

Al-Nahrain university
College of medicine
Department of medicine



كلية الطب
جامعة النهرين
تأسست عام ١٩٨٧

Frequency of indication of coronary angiography in Al-Kadhimiya teaching hospital

A graduation research submitted to the department of medicine at Al-Nahrain University college of Medicine in partial fulfilment for the degree of M.B.CH.B

Prepared by :

Muslim Aqeel Dawood

Under supervision of:

Dr. Moayed Basheer Al-Rekaby

Lecturer at Al-Nahrain medical college

Senior cardiologist / Al-IMammain Al-Kadhymain Medical city

Dedication

This work dedicated to

My mother:

A strong and gentle soul who taught me to trust in Allah , believe in hard work and that so much could be done with little.

My grandmother :

For being my first teacher .

My father :

For earning an honest living for us and for supporting and encourage me to believe in myself .

My love and my wife "lofty" :

Who support me and helping me in every thing who taught me to laugh inspite of the hard life. My special teacher

My teachers :

People , who never forget them , never forget their words

Acknowledgment

I would like to express my gratitude for my supervisor, Dr. Moayed Basheer for his continuous support, valuable guidance and close supervision during the entire period of this study.

My sincere gratitude and thanks for the attending doctors and specialists in the angiography unit at Al-Imamian Al-Kadhimiyyain Medical City for their cooperation and much appreciated help.

Finally, I would like to thank all the patients who agreed to be enlisted and participate in this study.



List of content

Index :

content	Pages no.
Index	3
List of tables and figure	4
Abstract	5
Abbreviation	6
Introduction	7
Aim of study	14
Patient and method	15
Results	17
Discussion	21
Conclusions	22
References	23

List of figures and tables

- Figure (1) shows atherosclerotic plaque page 7
- Figure (2) show the right coronary artery and its branches.... Page 10
- Figure (3) the frequency of indication of study sample in Al-Imamain Al-kadhmain teaching hospital . page 17
- Figure (4) the percentage between smoker and non-smoker patientspage 18
- Figure (5) the percentage of gender distribution in study sample.. page 18
- Figure (6) show the age distribution of study sample. Page 19
- Figure (7) the numbers of patients who have previous cardiac condition . page 19
- Table (1) show the frequency and mean age of each past medical history condition . page 20

Abstract

Introduction

The incidence of coronary artery disease (CAD) has increased in alarming proportions in our country. We conducted this study to analyse critically the data of CAD patients at our hospital, so as to effectively screen high risk cases and plan percutaneous coronary intervention accordingly.

In this study we did it in random way , as cross sectional study . to evaluate the patient who admitted . in which suction they arranged . and to define the cause for coronary intervention.

This study planned to focus on to detect the cause of their admission and to evaluate the past patient condition and health and its relation to current complaint .

Aim

To study the frequency of indication for coronary angiography

Patients and methods

The study was designed as a cross sectional analytic study conducted in Al-Imammain Al-Kadhymain medical city during the period from 1st of December , 2018 , till 3rd of February ,2019 for patient who undergo coronary angiography , coronary intervention were performed , interpreted and special questionnaire was filled .

Result and conclusion

The study involved 20 participants , which they are 12 (male) 60% and 8 (female) 40% , there age range from 40 to 70 years .

Coronary angiography remains the most accurate diagnostic modality for coronary artery disease. It provides a definitive assessment of coronary artery lumen and provides an avenue to percutaneous intervention

Abbreviation

ACS..... Acute coronary syndrome

CAD.....coronary artery disease

RCA.....right coronary artery

LCA.....left coronary artery

IV branches.....interventricular branches

RV.....right ventricular

LV.....left ventricular

RA.....right atrium

LMA.....left main artery

LAD.....left anterior descending

LCx.....left circumflex artery

CHAPTER ONE :

INTRODUCTION

I - Coronary Artery Disease ⁽²⁾

Coronary Artery Disease (CAD) develops when the arteries that supply blood to your heart become narrowed or blocked by a build-up of fatty deposits called plaque. As a result, it gets harder for the arteries to supply blood to the heart.

Symptoms of CAD may include: ⁽²⁾

- Chest pain (angina)
- Shortness of breath
- Heaviness in the chest
- Pain in the jaw or down the arms
- Heartburn
- Nausea
- Vomiting
- Heavy sweating

