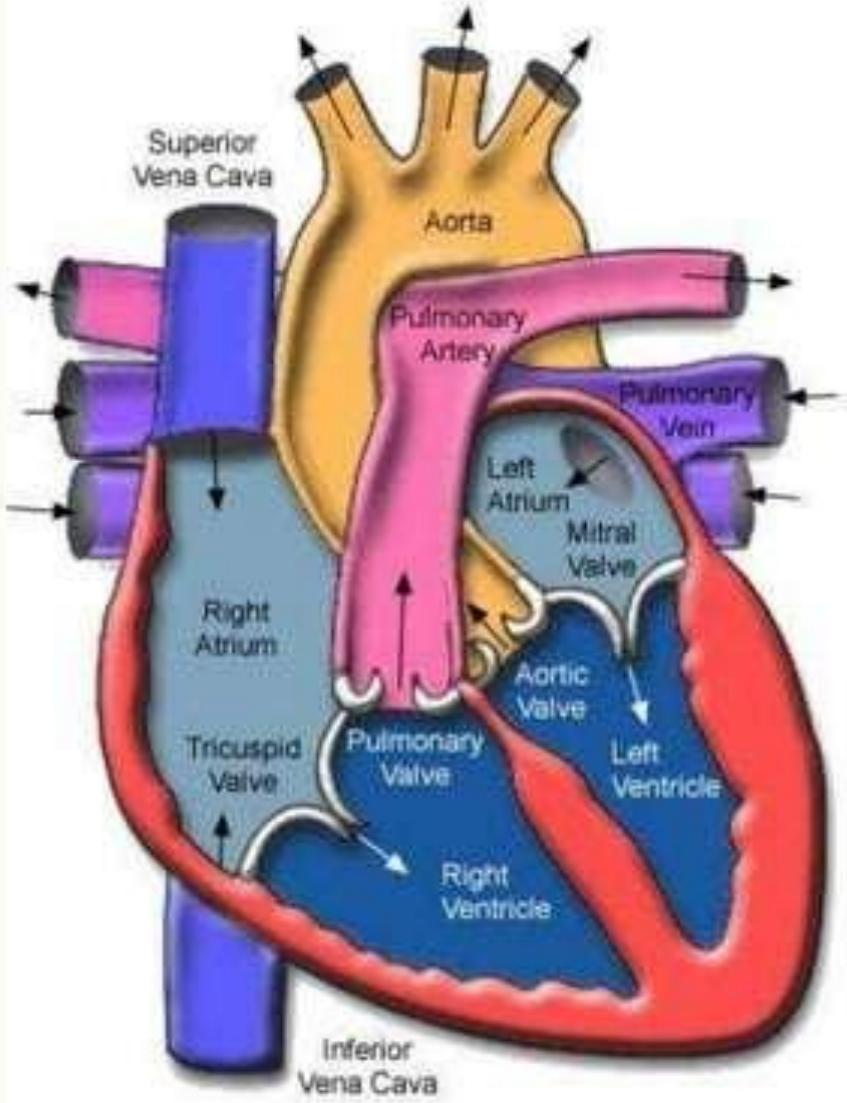
- The heart serve as a pumping mechanism to keep the blood in constant circulation through the vast system of blood vessels.
- Arteries convey the blood away from the heart.
- Veins convey the blood back towards the heart.

--- Two circuits of arteries, capillaries & veins branch out from the return blood back to the heart:

One of this circuits transverse the lungs to discharge carbon dioxide and take up oxygen for delivery to the reminder of body tissues. (Pulmonary Circulation)

The second circuit branches throughout the body to different organs and tissues. (Systemic Circulation)





The Heart:

The heart is a muscular pump, consisting of four chambers:

- The Rt. Atrium.
- The Rt. Ventricle.
- The Lt. Atrium.
- The Lt. Ventricle.

Rt. Atrium& Rt. Ventricle junction controlled by the Tricuspid valve.

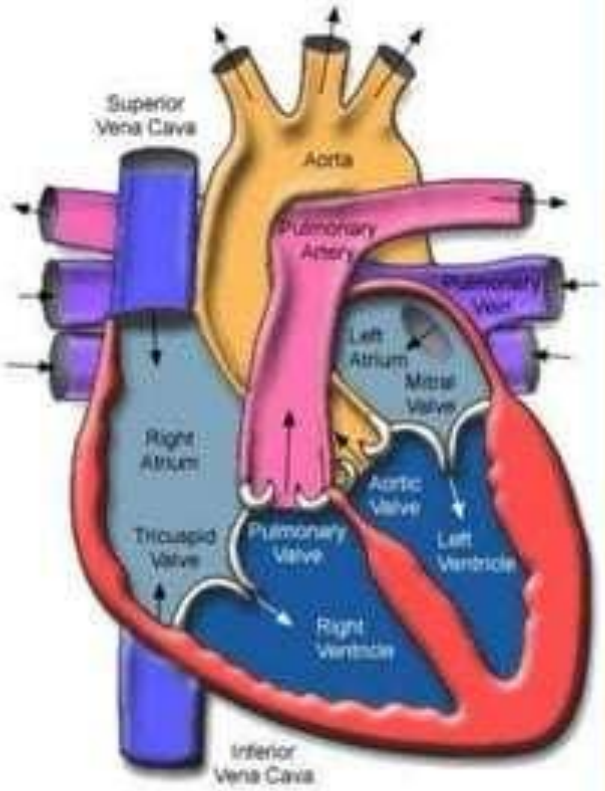
Lt. Atrium& Lt. Ventricle junction controlled by the Mitral valve.

