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Diagnosis of Triple Vessel Disease by Coronary Angiography Right Femoral Percutaneous approach using Contrast Medium - Omnipaque

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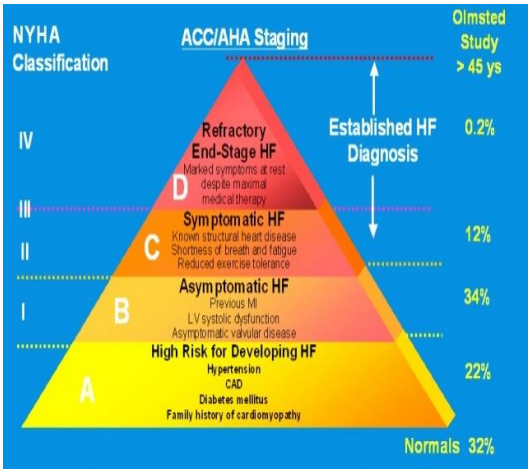
Abstract: **Coronary artery disease (*CAD*) is otherwise called as ischemic *heart* disease, it is primarily occurs in patients above the age of 40, younger men and women also can be involved. Very few of them have shown to have greater than one vessel coronary artery disease. Presence or absence of cardiovascular risk factors regardless of age should be the key factor in making a decision to perform a coronary angiography and full cardiovascular workup. One or more lesions in each of the three major coronary arteries (LAD, CX and RCA) are called as triple vessel disease. We report here 69 old male, known diabetic, presented with complained of chest pain. Troponin I high sensitivity: 2911, ECG taken revealed acute inferior wall myocardial infarction. Echo done revealed minimal hypokinesis apical inferior wall of LV, normal systolic function, LVEF: 59%, Grade I LV Diastolic dysfunction, No mitral regurgitation, aortic valve sclerosis (+) and was ultimately diagnosed with triple vessel coronary artery disease by Coronary Angiography Right Femoral *Percutaneous approach* using Contrast Medium (Omnipaque).**

Keywords: **Acute inferior wall myocardial infarction, Angiography, Right Femoral *Percutaneous approach*, LAD, CX and RCA.**

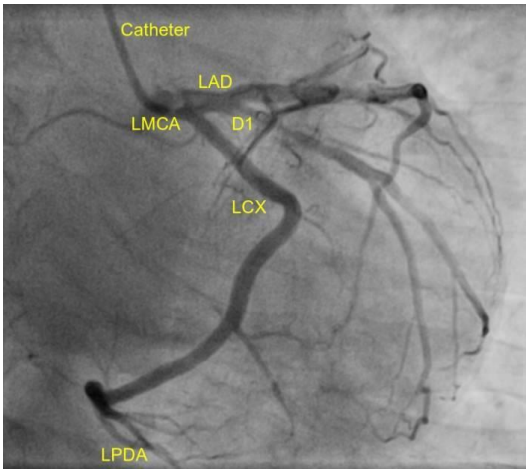
1. INTRODUCTION

A coronary angiogram is a special X-ray test, used to detect a blockage or narrowing of the vessels. This procedure is done to take pictures of the arteries in your brain, heart, and kidneys. During the procedure, the radiologist will inject contrast dye through a small spaghetti-like tube (catheters- small less than ¼ inch incision or puncture) into an artery in your groin or (sometimes) your arm. The small catheter tube is inserted after an injection of local anesthetic around the artery. Occasionally, intravenous sedation is given, after the contrast medium (a special dye) is injected. Omnipaque, imavist, SonoVue and Definity are commonly used contrast material. These contrast materials are used based on the diagnostic procedure, video scanning or photos are taken by using digital X-ray machine.

Heart failure classification



coronary angiogram



CATH-LAB

It is used to determine the diseases of arteries (these take blood to the brain, limbs and abdominal organs) and Veins (these carry blood back to the heart). These diseases may include: Atherosclerosis: furring of the arteries causing them to narrow. Aneurysms: blood vessels that become enlarged with a risk of bursting, conditions causing internal bleeding, amongst many others. A coronary angiogram which helps to visualize the treatment of angioplasty or stent, coronary artery bypass surgery (CABG) or medical therapy. Arteriograms can be applied in different part of the body such as aortic angiography (aorta), cerebral angiography (brain), coronary angiography (heart), extremity arteriography (extremities: arms, legs, hands, and feet), fluorescein angiography (parts of the eye: the retina and choroid), pulmonary angiography (lungs), renal arteriography (kidneys).

Types of angiography:

We currently used the two types of angiography; Magnetic Resonance Angiography (MRA) and Computed Tomography Angiography (CTA). The test is non invasive and a small tube called cannula is inserted into the vein of the hand or arm to allow access to vein; a special dye may be required for certain tests. Sometimes, invasive or conventional angiographies are needed.

Magnetic Resonance Angiography (MRA):

MRA is a scan which uses powerful magnets, radio waves and computers to generate images (MARACAS image-processing program software) of the body. To get the best glimpse of the blood vessels, it is usually needs to give some contrast dye into your vein at the time of the scan. The scanners have a broad range of tube which you lay inside on a scan table. The table moves through the scanner to take images of your body but the scanner is quite noisy, so you will be given a headset and will be offered some music to listen. Some people feel claustrophobic (irrational and intense fear) in the scanner, but most manage with little or no problem. The specially trained radiographer's who perform the scans are always available to help and give the reassurance. The scan takes about 15 - 20 minutes. Most advantage of MRA is that it doesn't use x-rays, which may be important if you are younger and multiple follow-up scans for your condition, it means that you are not supposed to expose the radiation which can be precarious if you required higher number of tests. As MRA scans use strong magnets, many people are not suitable to have this test. You should not have this test if you have a single-chamber pacemaker or dual-chamber pacemaker. If, you have any metal device or retained metal fragment inside your body you must make sure that you have told the doctor looking after you.

Computed Tomography Angiography (CTA):

A CT scanner looks similar to an MRI scanner, but the tunnel you pass in to for the scan is much shorter (the scanner looks like a doughnut). You also pass in and out of the scanner far more quickly than MRA and so it can be better for people who are quite claustrophobic. The scan takes no more than 5 - 10 minutes and it can be performed as an outpatient. CTA uses X-rays to get the pictures required and it is necessary to give contrast medium to light up the blood vessels. This scan is useful for people who are unable to have an MRA. Detection of coronary artery disease through Computed Tomography (CT) Scanning method is shows the better view and angle than Magnetic Resonance Imaging (MRI). The sensitivity and specificity between CT and MRI were (97.2 percent and 87.4 percent) and (87.1 percent and 70.3 percent). Multi slice CT scan is more commonly accepted, it is widely available, preferred to patients economic and multi slice CT scan have shorter breath-hold time than MRI.

