SNS COLLEGE OF ALLIED HEALTH SCIENCES

SNS Kalvi Nagar, Coimbatore - 35

Affiliated to Dr MGR Medical University, Chennai

DEPARTMENT OF RADIOGRAPHY AND IMAGING TECHNOLOGY

COURSE NAME : CONTRAST AND SPECIAL RADIOGRAPHY PROCEDURES

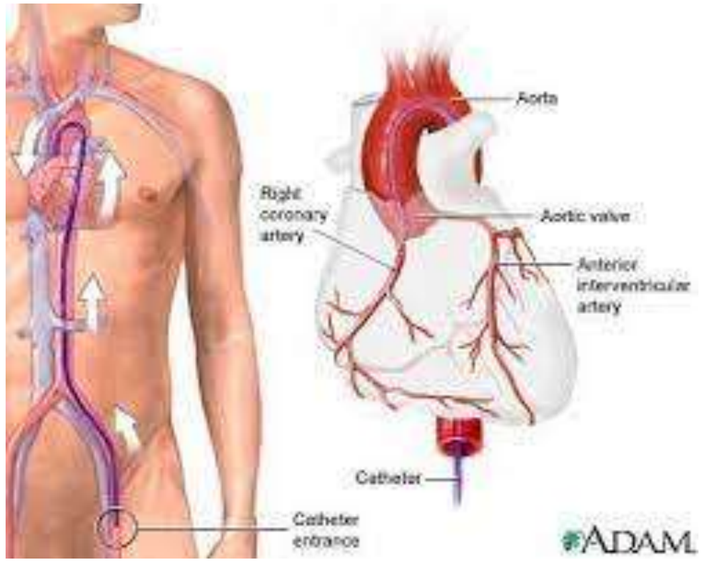
II YEAR

UNIT : 3

TOPIC : ANGIOGRAPHY

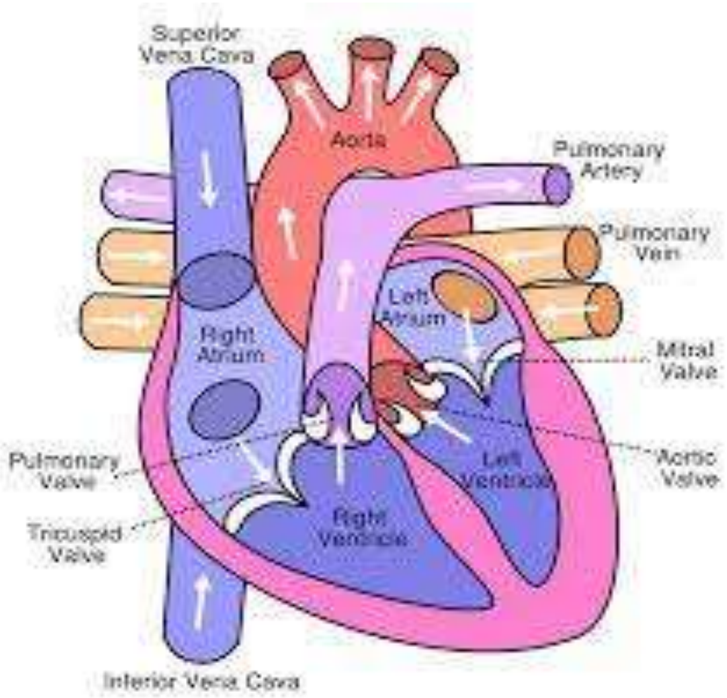
INTRODUCTION

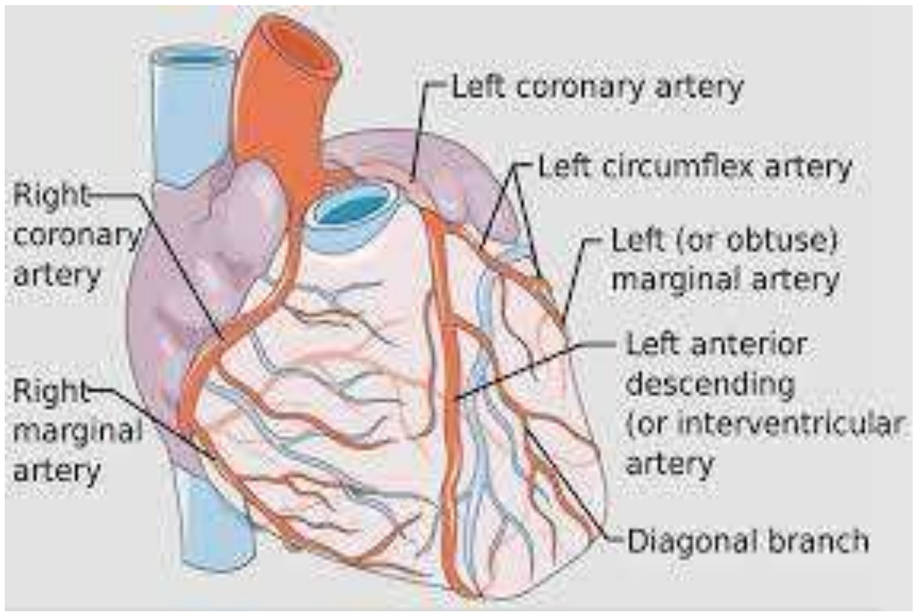
Angiography is the radiological examination of the coronary arteries in which