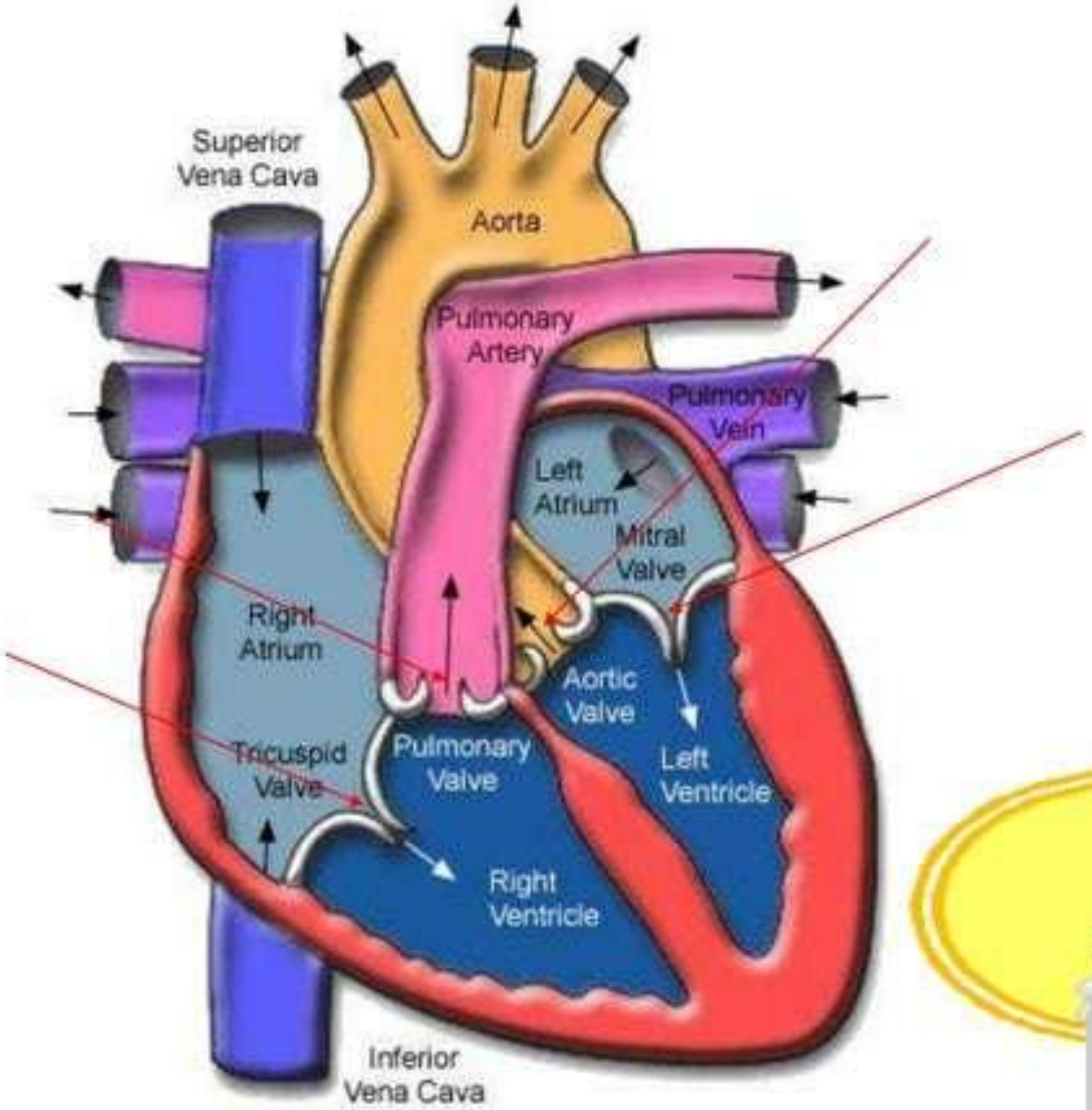
Pulmonary artery arises from the Rt. Ventricle.

Pulmonary artery controlled by the pulmonary valve.

Aorta arises from the Lt. Ventricle.

Aorta controlled by the Aortic valve.



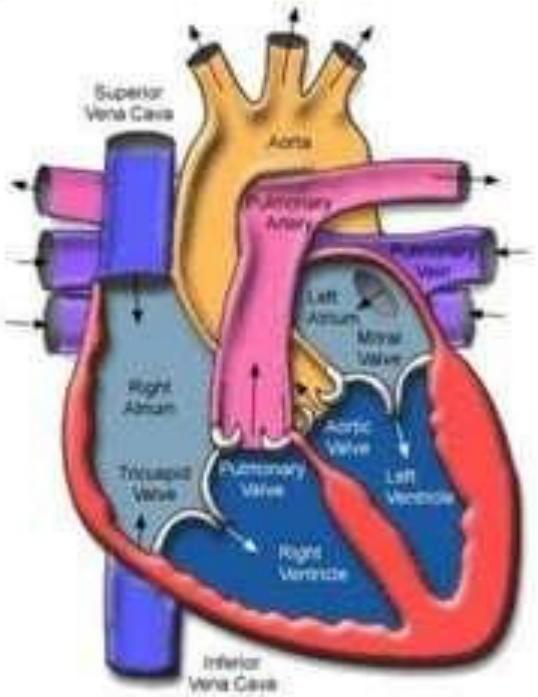

Superior
Vena Cava
Aorta
Pulmonary
Artery
Pulmonary
Vein
Left
Atrium
Mitral
Valve
Right
Atrium
Aortic
Valve
Tricuspid
Valve
Pulmonary
Valve
Left
Ventricle
Right
Ventricle
Inferior
Vena Cava

Aorta is dividing into the following:

- The Ascending aorta.
- The Arch of the aorta.
- The Descending aorta.
- The Abdominal aorta.