Coronary Calcium Scan:

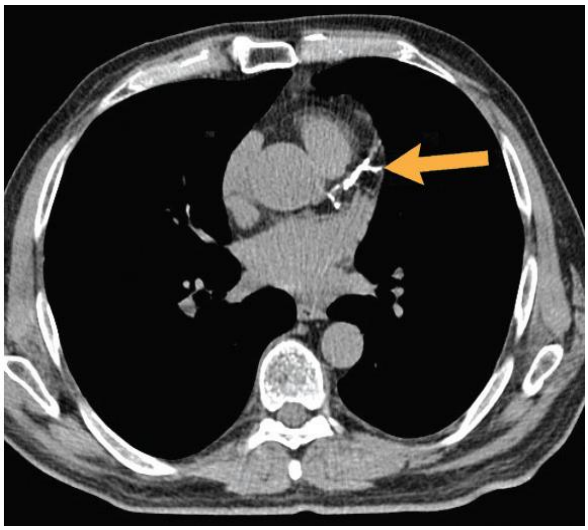
Coronary Calcium Scoring or Heart CT Scan is a simple, painless test to measure your risk of heart function and disease. Using state-of-the-art computed tomography (CT) imaging, we can find out the hard plaque you have in your coronary arteries. The CT machine is designed to not be claustrophobic and low dose of radiation. Calcification in the coronary arteries is the earliest indicator of coronary artery disease. The 128 or 320 slice (dual-source) CT scan machine complete a 10-minute test that produces a calcium score demonstrates the level of calcium deposits in patients. After taking into medical history, common information of patient's details like age, gender, cardiac risk factors and a calcium score is a strong measurement for the risk of coronary artery disease. Women above the age of 55 and men above the age of 45

observe the coronary calcium scan, especially if they have any following coronary artery disease risk factors: family history of heart disease (genetic factors), high cholesterol level (hypercholesterolemia), high blood pressure, Smoking, Obesity, diabetes, high-stress lifestyle and no regular exercise. The final document report contains observation from medical history of the patients, level of cholesterol and scanning of coronary calcium scoring. These results will determine the patient's potential of having early coronary artery disease or significant coronary artery disease, as well as risk for cardiac events. The result of this test is usually given as a number called an Agatston score. It is represents a combination of information that reflects the total area of calcium deposits and the density of the calcium. The score ranges between 0 and 1000 Agatston units.

Agatston Score

Coronary Calcium Scan

Calcium Score Guidelines		
Total Score	Plaque Burden	Risk Category
0	None	Very Low
1 - 10	Minimal	Low
11 - 100	Mild	Moderate
101 - 400	Moderate	Moderate High
Over 400	Extensive	High



Normal | Moderate Calcification | Severe Calcification

Conventional Angiography:

Digital Subtraction CT Angiography or Conventional angiography is an important diagnostic tool, but due to improvement in MRA and CTA it is now performed much less. It is one of the most important examinations in the diagnosis and treatment of blood vessels. It is an invasive test so there are some risks correlated with in it than the non invasive tests. We still use a conventional angiography; it is used to create the road map of blood vessels.

Digital Subtraction Angiography:

Classification of Applications of Coronary Angiography:

In considering the use of coronary angiography in specific disease states, the following classification is used throughout this report: Class I: Conditions for which there is general agreement that coronary angiography is justified. Class I explanation should not be taken to mean that coronary angiography is the only adequate diagnostic procedure. Class II: Conditions for which coronary angiography is regularly performed, but there is a discrepancy of opinion with respect to its confirmation in value and suitability. Class III: Conditions for which there is common concurrence that coronary angiography is not routinely explained. Specific cardiac disease that is observed under the following division: known or suspected coronary heart disease, atypical chest pain, acute myocardial infarction, valvular heart disease, congenital heart disease and other conditions.

Microangiography:

Microangiography is a powerful tool which is used to visualize the blood vessels by applying of contrast medium.

Risks associated with an angiogram:

A conventional angiography is a safe procedure; it is more invasive than MRA or CTA with high complication risks. The amount of radiation are exposed highly, depends on the number of images taken and investigated the body part, little chances for the development of cancer in the long term from the radiation, In case you are taking some medications. These include anticoagulants (blood thinning medications) and diabetic medication or a known kidney disease and allergic reaction from the dye. The nausea, vomiting, dizziness itching, sneezing, hives bleeding or injury at the site of an injection, blood clot in the wall of blood vessel or a weakness of the blood vessel wall are associated with risk factors during the angiogram treatment. If you are concerned with risks, talk to your doctor before the observation**.**

Types and Clinical Nature of Contrast Medium:

Product Name	Clinical Nature	References
Imavist (AF0150)	Perfluorohexane and nitrogen gas in stabilized microbubbles	Vera Paefgen et.al., 2015
SonoVue (BR1)	Sulphur hexafluoride gas in polymer with phospholipids	Brown AS et.al., 2004
Definity (DMP 115)	Fluorocarbon gas in liposomes Albunex Air-filled protein shell	Kenneth T.et.al., 2006

Optison (FS069)	Octafluropropane-filled albumin microspheres	Jarl A. jakobsen et.al., 2001
Levovist (SHU 508A)	Galactose-based, palmitic acid stabilized air-bubbles	A. L. Baert et.al.,2006
Echovist	Galactose-based gas bubbles	W Norman McDicken, et.al., 2011
Omnipaque	non-ionic, Galactose-based gas bubbles, monomeric, triiodinated X-ray contrast medium	Eun-Ah Park, et.al.,2016

Diagnostic vs Guide Catheter:

Diagnostic Catheter	Guiding Catheter Wire
Engage Coronary Arteries	Conduit for device & Wire
Pressure Assessment	Support of equipment
Coronary Angiography	Injection of Contrast
	Pressure measurements
	Angiographic Assessment