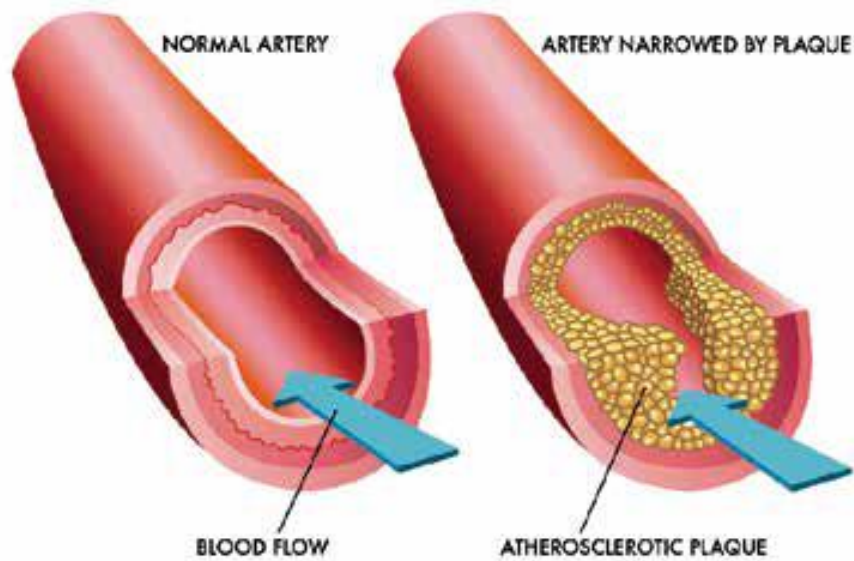


Figure (1) show the atherosclerotic plaque

There are a number of risk factors for CAD: ⁽³⁾

Certain risk factors are beyond your control, including:

- Age
- Family history of heart disease

However, the majority of risk factors can be controlled. When addressed successfully, these factors can reduce the risk of further heart disease:



Smoking decreases the amount of oxygen delivered to the heart, and increases the risk of developing deadly blood clots.



Obesity or excess body fat, particularly around the waist, can be a cause of increased blood pressure and high blood cholesterol.



Lack of physical activity or an inactive lifestyle may contribute to CAD.



High blood pressure places a strain on the heart and directly damages blood vessels, making it easier for plaque to form.



Diabetes causes excess sugar to build up in blood vessels and damages nerves.



High cholesterol in the blood can lead to atherosclerosis, or the build-up of thick, fatty plaque that clogs arteries

II - Basic Coronary arteries anatomy : ⁽⁴⁾

The coronary arteries arise from the ascending aorta at its anterior (right coronary artery) and left posterior (left coronary artery) aortic sinuses. The calibre of the arteries is based on measurements taken from arterial casts or angiograms and ranges between 1.5 and 5.5mm at their origins. The diameters may increase up to 3.3% per year¹. Variations in the anatomy and course of the coronary arteries are important as they can affect the blood supply to the diaphragmatic surface of ventricles. These variations are commonly found associated with the origin, size, and distribution of the posterior interventricular artery. In the right side dominance, the posterior interventricular artery is the largest branch of the right coronary artery, being present in 90% of the individuals. In left side dominance the posterior interventricular artery is a branch of the circumflex branch of left coronary artery: it occurs in 10% of the population. ⁽⁵⁾

The branches of the coronary arteries are generally considered to be the end arteries, i.e. arteries that lack adequate anastomoses with other large branches to maintain viability of the myocardium in cases of occlusion. However anastomoses do exist between branches of the coronary arteries, sub-epicardial or myocardial, and between these arteries and extracardiac vessels such as the thoracic vessels. An anastomoses also exists between the terminations of the right and the left coronary arteries in the atrioventricular groove as well as between the interventricular (IV) branches around the apex of the heart in approximately 10% of normal hearts. ⁽⁴⁾

Anastomoses between branches of the coronary arteries provide a collateral circulation, but in most cases they are not sufficient to provide an adequate blood supply to the myocardium when a branch becomes blocked in a cardiac pathology, such as myocardial infarction, resulting in necrosis of myocardium. Nevertheless, these anastomoses can provide alternate pathways, for blood to reach a given area of myocardium.

Coronary anomalies comprise several different entities, which a few have consistent clinical manifestations. Most reported cases require a specific and critical review because of the association of anatomical abnormalities as the clinical events might well be non-casual rather than than casual, i.e. indirect rather than direct.

Since cardiac diseases are the leading cause of death in the world, with most of these deaths being related to pathology of the coronary arteries, knowledge of the anatomy of coronary arteries is important. In order to prevent cardiac diseases and to design new treatment modalities there is a need to appreciate and understand the coronary circulation anatomy. ⁽⁵⁾

II – A. Right Coronary Artery ⁽⁶⁾

Origins from ostium, lies deep in the epicardial fat between pulmonary conus and RA (behind RA appendage) , Branches take off at right angles

Branches:

- Conus artery
- RA branches
- RV branch
- Interventricular septal branches
- AV nodal branch