Three branches arise from the Arch of the aorta:

- The Brachiocephalic (Innominate) artery.
- The Lt. Common Carotid artery.
- The Lt. Subclavian artery.



The Arteries of The Head& Neck:

•The (Rt. & Lt.) Common Carotid arteries, subdivided to:

- External& Internal Common Carotid arteries

Branches of the External Common Carotid arteries are:

- Superior thyroidal artery.
- Ascending pharyngeal artery.
- The lingual artery.
- The facial artery.
- The occipital artery.
- The posterior auricular artery.

The Arteries of The Brain:

The Rt. & Lt. internal carotid arteries.

The Rt. & Lt. vertebral arteries.

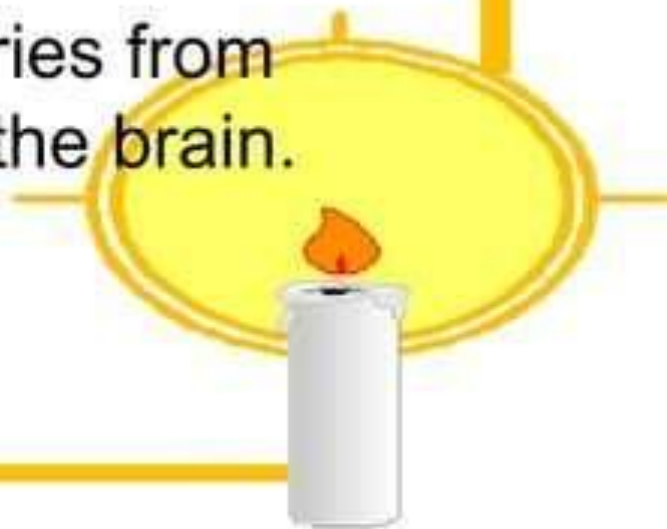
- The Circle of Willis:

Consist of:

The two internal& external carotid arteries.

The basilar artery.

The anterior& posterior arteries from the arterial communicating of the brain.



The Abdominal Aorta:

Branches of the abdominal aorta are:

- The inferior phrenic arteries.
- The celiac axis.
- The superior mesenteric arteries.
- The Rt. & Lt. suprarenal arteries.
- The Rt. &Lt. renal arteries.
- The Gonadal arteries.
- The inferior mesenteric artery.
- The lumbar arteries.
- The common iliac arteries.

- Especial Radiographic Investigation of:
- Arteries ⇒ Arteriography
- Veins ⇒ Venography

Angiographic Studies:

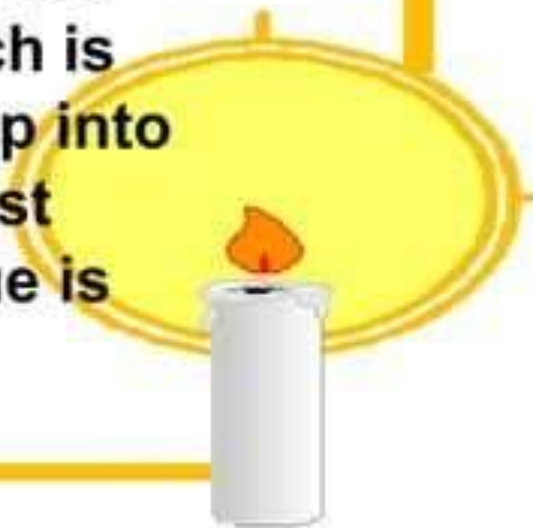
Contrast Media:

-----Wide range of contrast media are used in angiographic studies.

----- All materials currently in use are organic iodine solution.

Injection Techniques:

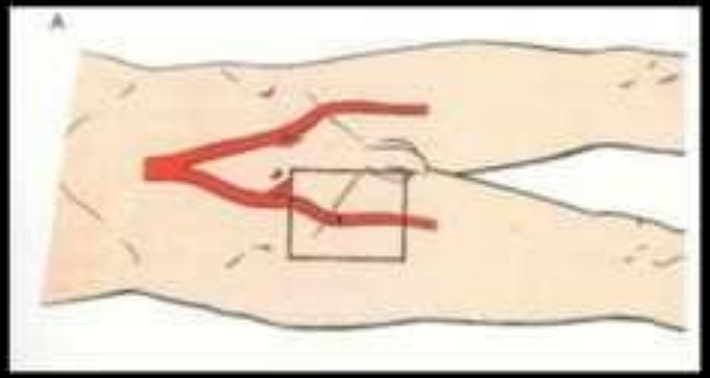
---- The contrast medium may be introduced into vessel through a "Direct Stick" which is simply the process of placing a needle tip into the desired vessel & injecting the contrast agent through the needle. (This technique is acceptable in limited situation).



----- A flush injection through a catheter involves placing the catheter tip into a large proximal vessel.