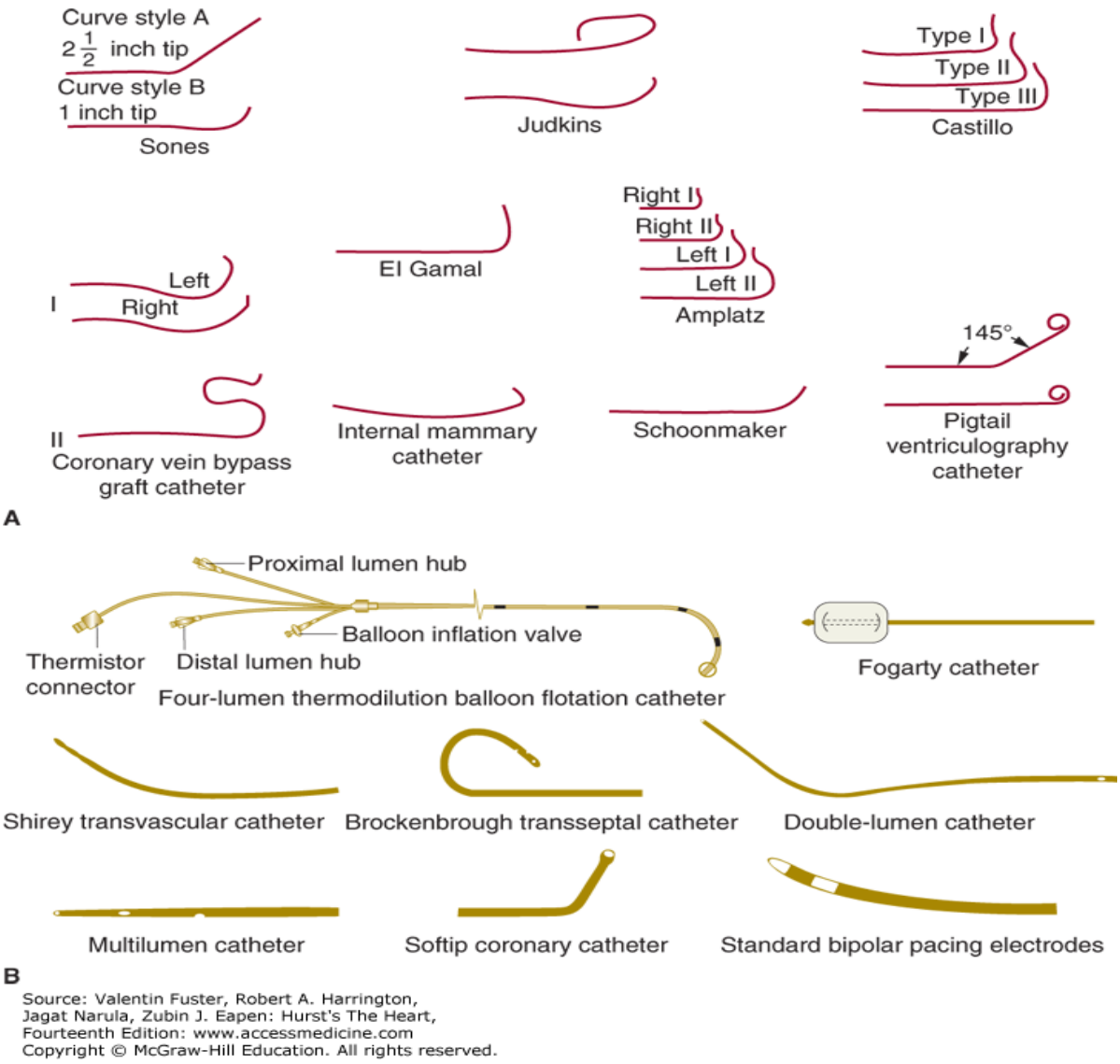
Guiding catheter's size in practice left system:

S.NO	AL Curve Amplatz Curve	XB curve	JL Judkins left	Q curve	VL curve Voda left
Normal	AL1	XB 4.5 or 3.5	JL 4.0	Q 4.0	VL 4
Dialated	AL2	XB 4.0 or 4.5	JL 4.5	Q 4.5	VL 5
Narrow	AL0.75	XB 3.0 or 3.5	JL 3.5	Q 3.5	VL 3

Guide catheters Compatibility with devices and techniques:

Catheter Size	Devices	Techniques
5 Fr	Balloons < 5 mm Stents < 4.5 mm IVUS Rotablator 1.25 mm	No Kissing Balloon
6 Fr	All Coronary balloons All Coronary stents Cutting Balloon Rotablator < 1.5 mm CSI Orbital atherectomy 1.25 mm Protective device Guide liner	Kissing Balloon
7 Fr	JoStent Rotablator 1.75 mm Guideliner Trapping balloons	Simultaneous Kissing Stent
8 Fr	Rotablator 2 mm Guideliner Trapping balloons	Trifurcation stenting

Different types of Catheters:



Source: Valentin Fuster, Robert A. Harrington, Jagat Narula, Zubin J. Eapen: Hurst's The Heart, Fourteenth Edition: www.accessmedicine.com

2. METHODS

Preparation for an angiogram:

You will usually be admitted to hospital as a day patient for this procedure. Bring your clinical biochemistry report, ECG report, ECHO cardiogram report and chest X-ray report with the radiology staff as the doctor may need to look at them. The radiology staff or cath lab senior technician will tell you when these are ready to be picked up, wear comfortable, loose clothing, leave all valuables things at home You may be asked not to consume food for four hours before the angiogram but allowed to drink the clear fluid such as tea, black coffee, clear soup or water during four hours before the angiogram. It is important for your kidneys to have fluids.

Coronary Angiography Right Femoral Percutaneous Approach:

The catheterization of coronary angiogram or angioplasty performed in various ways; transradial approach, percutaneous transfemoral approach or brachial approaches (Kwac et al. 2010). Importance and Preferences of these approaches are based on the utilization of particular access sites is varying from different centers. The right transfemoral approach is better than transradial approach, because of the large artery diameter, possibility to insert larger arterial sheaths or catheters and bulkier devices. Femoral approach is most common and easy access for the operator. The main detriment is the time-delay after the angiography and before mobilizing the patient. Femoral pulse is palpated first and applied the local anesthesia. The puncture of the femoral artery is implementing 2 cm below at the inguinal ligament of *punctum maximum*. The inguinal ligament is attached in between a spina *iliaca anterior superior* to the pubic bone. It makes easy

for the anatomical location. The obese patients contain overlapping skin crease, the less experienced operators prone to puncturing too distally, Puncture via the ligament and difficult to make the haemostasis. The firm structure of ligament which precludes adequate pressure against the artery.