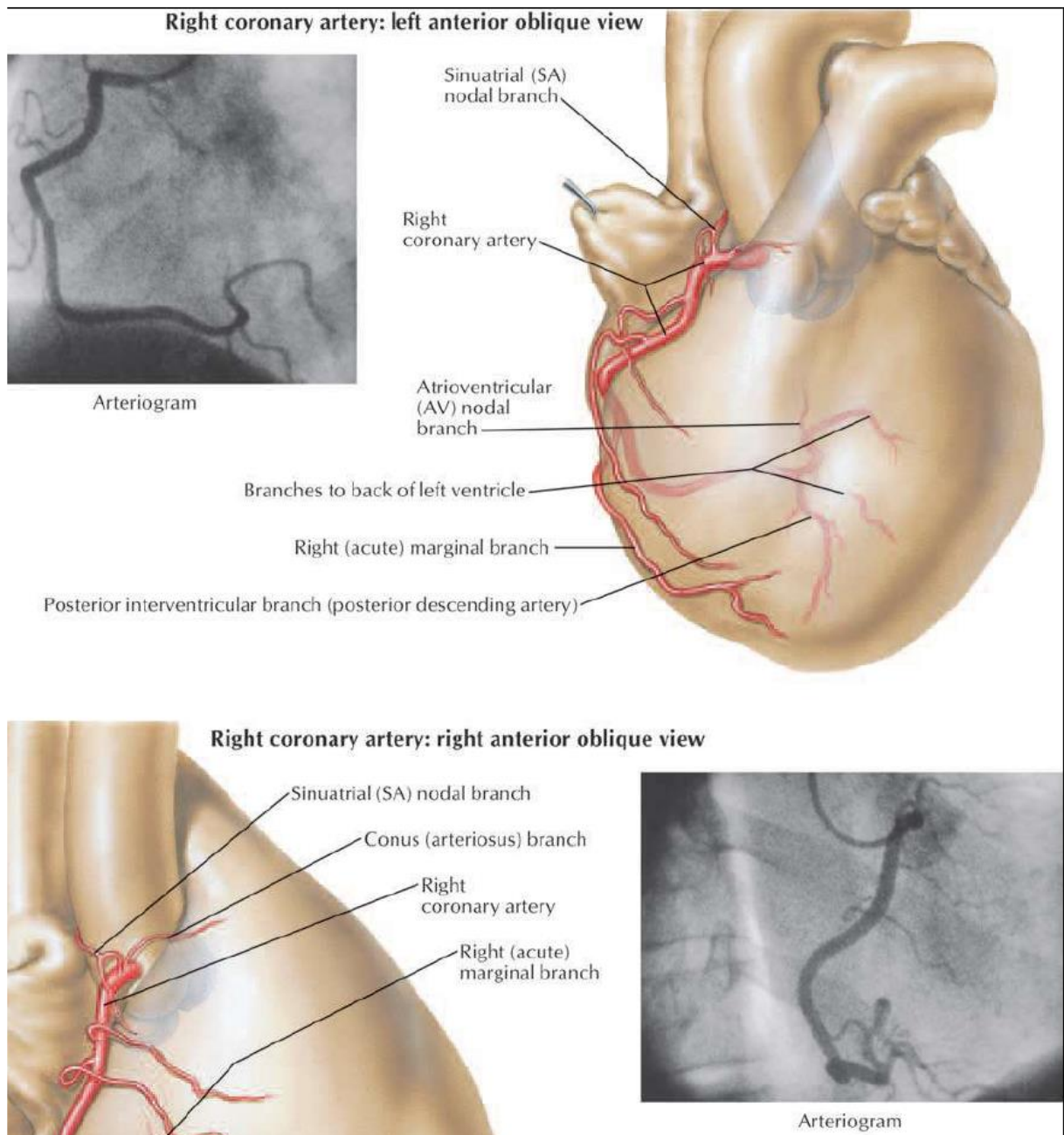


Figure (2) shows the right coronary artery supply and its branches

II – B. Left Coronary Artery ⁽⁶⁾

- Left Main artery (LMS)
- Left Anterior descending (LAD)
- Left Circumflex Artery (LCx)
- Intermediate Artery (Ramus Intermediate, Median Artery, Left Diagonal Artery, Straight LV Artery)

II – B. 1) Left Main Artery

Arises from left sinus of Valsalva, course laterally between base of pulmonary trunk and LA, Length usually 2-12mm (even 30mm) with diameter from 5-10mm

II – B. 2) Left Anterior Descending

Passes left of pulmonary trunk and on the interventricular sulcus towards apex.

90 degree turn usually after 2nd diagonal – point for surgical bypass

Occasionally bifurcates into 2 parallel vessels towards apex, Often covered by superficial muscle fibers “myocardial bridging”

II – B. 3) LAD

Often divided to proximal (till first major septal branch), mid (till 90 degree angle or 2nd diagonal) and distal, Gives diagonal branches (2 to 9) , May have RV branch

Septal branches penetrates 2/3 into anterior septum (40-80 mm long). “anchors” LAD and limits motion/buckling during systole

II – B. 4) Left Circumflex (LCx) Artery

Arises from LMS at right angle, Runs in the atrioventricular sulcus till crux, mirrors the RCA , Proximal (till OM1), mid (till OM2), distal. 40% subjects has left atrial branch supplying the SA node

Kugel’s artery – early anterior atrial branch anastomotic network between RCA and LCx .

Obtuse Marginal (OM) – supplies left ventricle anteriorly, marginally or posteriorly – usually 1-3 branches.