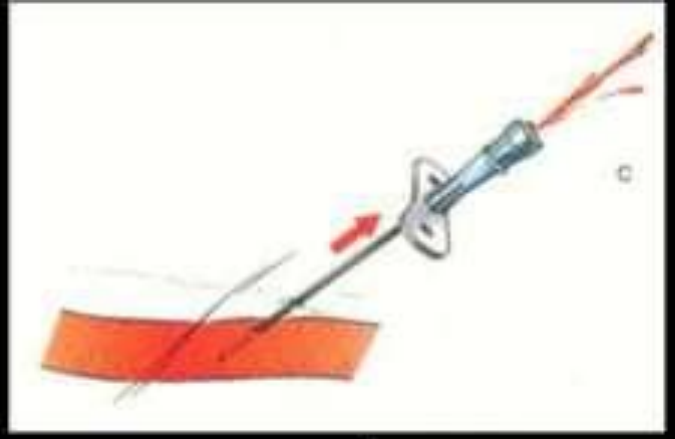
----- In a selective injection the catheter tip is positioned into the orifice of a specific artery so that the specific artery is injected.

----- A contrast medium may be injected by hand with a syringe, but ideally an automatic injector is used.



Steps of injection in arteries

A, An ideal arteriotomy occurs in the femoral artery just below the inquinal ligament. **B,** A beveled compound needle containing an inner cannula pierces through the artery. **C,** The needle's inner cannula is removed, and a flexible guide wire is inserted. **D,** The needle's inner cannula is removed, and a flexible guide wire is inserted. **E,** The needle is removed; pressure fixes the wire and reduces hemorrhage. **F,** The catheter is slipped over the wire and into the artery. **G,** The guide wire is removed, leaving the catheter in the artery.



A, An ideal arteriotomy occurs in the femoral artery just below the inguinal ligament. **B,** A beveled compound needle containing an inner cannula pierces through the artery. **C,** The needle's inner cannula is removed, and a flexible guide wire is inserted. **D,** The needle's inner cannula is removed, and a flexible guide wire is inserted. **E,** The needle is removed; pressure fixes the wire and reduces hemorrhage. **F,** The catheter is slipped over the wire and into the artery. **G,** The guide wire is removed, leaving the catheter in the artery.

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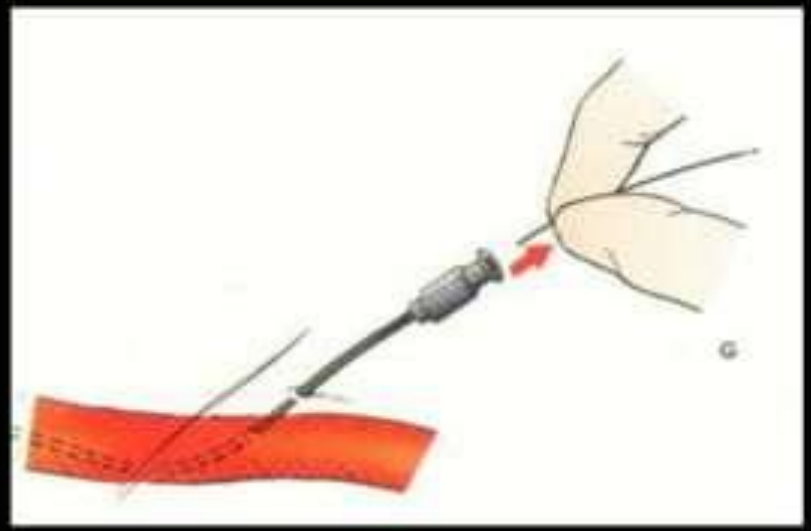


Catheters

Selected catheter shapes used for angiography.

(Courtesy Cook, Inc., Bloomington, Ind.)

Equipment

Indications for imaging:

- To locate and assess narrowing, occlusions, and other abnormalities of various arteries, especially the femoral arteries of the legs; the carotid arteries in the neck; and the arterial systems of the brain, heart, and kidneys.

- It also displays the vascular anatomy to organs such as the brain, liver, and gastrointestinal tract.

Patients Preparation:

- Blood tests are done beforehand to make sure that the blood will clot normally.