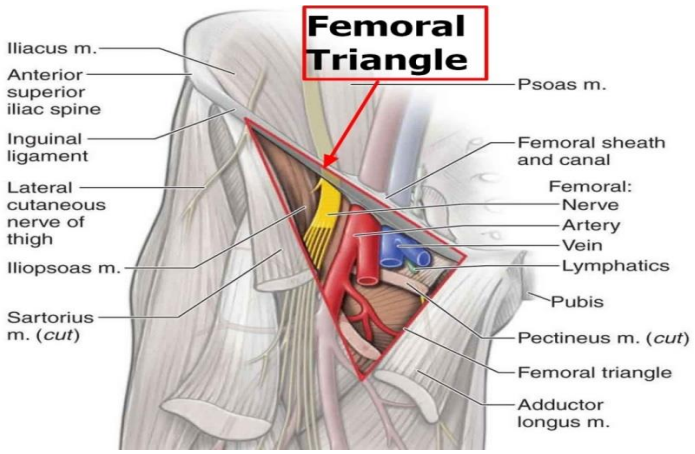
Comparison of Femoral and Radial Access for Cardiac Catheterization

Feature	Femoral	Radial
Access site bleeding	3%- 4%	0 %- 0.6 %
Artery complications	Pseudoaneurysm, retroperitoneal bleed	Rare local arteriovenous Fistula, painful hematoma irritation, pulse loss 3%-5%
Patient comfort	Acceptable	Great
Ambulation	2-4 hrs	Immediate
Extra costs	Closure device	Band
Procedure time	Perceived shorter	Perceived longer
Estimated radiation exposure	Perceived shorter	Perceived longer
Access of left internal mammary artery	Easy	Difficult from right radial artery
Use of artery for CABG	N/A	Unknown
Learning curve	Shorter	Longer
›8-F guide catheters	No problem	Maximum 7F (in men)
Peripheral vascular disease, obese	Problematic	No problem

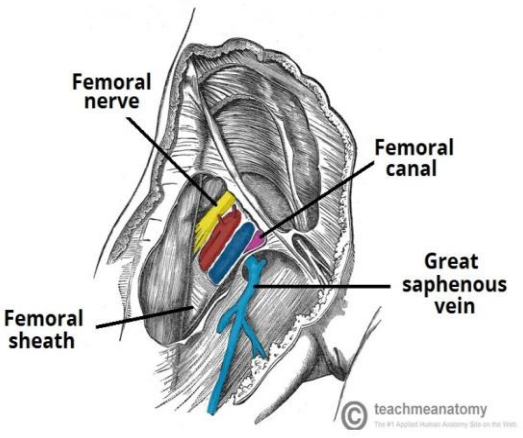
Performing the coronary angiography:

The coronary diagnostic catheter is placed through Femoral Sheath into a peripheral artery and farther reached up to the aorta. There are many guidewire are available today, it is based on the structure, length, coatings, diameter, tip structure and shape and materials. The guide wire should not be used through the needle, because of the possibility to damage. The coronary angiography hydrophilic coating catheter is advanced the catheter; the proximal part of the J-wire has to be visible on the outside of the catheter and secured by the operator's hand as to avoid embolization of the J-wire into the patient's circulation. That would require an emergency vascular surgical procedure to remove the J-wire from the patient's aorta. The Fluoroscopy X-ray guidance helps to support the guide wire tip in the ascending aorta and into the aortic root. The catheter is reached into valsalva sinus of the aorta and withdrawn the guidewire from the catheter in place; finally, outside portion of the catheter is connected to manifold.

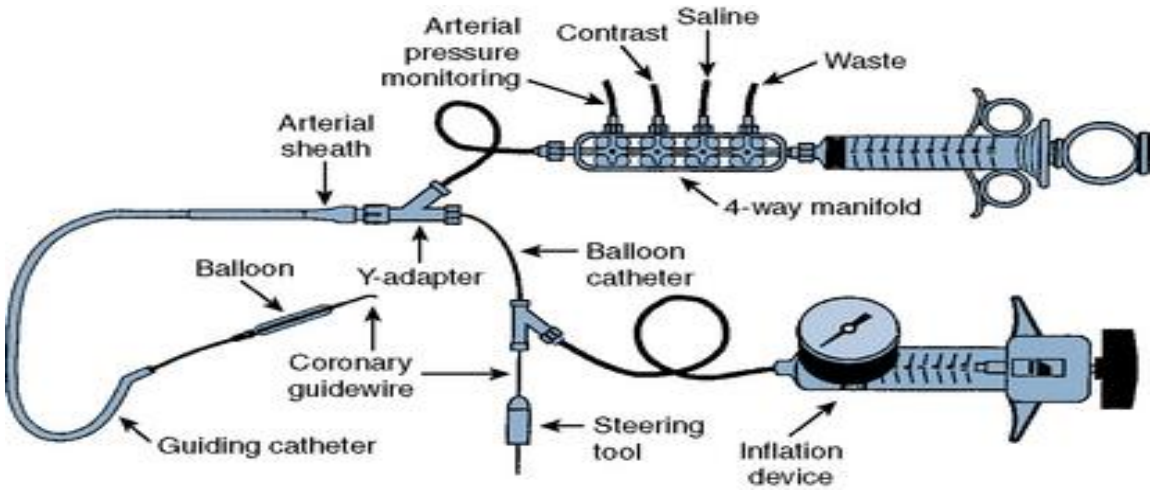
Percutaneous Coronary approach



Femoral Sheath



Basics of Percutaneous Coronary Interventions



The manifold is connected on the other side of the syringe (or an automated injection-device) for radio contrast application, and on its secondary arms to the saline infusion, to the transducer for invasive blood-pressure monitoring, and to a radio contrast container from which radio contrast materials is taken into the syringe. Through the manifold, the angiography specialist controls the contrast material injection, blood pressure, injections of heparinized saline if necessary, etc. To make sure that there is no air or clot within the coronary catheter, a syringe is connected to the catheter to aspirate and discard at least 5 ml of blood. This is almost accurate volume of the catheter lumen.

Some angiography specialist gives an important to bleed back from a catheter, after which the catheter is connected to the three-port manifold. Through the femoral arterial sheath and above the guide wire, the first coronary diagnostic catheter is placed into the artery; observe the proximal end of the wire from the outside of the catheters allow to connect the manifold by fluid against- fluid method. This way use to connecting the catheter in to manifold and avoiding the air embolism from the air bubbles within from the catheter or from within the manifold.

Left coronary artery engagement:

The left coronary artery catheter is placed in to percutaneous femoral sheath and reached up to coronary ostium under the X-ray fluoroscopic guidance to take several recordings. The 6 Fr catheters are used in left coronary artery engagement but sometimes 4 Fr to 8 Fr catheters are used. Judkins catheters is most commonly used in diagnostic of coronary heart disease, two types of Judkins catheters namely JL4 for the left and JR4 for the right coronary artery. Judkins catheters are unfolded in the ascending aorta at the *en face surface* position. The left anterior oblique (LAO) 50° is a proper view to see the left and right coronary ostia and sinus of Valsalva aortic root are not superimposed on either of the coronary ostia. Anteroposterior (AP) position of left coronary artery (LCA) is not recommended because it is not properly shows the ostium position and ostial Left Main Coronary Artery (LMCA) stenosis. For engagement of the LCA, the J-wire is advanced to the level of aortic valve. Then, the JL4 catheter is placed as low as possible facing the left coronary ostium. Slowly withdrawn the guidewire, catheter tip is previously located in the LMCA or just below it. Some angiography specialist fears about this method, so they prefer to leave the catheter tip above the level of the left sinus of Valsalva. Catheters tip is allow reaching up to the level of ostium but not within the ostium itself. Catheter is easily inserted into the ostium by a clockwise or counter-clockwise torque. The injected contrast medium reached up to the expected location of the coronary ostium and shows the catheter tip position within the aortic root and made the cannulation process. JL5 or JL6 catheters are used to view the dilated aorta with a small individual or aortic arches. The left coronary artery is cannulated by using JL3.5 or even JL3 catheters and taken the multiple recordings.