III - Coronary Angiography

Coronary angiography is a procedure to visualize the coronary arteries. The coronary arteries are the blood vessels that supply blood to the heart muscles. On ordinary chest X-ray films, the heart appears as a silhouette and the coronary arteries cannot be seen.

To see the coronary arteries, a special dye or contrast medium is injected through a small tube (catheter) inserted via a large artery in the groin or the wrist. The catheter is then advanced to the heart and positioned at the openings of the coronary arteries before injection is performed. After the catheter placement and filming, which normally takes about 15 to 30 minutes, the catheters will be removed.⁽⁷⁾

How the Test is Performed

Coronary angiography is often done along with cardiac catheterization. This is a procedure which measures pressures in the heart chambers.

Before the test starts, you will be given a mild sedative to help you relax.

An area of your body (the arm or groin) is cleaned and numbed with a local numbing medicine (anesthetic). The cardiologist passes a thin hollow tube, called a catheter, through an artery and carefully moves it up into the heart. X-ray images help the doctor position the catheter.

Once the catheter is in place, dye (contrast material) is injected into the catheter. X-ray images are taken to see how the dye moves through the artery. The dye helps highlight any blockages in blood flow.⁽⁷⁾

How to Prepare for the Test ⁽⁸⁾

You should not eat or drink anything for 8 hours before the test starts. You may need to stay in the hospital the night before the test. Otherwise, you will check in to the hospital the morning of the test.

You will wear a hospital gown. You must sign a consent form before the test. Your health care provider will explain the procedure and its risks.

Tell your provider if you:

- Are allergic to any medicines or if you have had a bad reaction to contrast material in the past
- Are taking Viagra
- Might be pregnant

Normal Results ⁽⁸⁾

There is a normal supply of blood to the heart and no blockages.

What Abnormal Results Mean ⁽⁹⁾

An abnormal result may mean you have a blocked artery. The test can show how many coronary arteries are blocked, where they are blocked, and the severity of the blockages.

IV - Common Diagnostic Indications for Coronary Angiography ⁽¹⁴⁾

The indications for coronary angiography have been divided into the follow *clinical* categories:

- 1. Coronary artery disease**
- 2. Stable pattern**
 - a. suspected coronary artery disease**
 - b. known coronary artery disease**
- 3. Unstable pattern**
 - a. Acute coronary syndrome with unstable haemodynamics or rhythm**
 - b. Unstable angina and Non-ST elevation MI**
 - c. ST elevation MI**
 - d. Out of hospital cardiac arrest**
- 4. Special considerations**
 - a. Congestive cardiac failure**
 - b. Preoperative assessment for non cardiac surgery**
 - c. The value of non invasive computed tomography coronary angiography**
- 5. Prelude to structural cardiac disease/valvular heart disease intervention**

CHAPTER TWO :

THE STUDY

AIM :

To study the frequency of indication for coronary angiography in Al-Imamain Al-Kadhumain teaching hospital.

Patients and methods :

Study design : cross sectional study

We analyzed the data of 20 patients complain from chest pain or dyspnea where they are admitted to CCU in AL-Imamain –al kadhmain teaching hospital to the angiography unit, where they are randomly collected at the period between 1st of December 2018 , till 3rd of February 2019 . 12 of the patients were males and 8 were female , the age range was from 40 to 70 years . with the mean age being 55 years . they evaluated by their doctors to indicated to coronary intervention .

After completing data collection, the data (name, age, gender, history of cardiac disease, and past medical history) were allocated in the form of a questionnaire (see the next page) and grouped according to age and gender to simplify the insertion and calculation.

Multiple factors interfere with the indication of coronary angiography intervention in our hospital , and the most one is patient wish . which is affect the outcome .

- **Inclusion criteria :**
 1. **Patients who undergo coronary intervention with known indication .**
 2. **Patients who have sign and symptom , in which they did coronary angiography**
- **Exclusion criteria:**

Patients who have sign and symptom and they refuse to do coronary intervention

Statistical analysis :

The data were analyzed manually and represented in the form of frequency and percentage for certain variables in tables and graphics design using Microsoft excel software .

Medicine department | cardiology | research

- Name :
- Age :
- Gender :

Indication of coronary angiography:

- History Of cardiac disease:
- Past medical history :

smoking :

Yes No

Result

From total 20 patients, their age ranged from 40 – 70 years old . in which they are 12 (male) 60% and 8 (female) 40% that have been counsel the coronary intervention part in ccu during the mentioned period .