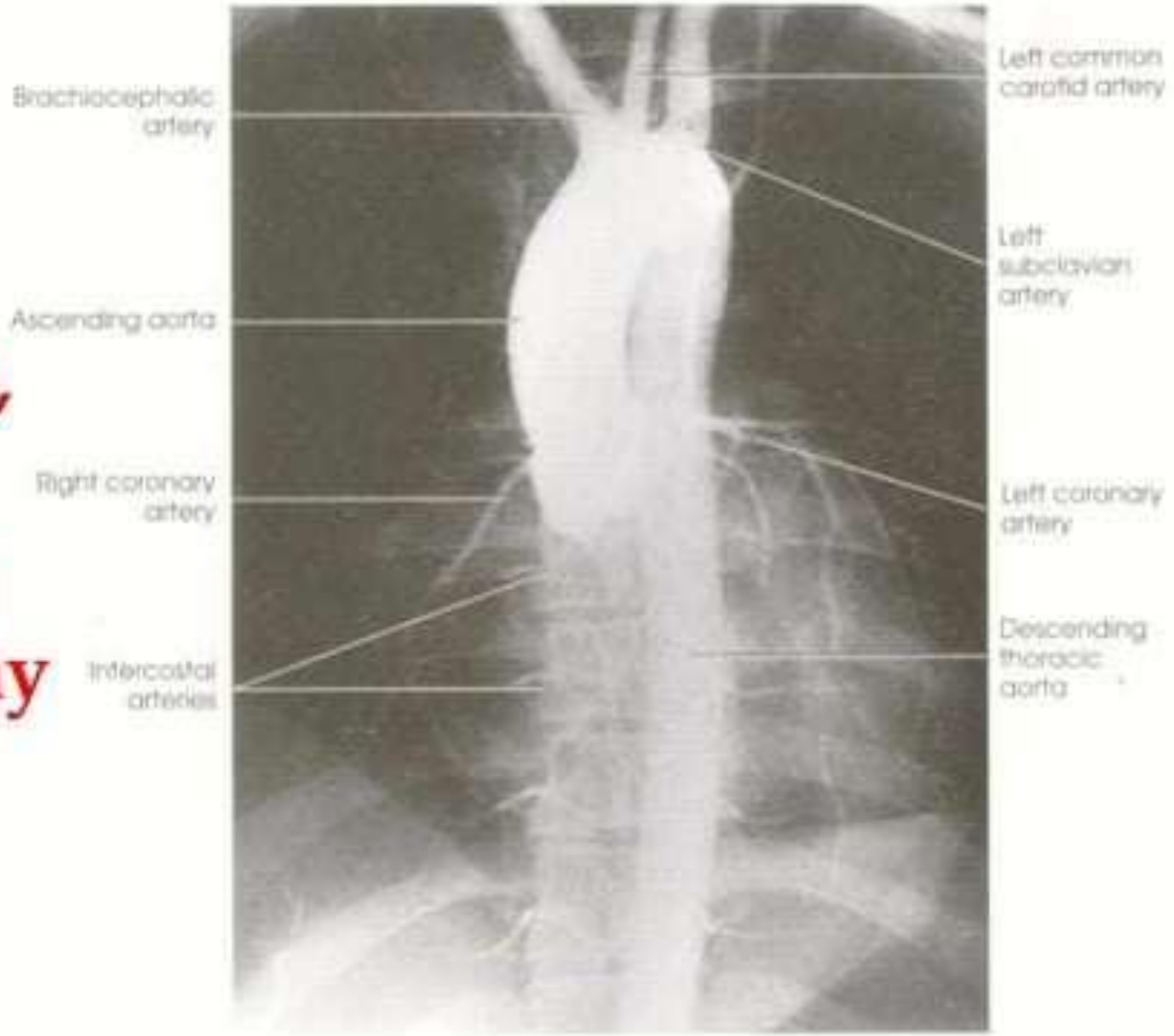
- A sedative (e.g., a benzodiazepine such as Valium) may be given to help patient relax during the examination.

- The area where the catheter will be inserted is thoroughly cleansed and perhaps shaved; you may also be instructed to shower with an antiseptic soap.

- A local anesthetic will be injected into the skin to numb the area prior to the procedure.

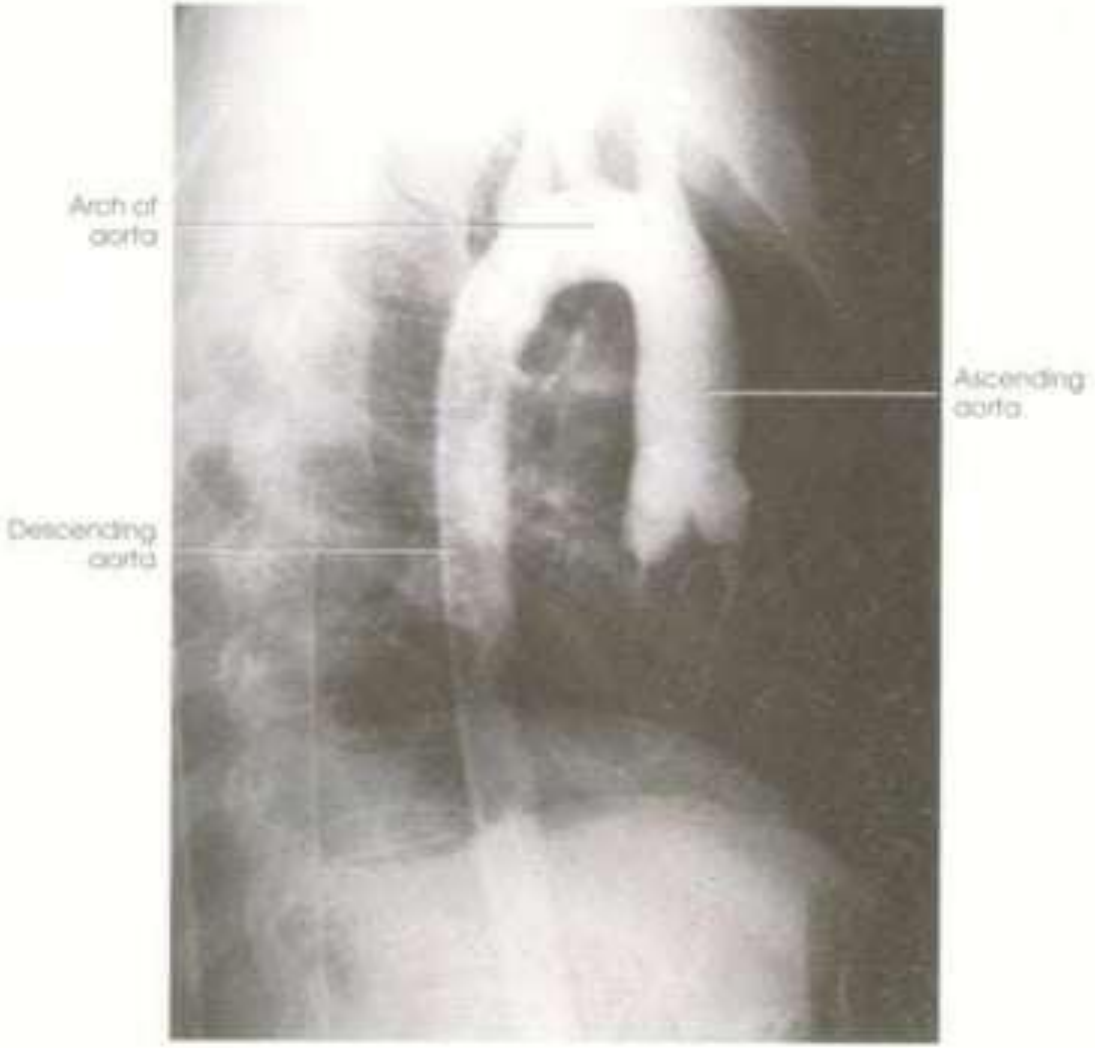
- ECG electrodes will be affixed to your chest, this device allow constant monitoring during the procedure.