Right coronary artery engagement:

The left coronary artery are recorded by luminograms method, remove the catheter and another right coronary artery (RCA) catheter is inserted through the femoral sheath reached into the aorta and extended up to the right coronary ostium in a LAO standard position. The right coronary catheter with a tip is reached to ascending aorta. Then, guidewire is removed; the catheter is aspirated and connected to manifold. An advanced catheter JR4 is inserted through the aortic root, 2 cm overhead the valve level. The angiography specialist are administered a clockwise rotation with some traction to the catheter. The catheter is rotated slowly using the rotation swivel and should be reduced the torque, so that there is

no overshoot of the catheter over the right coronary ostium. In-case, 1st rotation is not successful in cannulation of the artery; the catheter should be rotated counter-clockwise to the position and make sure that avoid the kinking of the catheter. Amplatz left (AL) 1 or 2 coronary catheters which are used to perform the selective cannulation of RCA. The multipurpose (MP) catheter is used in right coronary artery ostium reached at oriented straight downwards position. In contrast, the shepherd's crook (SC) catheter or internal mammary (IM) catheter used to reach the right coronary artery ostium oriented upwards position.

Contrast injection technique:

The radio contrast injection materials are taken without any air-bubbles inside of the syringe and this contrast material was injected into the patient's coronaries. The air components of the bubble are made up of nitrogen, oxygen and carbon-dioxide molecule. These air components are dissolved in the blood. The angiography specialist must previously make sure that there are no air-bubbles inside of the syringe.

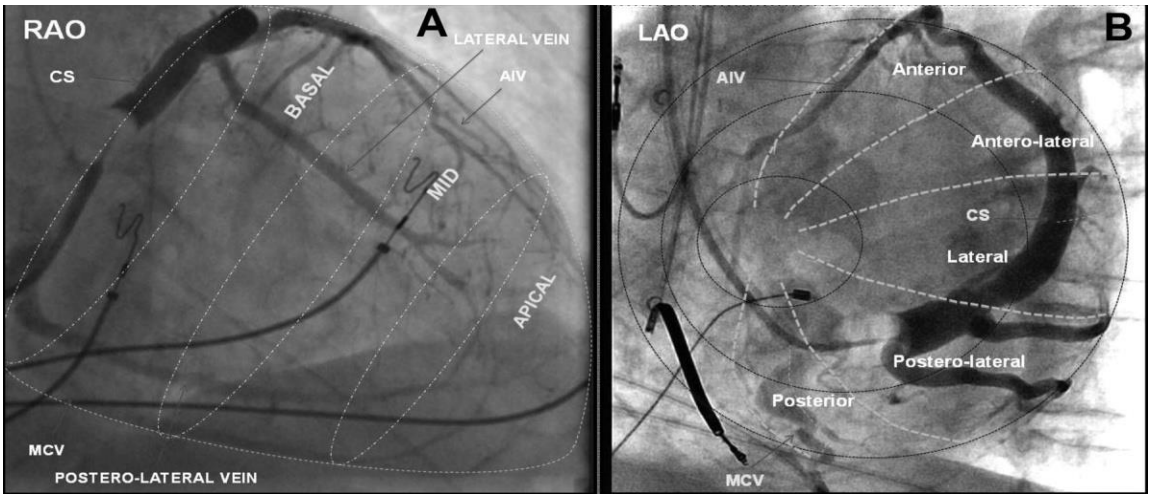
Pressure damping:

The cannulation of the coronary artery ostia, the operator must be taken a special care to monitor the blood pressure. The blood pressure is suddenly reduced which may leads to ventricular fibrillation and cardiac arrest. Damping is evident by a reduction in the aortic pressure of the aortic root occurring when the catheter is inserted in the coronary ostium, lead for the removal of systolic and diastolic waveforms. Pressure damping, otherwise, known as ventricularization. The aortic pressure damping occurs during the coronary artery engagement; removal of the catheter immediately is the best way for avoiding pressure damping (Conti et al. 1980). Repeated the cannulation process again carefully continue with administration of nitroglycerin, if pressure damping occurs again, the angiogram can be rapidly recorded, and the angiography specialist must remove the catheter immediately.

Coronary anatomy and the purposeful angiographic projections:

The coronary arteries are three-dimensional structure, X-ray image is two dimensional. Coronary luminograms are applied to measure the length of vessel and lumen diameter. The projections are defined according to the angle view of the digital flat panel radiography detector, or C-arm image intensifier or x-ray image intensifier, these devices made up of twelve tubes. The image intensifies are characterized by depending on the application of cardiac angiography. X-ray tubes are located under the cardio angiography table.

RAO and LAO standard angle view



The standard angle view and additional projection view are studied from the combination of antero-posterior (AP), cranial, caudal, left or right lateral, and left or right anterior oblique (LAO and RAO, respectively). The posterior oblique positions are used rarely in diagnostic of coronary angiography. Regularly, used eleven positions at varying angles are: AP, AP-cranial, AP-caudal, left lateral, right lateral, RAO (right anterior oblique), RAO-cranial, RAO-caudal, LAO (left anterior oblique), LAO-cranial, and LAO-caudal. These views are characterized by angles to cranial (or) caudal and left (or) to right angle. These angles are differs from the patients' anatomy, coronary anatomy, position of the heart.