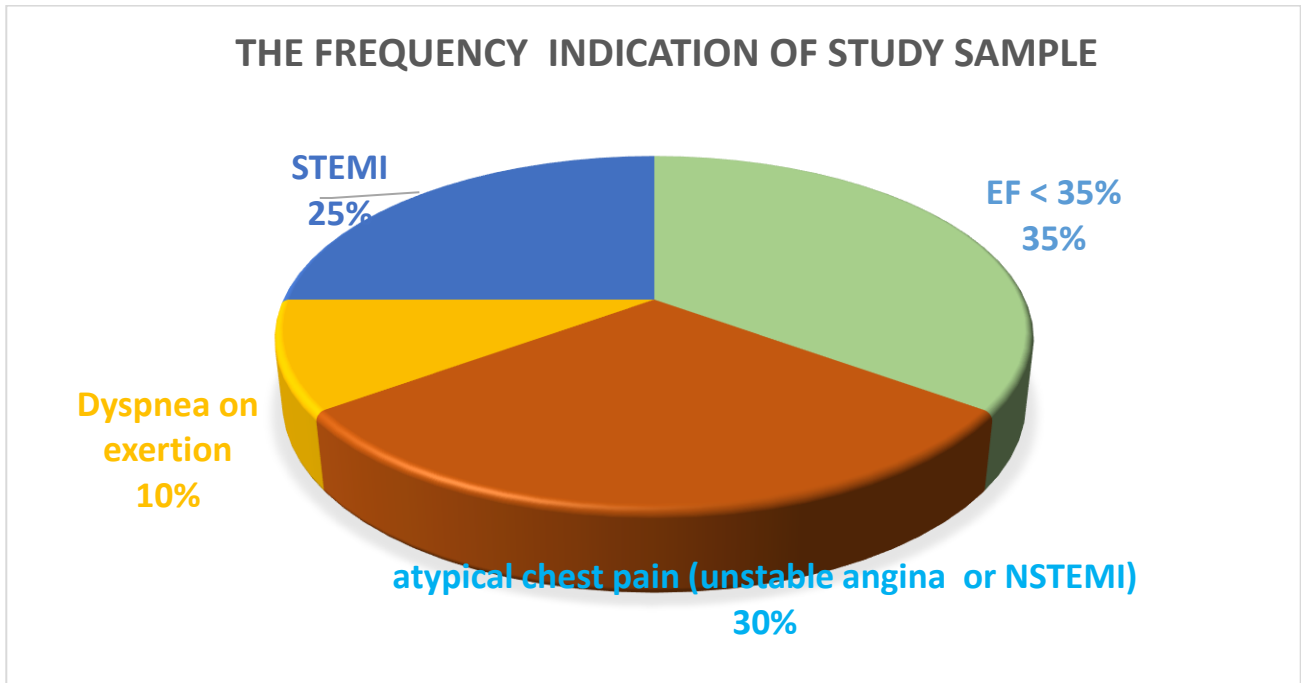


Figure (3) the frequency of indication of study sample in Al-Imamain Al-kadhumain teaching hospital .