A.P Projection, Flush Thoracic Aortography



AP thoracic aorta that also demonstrates right and left coronary arteries.

Lat. Projection, Flush Thoracic Aortography

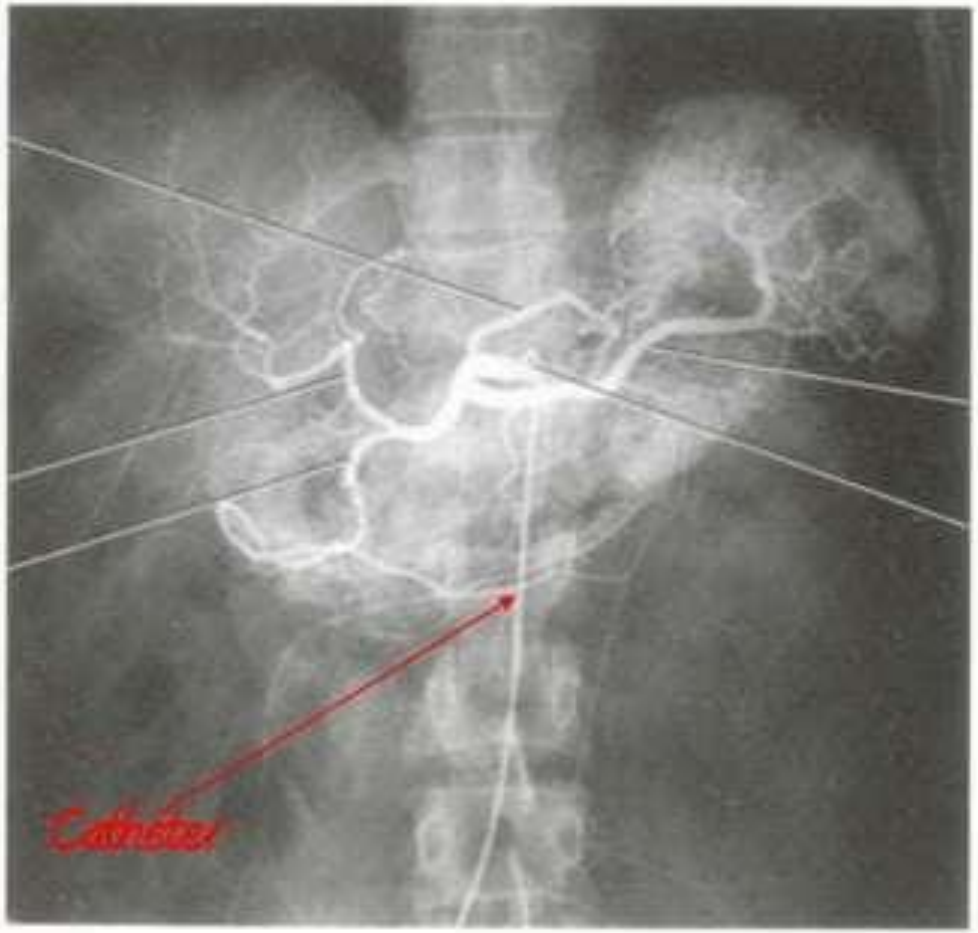


Lateral thoracic aorta

A.P Projection, Flush Abdominal Aortography

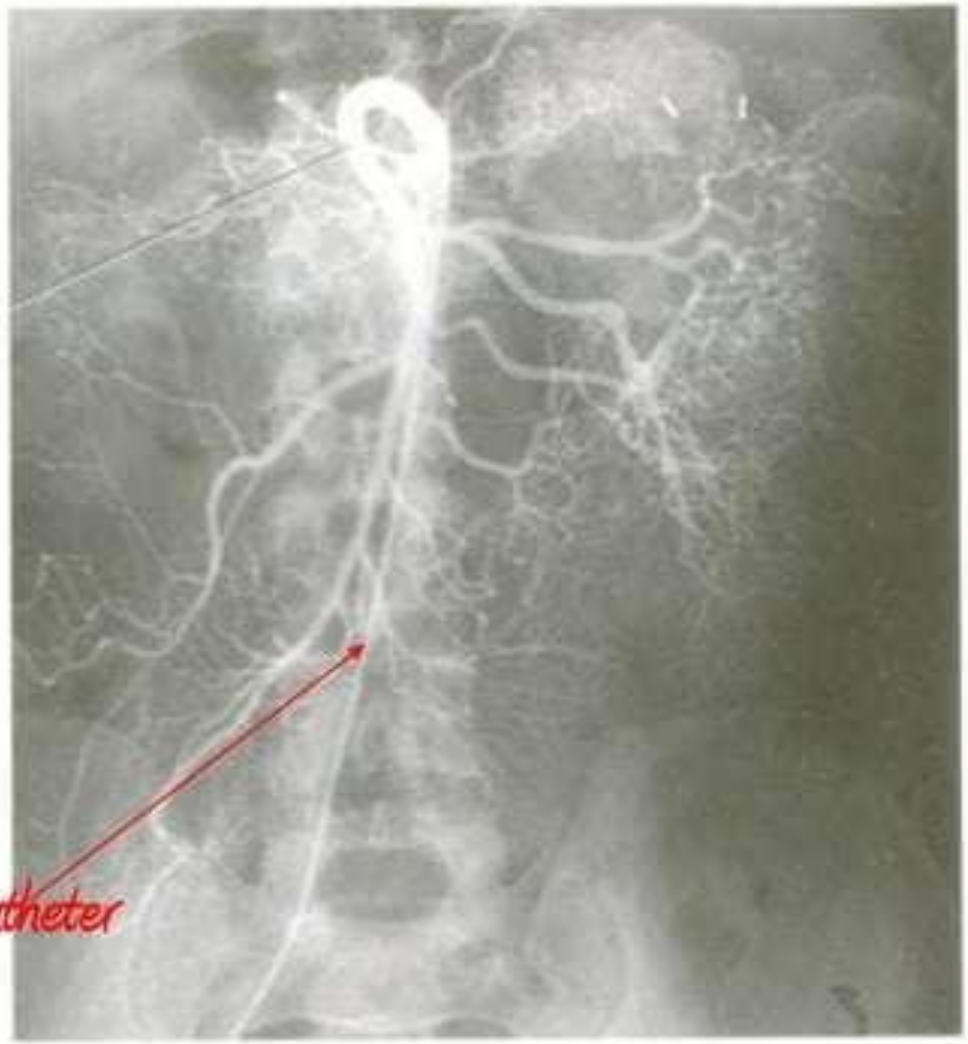
AP abdominal aorta.

A.P Projection, Selective Celiac Arteriography



Selective AP celiac arteriogram.