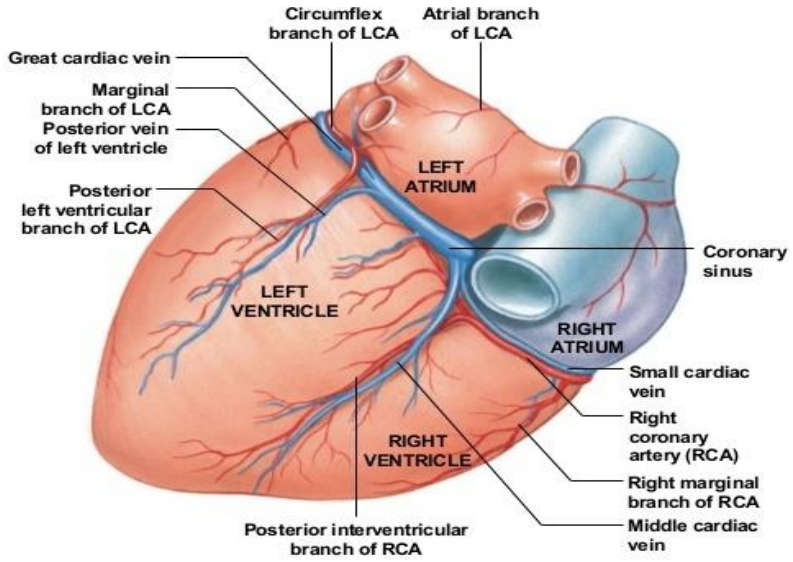
Coronary system, standard and additional projection:

Coronary System	*Standard Projections*	*Region of Interest*	*Additional Projections*	*Region of Interest*
Left coronary artery	RAO 20°-CAU 20°	Left main, proximal LAD, proximal LCX	PA-CAU 40°	Left main, proximal LAD, proximal LCX
	RAO 10°-CRA 40°	Mid and distal LAD, diagonals	RAO 35°-CAU 35°	Left main, proximal LAD, proximal LCX
	LAO 45°-CRA 15°	Mid and distal LAD in orthogonal plane	RAO 40°-CRA 40°	Mid and distal LAD
	LAO 45°-CAU 35°	Left main, proximal LCX	LAO 90°	Mid and distal LAD
Right coronary artery	LAO 45°	Proximal and mid RCA	LAO 90°	Proximal and mid RCA
	LAO 10°-CRA 25°	Distal RCA, bifurcation into PDA and posterolateral branches		
	RAO 30°	Mid RCA		

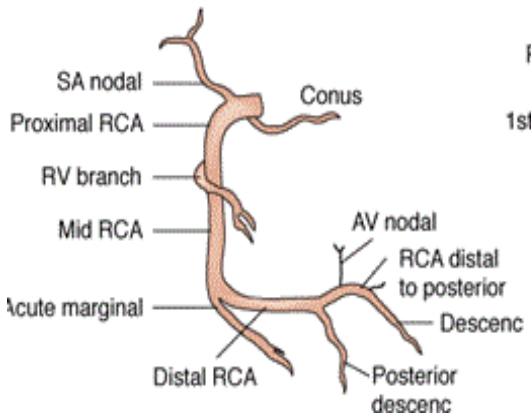
LAD = left anterior descending artery; LCX = left circumflex; RCA = right coronary artery; PDA = posterior descending artery; LAO = left anterior oblique; RAO = right anterior oblique; CAU = caudal; CRA = cranial.

Radiological coronary anatomy:

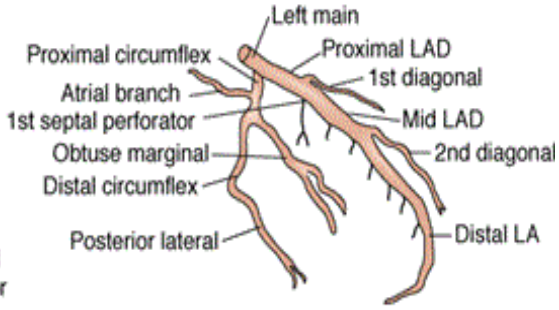
Anatomy of coronary artery



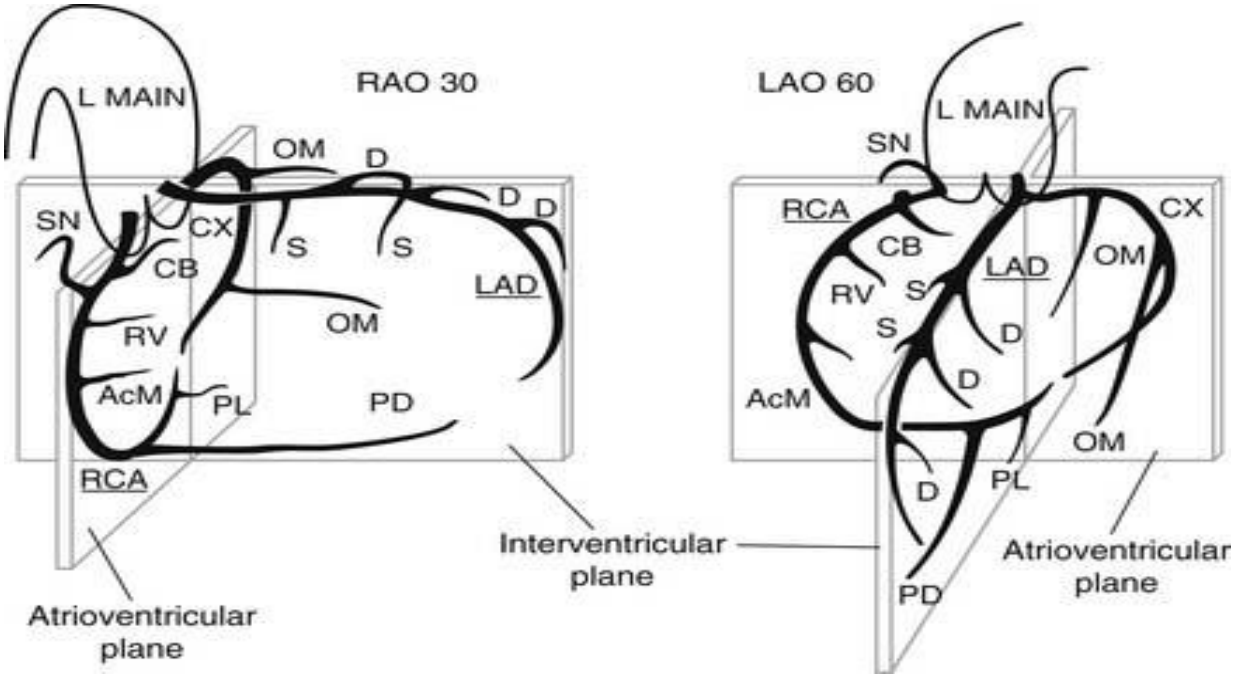
Right Coronary Artery



Left Coronary Artery



Left coronary artery is a more complex structure than RCA, it is usually contains 4-5 projections. The LMCA is a small artery with different length, usually bifurcating into the left anterior descending (LAD) and left circumflex coronary artery (CX). LMCA is short but rarely LMCA is longer than 2 cm. It usually gives rise to D-1 and D-2 diagonal branches, sometimes they may also differ. Diagonal branches are located on the left anterolateral surface of the heart. The septal perforator is raised from LAD. The first septal perforator is large. It creates the border line between the proximal and the mid portion of the LAD. The distal portion of the LAD is the distal 1/3 of the vessel, and has no specific landmark as to define it against the mid part. It is important to note the largest septal branch if the patient is to be subjected to alcohol septal ablation for hypertrophic obstructive cardiomyopathy.