the contrast medium is injected into the heart's blood vessels through a catheter to identify the narrowig,blockages,function,heart disease and coronary artery disease.As the contrast media travels through the blood flow,the radiographs are taken.



ANATOMY

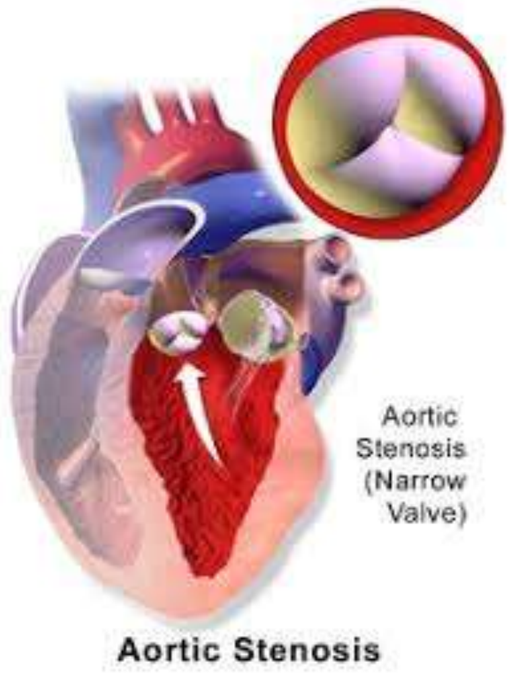
The coronary arteries arise from the aortic sinuses.They transport blood into cardiac muscle.There are two main coronary arteries,the left coronary artery and the right coronary artery