smoking relation in the study sample

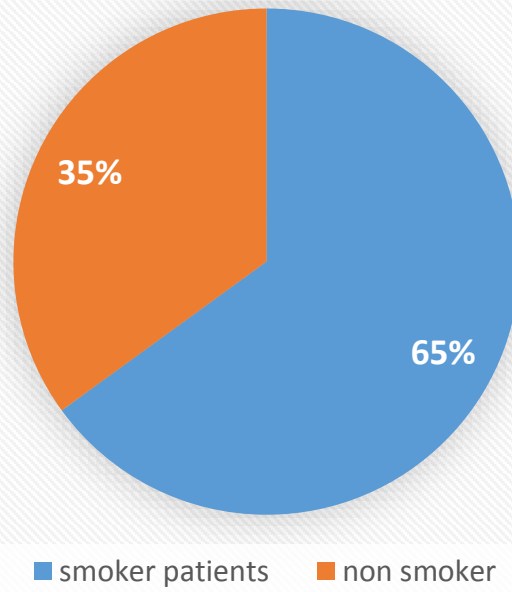


Figure (4) the percentage between smoker and non-smoker patients

Gender distribution

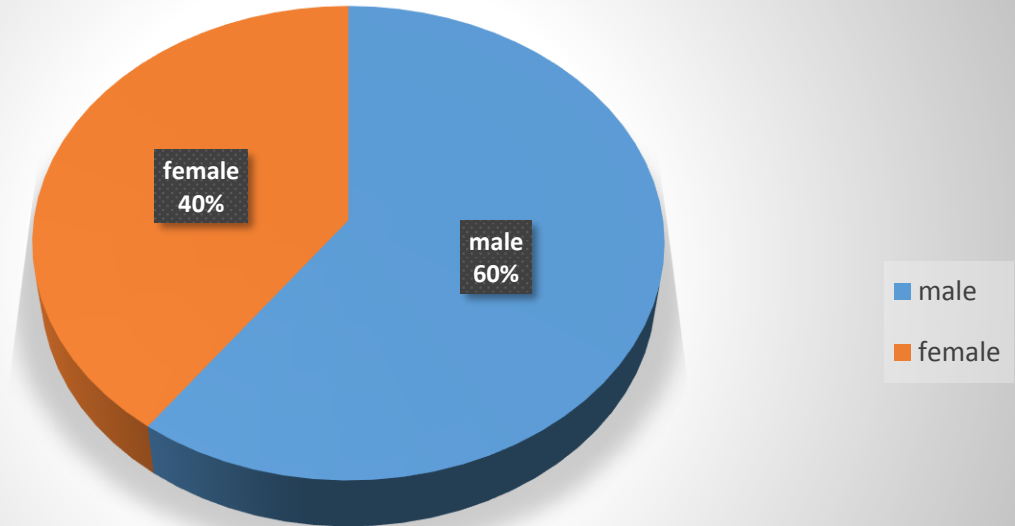


Figure (5) the percentage of gender distribution in study sample

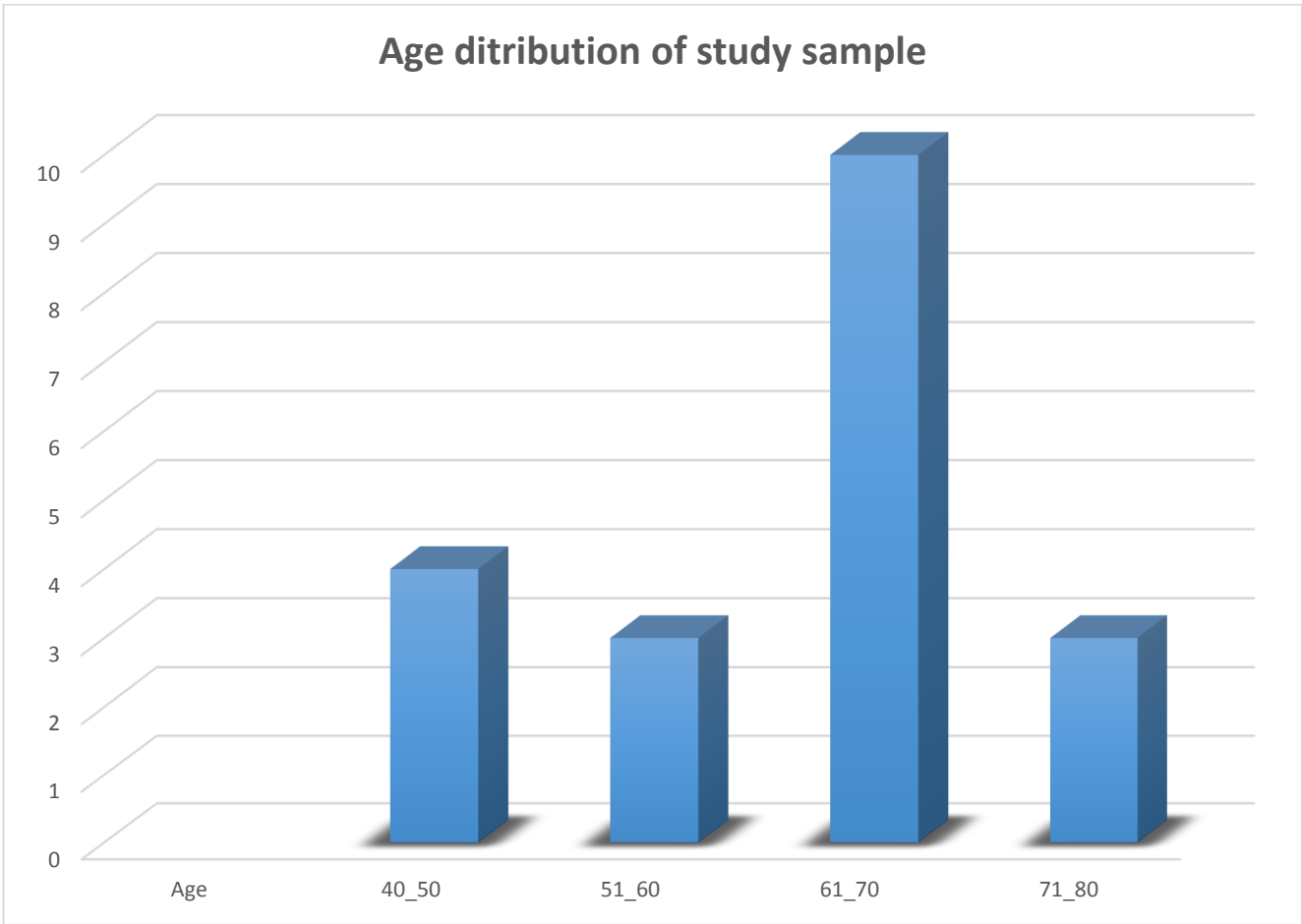


Figure (6) show the age distribution of study sample

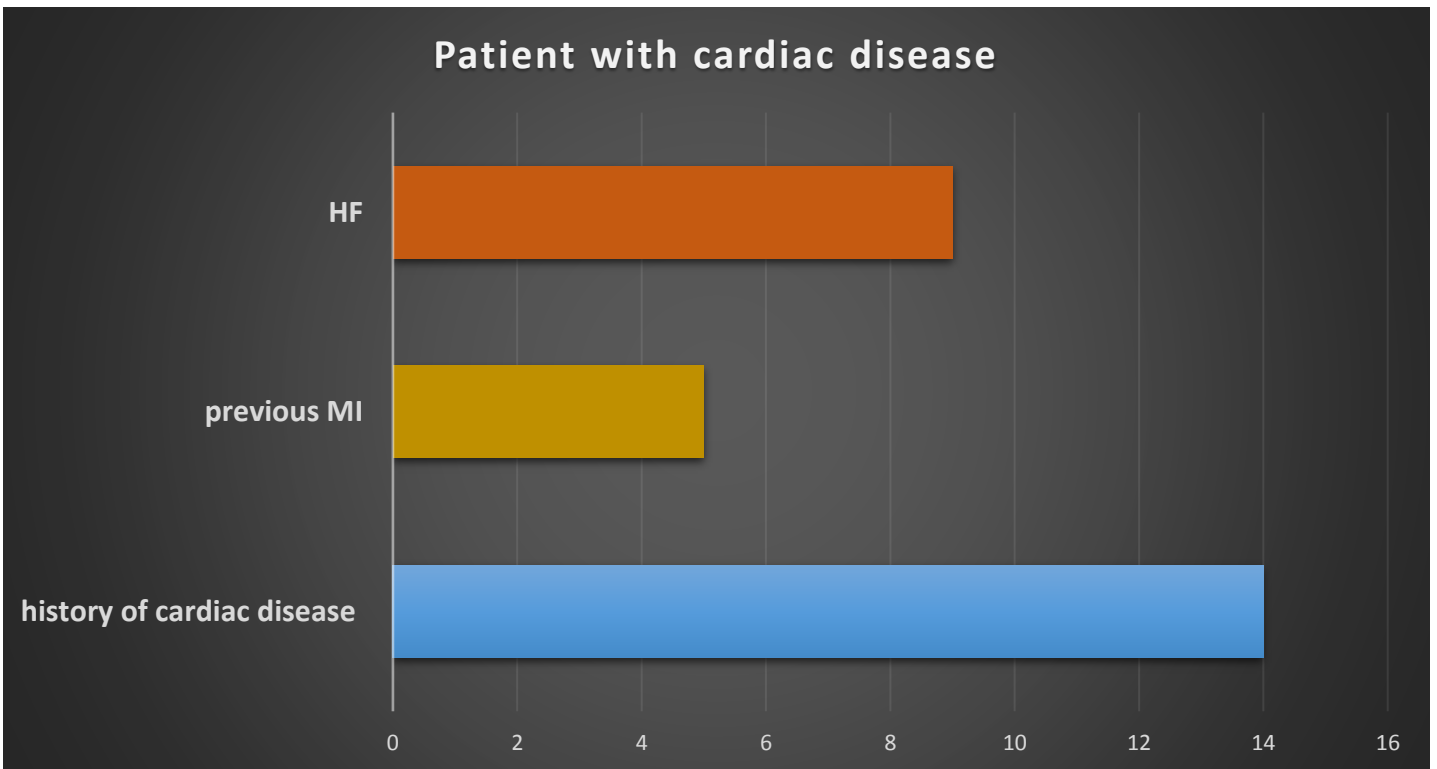


Figure (7) the numbers of patients who have previous cardiac condition .

Table (1) show the frequency and mean age of each past medical history condition .

Past medical history	Frequency	Mean age
Hypertension	9	49
DM	8	51
Dyslipidemia	3	63

Discussion

Coronary artery disease remains one of the principal causes of disability worldwide. Our study aimed to have an idea of clinico-angiographic indications in our hospital during constant period , which mentioned previously .

In this study a significant number of patients was male , their percentage is 60% , and the percentage of female was 40% . which signify there is a significant relationship between ACS and male gender. ⁽¹⁶⁾

Also the study signify large percent of patients in age of 41-50 which is highlighting the importance of screening of high risk in younger age . as shown by other studies^{9,10}

There is general agreement that coronary artery disease is multifactorial in aetiology¹¹ , we also found significant percentage of multiple risk factors in our patient . which is ordered as past medical history and cardiac risk factors . hypertension was most prevalent in our study followed by DM .

Several trials have shown importance of blood pressure lowering and life style modification such as (diet and exercise) in primary as well as secondary prevention^{12,13} Few patients were dyslipidaemic because most of the patients were on statins therapy .

Most of the patients in our study sample taken up for PCI presented with unstable angina and post MI-angina , which is account 55%. Regard the patient with STEMI 25% , and unstable angina + non STEMI 30% .

The most prevalent indication of coronary angiography in Al-Imamain Al-Kadhumain teaching hospital was low EF , account 35% of the cases .

Our study had significant number of patients with severe disease and most of them had multiple risk factors, emphasizing the fact that the extent of coronary disease correlates well with presence of multiple risk factors. The smoking is prevalent risk factor in the study sample ¹⁹. shows the high percentage of relationship . account 65% .