The circumflex artery (CX) is located in the atrio-ventricular (AV) groove from the left surface of the heart. It is developed in to number of atrial branches. The marginal branches are most important, it is located on the *Margo obtusus cordis*, there are OM-1, OM-2, and OM-3, but their number can also vary individually. Marginal branches play an important role in the coronary bypass grafting. The CX artery is a non-dominant. Blood supply of both LAD and RCA are very longer and more important than the CX. The right coronary artery (RCA) is located in the ostium position. It is a rise to conus branch and sinoatrial node artery (second proximal branch). The RCA follows on the right-side of AV-sulcus and rise to a right-atrial branch. One or two acute marginal branches are developed from the right-atrial branch and positioned on the *Margo acutus cordis*. Posterior right ventricular branches are developed from RCA. The RCA is divided into the PLA and PDA. RCA is dominant, commonly used for the diagnosis of Coronary Atherosclerosis. Small branches are located in the PLA and PDA, e.g., the posterior septal perforators developed from the PDA. In the crux region, the AV node artery developed from the RCA and allow vertically upwards. This region of RCA play important, role in diagnosis of ischemia can be associated with heart block.

The best projections for evaluating the left coronary artery:

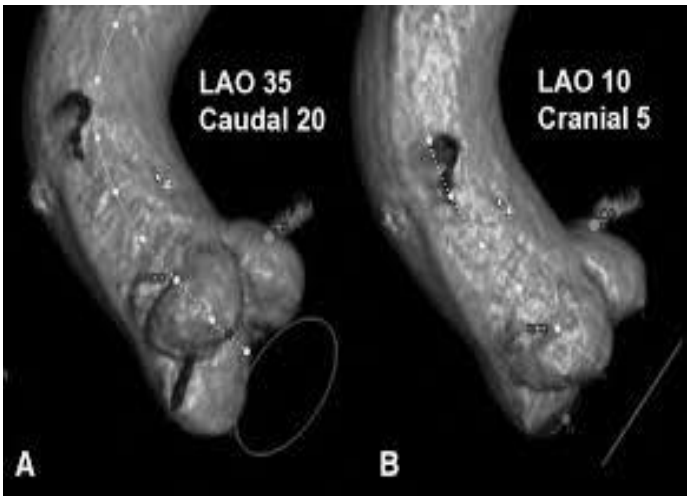
Left caudal view (LAO-caudal or "spider") view is better for the calculation of the LMCA. LAD and CX are bifurcated from LMCA or sometimes LAD, CX and intermediate branch are trifurcated from LMCA (Di Mario and Sutaria, 2005). Interventionalists apply the catheters wire in the LAD or CX, the mid and distal segment of the LAD are recorded on the digital screen to view the diagonals and septal region which helps to show the ostia of high marginal branches. It is done in 25-40º caudal and 30-50º to the left. Left cranial (LAO-cranial) angle is excellent for observing the ostium of the LMCA. Cranial (AP-cranial) projection exhibit the ostium of the LMCA is corresponding to the LAO-cranial view (Di Mario and Sutaria, 2005). The operators use the proximal LAD view because, interventions and evaluation of the proximal LAD better than AP-cranial. Overlapping of the CX is too distracting.

The viewings of CX are confusing for the new operator, particularly from the proximal and mid segments. Caudal (AP-caudal) is a nice projection for the calculation of the LMCA to view the ostial LAD and entire CX, but if it is dominant,

distal portions of the CX. Caudal (AP-caudal) is a nice projection for evaluation of the LMCA to view the ostial LAD, and the entire CX. Some operators' prefers to apply the guide wire to the marginal branches in RAO-caudal, sometime the marginal ostia regions are overlapped with the main course CX. AP-caudal is excellent projection for the calculation of CX entirety with marginal ostia. It is commonly good for treating trifurcation lesions on LMCA + LAD + CX, along with the spider-view. CX is anatomically dominant; the cranial projections view is good. Right, cranial (RAO-cranial) projection applies to perform the cranial angulation of 30º or in some cases even more. Right, caudal (RAO-caudal) view is excellent for evaluating the distal LAD. In many cases, proximal LAD and mid part of the LAD are overlapped with diagonals segment. RAO-caudal projection view supported to study of the CX artery. Today, Pure RAO is rarely used but Pure LAO commonly. Cannulation of both LCA and RCA done by LAO but is not useful in calculating LCA or its branches. Straight AP is also not an ideal projection for calculation of the LCA.

The best projections for evaluating the right coronary artery:

An angiography specialist are considered that two projections can be perfectly enough for calculation of the RCA. The RCA is less complicated structure compared with LCA, The RCA can be viewed in LAO 45º, LAO 10º and RAO 30º projection angle. But LAO-caudal view is better view than LAO cranial.



The LAO-cranial views show the better proximal and distal RCA. This method is good for the crux, PLA and PDA observation (Di Mario and Sutaria, 2005). PDA is also quietly viewed in AP-cranial. The crux, PLA and PDA are viewed at 5-10º angulation from the right side.

3. RESULTS AND DISCUSSIONS

Presenting complaints:

69 years old male, known diabetic, presented with the complained of chest pain.ECG taken and revealed acute inferior wall myocardial infarction, admitted for the further management.

On examination:

Patient conscious, oriented and a febrile.