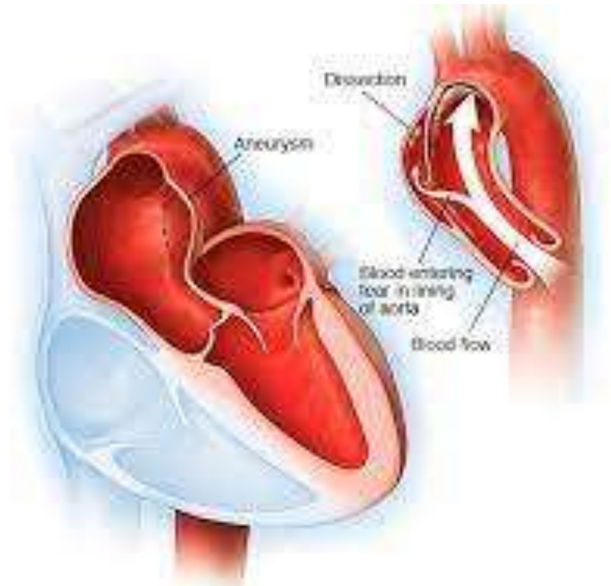




INDICATION

- Blockage in coronary vessels.
- Aneurysm.
- Arteriovenous malformation(AVM).
- Atherosclerosis.
- Stenois.
- Suspected of clot,thrombus and embolus.
- Chest pain(angina).
- Congenital heart disease.
- Heart valve disease.
- Vascularity assessment of a tumour.
- Investigating source of haemorrhage.





CONTRAINDICATION

- Allergy to iodine contrast.
- Renal failure.
- Hepatic failure.
- Suspected pregnancy.
- Severe anemia.
- Impaired blood clotting factor.
- Recent stroke (myocardial infarction).
- Absence of pulse at the access site.
- Severe hypertension.

PRE-PROCEDURE INVESTIGATIONS

The pre-procedure investigations must be reviewed by the radiologist or cardiologist,which includes –

* Chest X-ray report.
* Blood urea.
* Blood Serum creatinine.
* Ultrasonography report and CT,MRI reports.
* Liver function test reports.
* Blood sugar reports.
* Total blood count and bleeding and clotting time.
* History of previous medication,bleeding disorder,should be taken by the radiologist.

PATIENT PREPARATION

- The patient is asked to take a low residue diet for two days prior to the examination and drink clear liquids the day before the examination.
- Fasting may be employed for 6-8 hours.Ask the patient not to eat or drink after midnight.
- Women should inform about any possibility of pregnancy.Pregnant women should not have a radiologic examination because of the risk of radiation exposure to the unborn baby.
- The patient is instructed to remove all the metallic objects and metallic jewelry from the body.
- The patient is asked to stop taking an anticoagulant,two days prior to the examination.
- The puncture site must be shaved before the examination.
- The patient should be hydrated before examination and premedications are given to reduce anxiety.

EQUIPMENT

The major Cath lab equipment are the same,but additional specific equipment are required for the coronary angiography.

* JR4(Judkins Right 4) for right coronary artery.
* JL4(Judkins Left 4) for left coronary artery.
* Pigtail catheter for ventricles.
* Sheath.
* Guide wire.
* Contrast agent – iodinated non-ionic water soluble contrast media(350 I/mg flow rate 5 – 8 ml per second).
*Local anaesthesia – 1% to 2% Xylocaine without adrenaline is used.

Contd.,

PROCEDURE

- On the day of the examination,the technologist should describe the whole procedure to the patient and obtain written consent from the patient,for permission of the procedure.
- The patient is asked to remove clothing and wear hospital gown.
- The patient is placed in the supine position with an empty bladder on the fluoroscopic table (c – arm unit).
- An intravenous line is inserted into the patient arm.If necessary,sedative medication is given through line to make the patient relax.
- The blood pressure,heart rate,respiration rate,oxygen level and other vital signs of the patient should be monitored during the procedure.Then antibiotics and necessary medications are given to the patient through an IV line prior to the procedure.
- The safety straps fasten on the patient body to make him immobilize and the pulse oximeter is clipped on the patient finger for the measurement of oxygen level.

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- The puncture site of the patient must be cleaned with the antiseptic solution under the strict sterile protocol and draped with a sterile towel.The most preferred insertion site is the right groin area.
- Afterward,local anaesthesia is given at the insertion site.After numbing the area,the cardiologist applies the seldinger technique to access the femoral artery.
- In seldinger technique,a vascular access needle is inserted on a specific angle direct into a femoral artery.When the blood comes out from a needle,then a flexible small guide wire is inserted through a needle.
- After insertion of the guide wire,the needle is removed,and then a sheath is placed over the guide wire.
- After placing the sheath in the femoral artery,the guide wire is removed.