A.P Projection, Selective Superior Mesenteric Arteriography

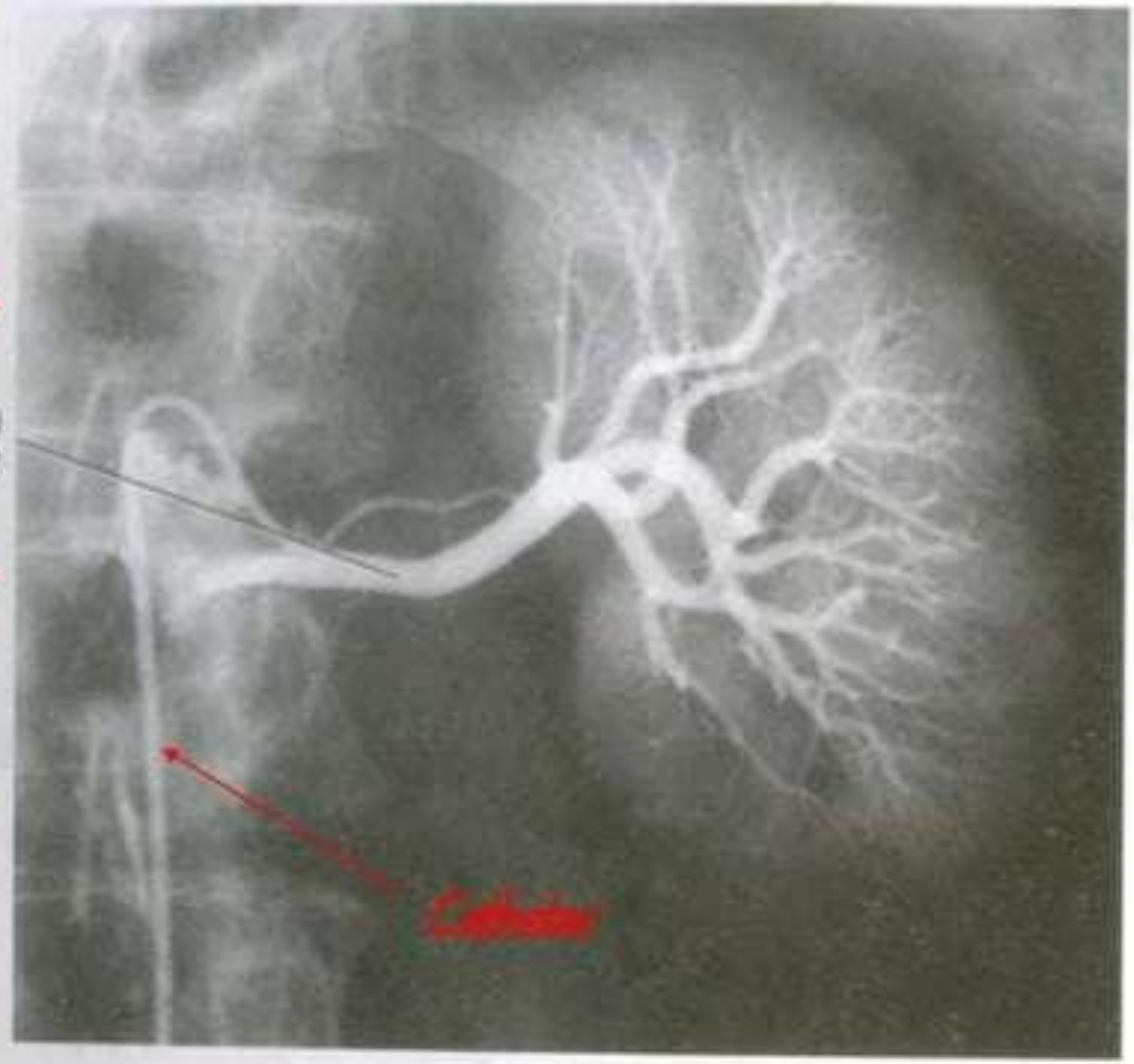


Selective superior mesenteric arteriogram.

A.P Projection, Selective Inferior Mesenteric Arteriography

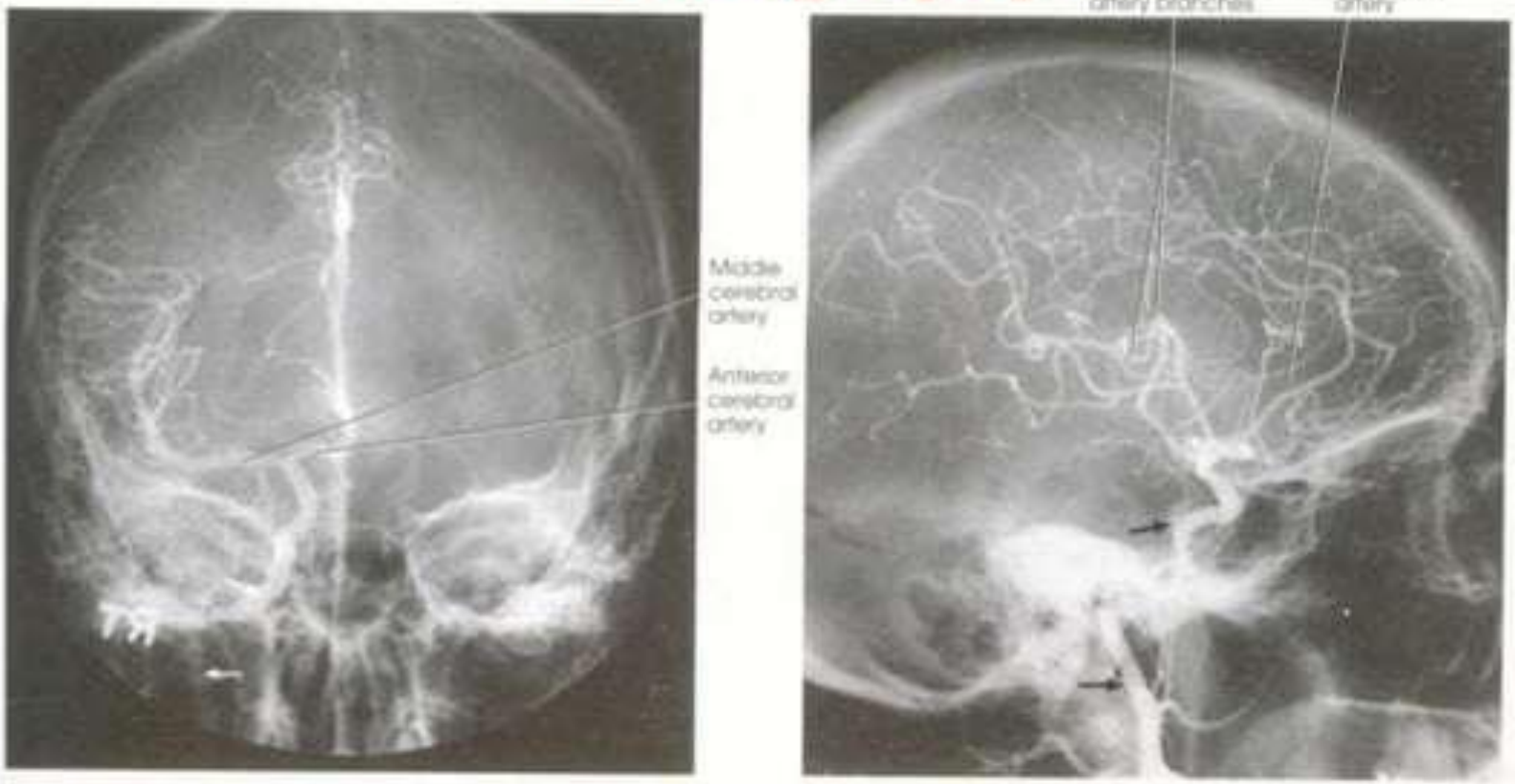
Selective inferior mesenteric arteriogram.

A.P Projection, Selective Lt. Renal Arteriography



Selective left renal arteriogram in early arterial phase.

A.P & Lat. Projection, Selective I.C. Arteriography



Carotid arteriograms showing internal carotid artery (arrows) and anterior cerebral blood circulation.


THANKS