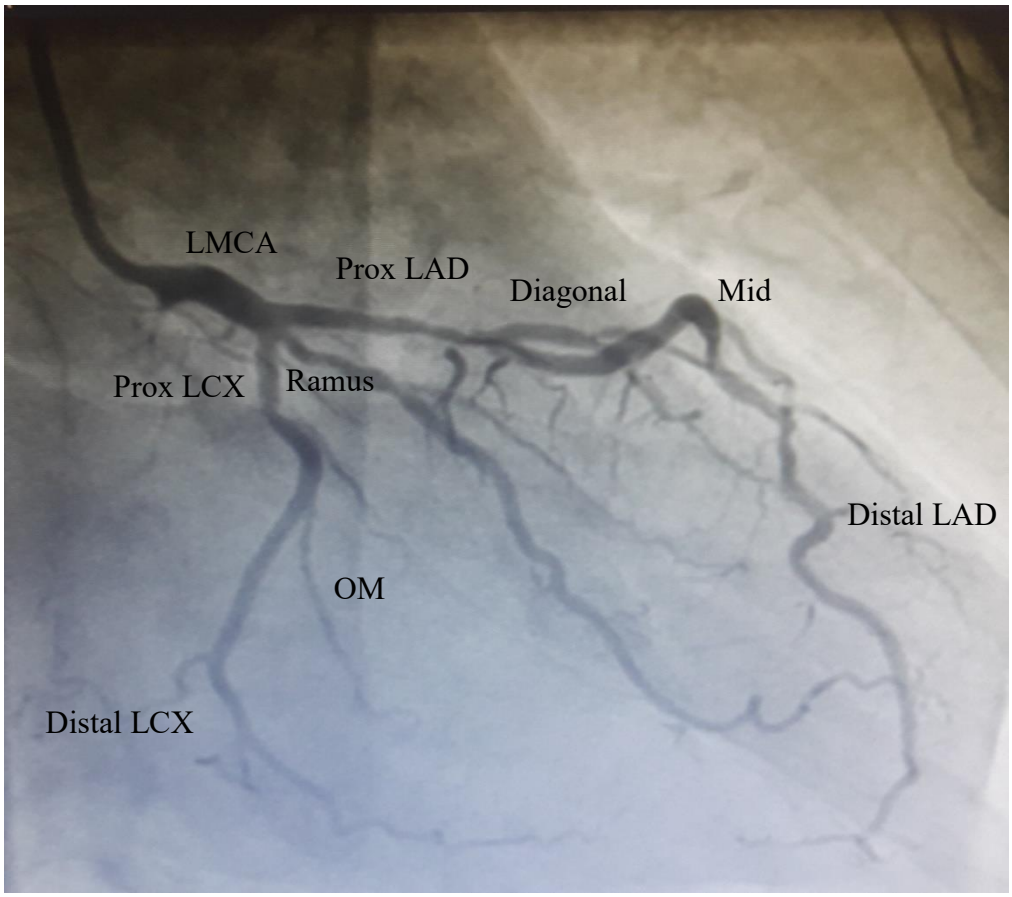
Physical examination:

BP: 130/90 mm Hg, pulse: 62/min, Temp: 98.6 ºF.

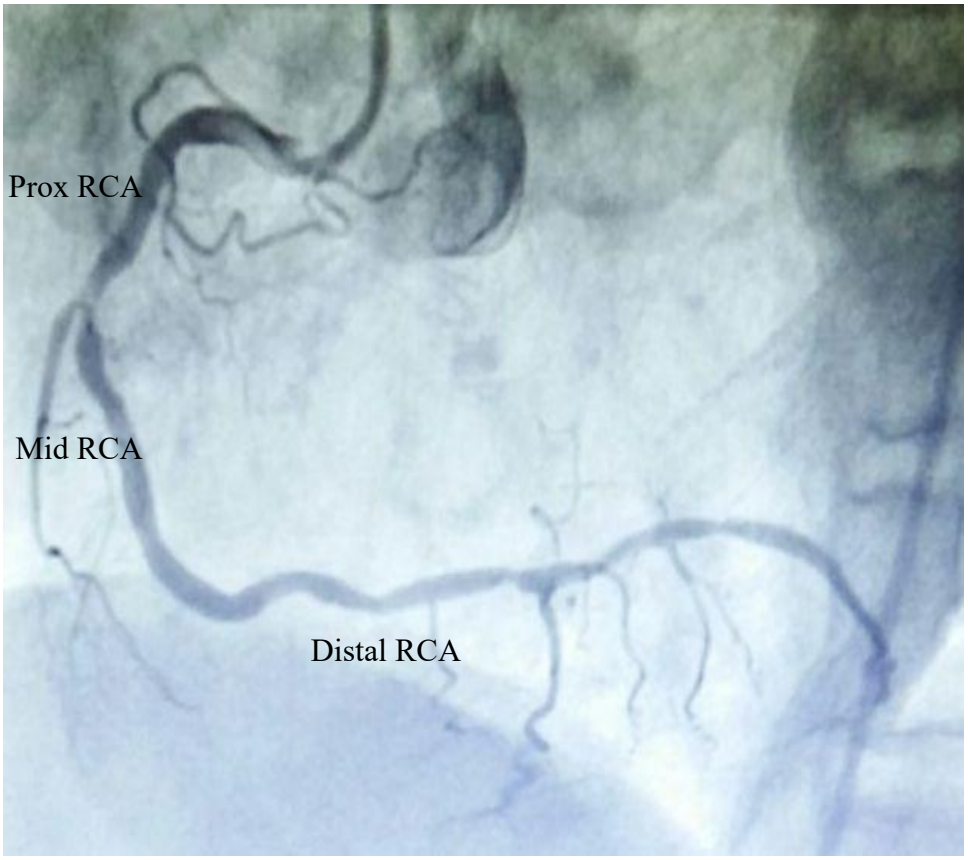
Coronary Angiogram Report:

One or more than one lesion was observed from the left Coronary arteries lesions and Right Coronary arteries. Snapshot of the conventional digital X- rays showed the Proximal LAD, D1, Proximal LCX, Proximal RCA, Mid RCA, Distal RCA and PLV were recorded and display on the digital screen.

Coronary Angiogram: Left Coronary Arteries



Coronary Angiogram: Right Coronary Arteries



Diagnosis	CAD/ Infereier Wall MI .Good LV function.
ECHCO Cardiograph	Good LV Systolic Function EF :55%
Procedure	Coronary angiography right femoral percutaneous approach
Contrast	Omnipaque 50 ml. Fluro time :5.1
catherization	6F Femoral Sheath 6F JL 3.5 6F JR 3.5
LMCA	Normal
LAD	LAD type III,Proximal LAD shows 10%to 20% plaquing followed by 80 % to 90% long lesion astride D1 origin shows 60% lesion
Ramus	Proximal 10% to 20% Plaquing followed by 70% lesion
LCX	Proximal LCX 30% lesion
RCA	Dominant.Proximal RCA shows 20% lesion.Mid RCA shows 70% to 80 % lesion. Distal RCA shows 60% lesion.PLV shows 40% to 50% lesion
Impression	Triple vessel disease
Treatment	CABG/ PCI
CVS(cardiovascular system lub-dub)	S1S2(+)
RS respiratory system	Bae means bilateral entryBAE(+),NVBSnormal vesicular breath sound
P/A	SOFT,BS(+)
CNS	NFND

4. CONCLUSION

An angiography is a right and excellent tool for diagnosis of heart disease. Conventional angiography gives better images than another angiography. Triple vessel disease were identified and recorded the Snapshot were visualized from conventional digital angiography and cardiologist suggested him to proceed for the further cardiac surgery treatment coronary artery bypass grafting.

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