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- After that a catheter with guide wire is introduced through the sheath.The movement of the catheter is monitored by cardiologist and radiologist under the fluoroscopy(c-arm unit).
- Then the cardiologist gently advances the catheter into abdominal aorta through the common iliac artery and slightly insert into the aortic sinuse passing through the aorta.
- After placement of the catheter in the desire position then the iodinated contrast media is injected through a pressure injector into the coronary vessels under the fluoroscopic guidance of the C- arm machine.
- During the administration of the contrast media,the patient is asked to hold his breath.The C-arm machine moves around the patient’s chest and takes images of the aorta and coronary vessels.

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- The radiologist and cardiologist evaluate the blockage,lesions,strictures and other abnormalities under the C-arm fluoroscopy.The fluoroscopic system and video recording system of the C-arm machine gives the real – time images of the aorta and coronary vessels.
- During the examination,if plaque is present in coronary vessels.The cardiologist may be performed balloon angioplasty or stent placement in coronary vessels.
- After completion of the procedure,the sheath and a catheter will be removed,and then the puncture site is closed by pressure dressing.

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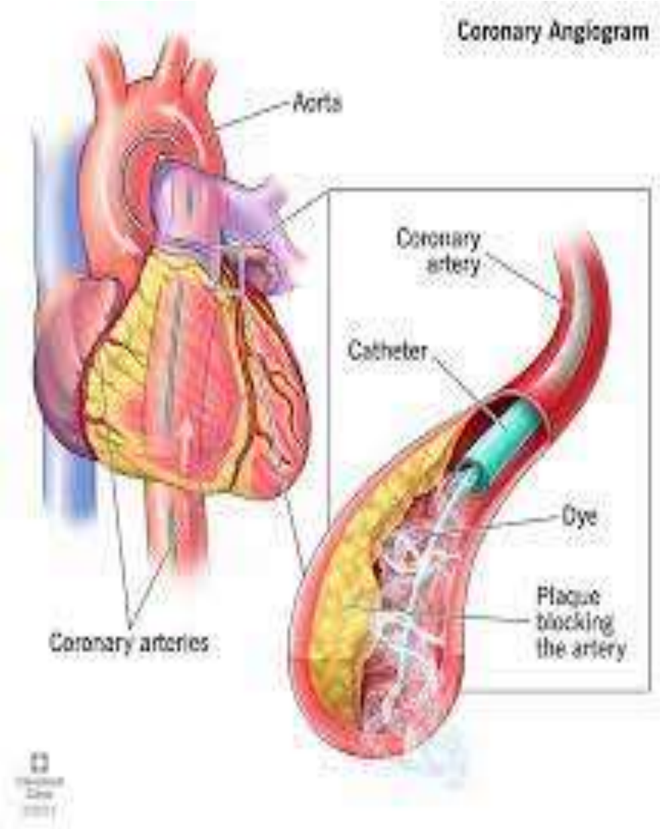
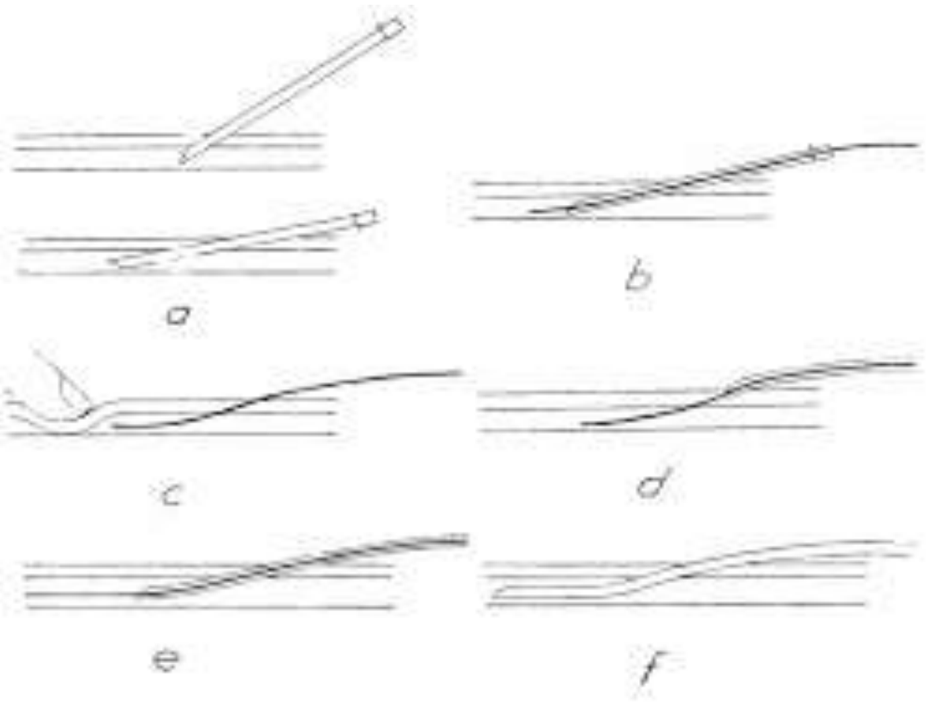
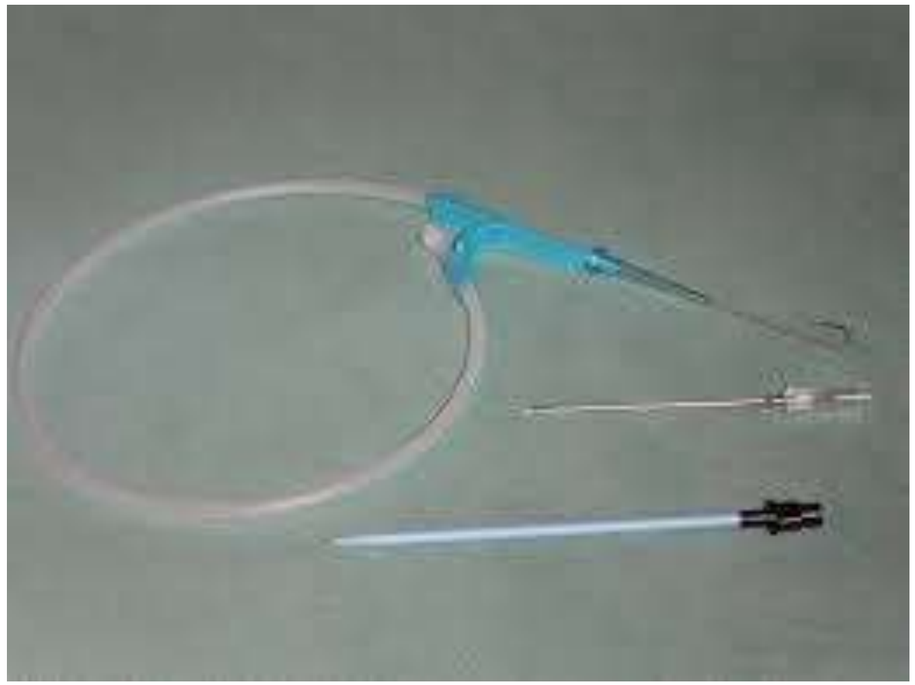

Coronary Angiogram
Aorta
Coronary artery
Catheter
Dye
Plaque blocking the artery
Coronary arteries


POST STENT

Seldinger technique





COMPLICATIONS

- Allergic reaction to the dye.
- Blood clots formation.
- Infection in vessels.
- Injury in the aorta.
- Tear in the artery wall.
- Loose plaque sometimes causes the stroke.
- Internal bleeding due to damage to the artery wall.

AFTERCARE

- The patient should be kept under observation.The blood pressure,heart rate,oxygen level,fluid balance and other vital signs must be monitored.
- Plenty of liquids are given to the patient to prevent dehydration and flushing contrast media out of the body.
- If the vital signs are normal,then the patient is allowed to leave the examination room.

THANK YOU