A low percentage shows there is special indication in which dyspnea on exertion in patients with previous MI . in which account 10% .

Many trials have addressed the issue of invasive treatment versus conservative treatment in acute coronary syndromes¹⁷. The recently concluded trial has favored invasive approach owing to significant benefits¹⁸.

Conclusion

Coronary angiography remains the most accurate diagnostic modality for coronary artery disease. It provides a definitive assessment of coronary artery lumen and provides an avenue to percutaneous intervention.⁽²²⁾

It is pivotal in the treatment on unstable or acute coronary syndromes and life saving in cardiogenic shock and STEMI. Indications for invasive coronary angiography have changed incrementally over the decade .⁽²³⁾

The advent of noninvasive CTCA has changed the landscape for the diagnosis of CAD but CTCAs seem destined only for the low to intermediate risk patients.⁽²⁴⁾

Coronary angiography also serves a pivotal role in the burgeoning field of percutaneous structural cardiac interventions, especially percutaneous valve implants.

References

1. Reddy KS, Yusuf S. Emergency epidemics of cardiovascular disease in developing countries. *Circulation* 2000; 97: 596- 601.
2. Enas EA, Jacob S. Decline of CAD in developed countries: Lessons for India. In : Sethi KK (ed). *Coronary Artery Disease in Indians - A Global Perspective*. Mumbai: Cardiological Society of India 2004; 98-113.
3. Raj Mohan L, Deepa R, Mohan V. Risk factors for coronary artery disease in Indians: Emerging trends. *Indian Heart J* 2000; 52: 221-5.
4. Enas EA, Mehta JL. Lipoprotein (a): an important risk factor in coronary artery disease. *J Am Coll Cardiol* 1999; 32 (4): 1132-4.
5. Chambers J, Kooner J. Plasma homocysteine concentrations and risk of coronary artery disease in UK Indian Asian and European men. *Lancet* 2011; 355: 523-7.
6. Kannel WB, Wolf PA, Castelli WP *et al*. Fibrinogen and risk of cardiovascular disease. The Framingham Study. *JAMA* 1999; 258: 1183-6.
7. Gupta R, Malhotra B. Infections and atherosclerosis in Indian context. *JAPI* 2007; 47: 409-12.
8. Smith SC Jr, Dove JT, Jacobs *et al*. ACC/AHA guidelines for percutaneous coronary intervention: a report of American College of Cardiology/American Heart Association Task Force on Practice Guidelines. *J Am Coll Cardiol* 2001; 37: 2239.
9. Kaul U, Dogra B, Manchanda SC *et al*. Myocardial infarction in young Indian patients: Risk factors and coronary arteriographic profile. *Am H J* 2011. 112 (1): 71-5.
10. Uhl GS, Farrell PW. Myocardial infarction in young adults: Risk factors and natural history. *Am H J* 2009 105: 584.
11. Tibblin G, Wilhelmsen L, Werko L. Risk factors for myocardial infarction and death due to IHD and other causes. *AMJ Cardiol* 2006; 35: 514.
12. Hansson L, Zanchetti A, Camithers SG *et al*. For the HOT study group. Principal results of the Hypertension optimal Treatment (HOT) randomized trial. *Lancet* 2008; 351: 1755.
13. Hjermann I, Valve Byre K, Holme I, Leren P. Effect of diet and smoking intervention on the incidence of coronary artery disease. *Lancet* 2001; 2: 1303-10.

14. Dangas G, Mehran R, Wallestein S *et al.* Correlation of angiographic morphology and clinical presentation in unstable angina. *J Am Coll Cardiol* 1999; 29: 519-25.
15. The Pursuit Trial Investigators. Inhibition of glycoprotein IIb/ IIIa with eptifibatid in patients with acute coronary syndromes. *N Eng J Med* 2006 330: 956-61.
16. Wilson SH *et al.* the relation between acute coronary syndrome and gender *J Am Coll Cardiol* 2000; 35: 937-43.
17. Boden WE, O' Rourke RA, Crawford MH *et al.* Outcomes in patients with acute non Q wave MI randomly assigned to an invasive as compared with a conservative strategy. *N Eng J Med* 2007; 338: 1785-92.
18. Long-term low-molecular-weight heparin in unstable coronary-artery disease: FRISC II prospective randomized multicentre study: Fragmin and fast revascularization during instability in coronary artery disease. *Lancet* 2001; 354: 701-7.
19. ASSENT-4 investigators, (2006). Primary versus tenecteplase-facilitated percutaneous coronary intervention in patients with ST-segment elevation acute myocardial infarction (ASSENT-4 PCI): randomised trial. *Lancet* 367:569–578.
20. Aurore A, Jabre P, Liot P, Margenet A, Lecarpentier E, Combes X. (2011). Predictive factors for positive coronary angiography in out-of-hospital cardiac arrest patients. *Eur J Emerg Med.* 18(2):73-6.]
21. Bernard SA, Gray TW, Buist MD, Jones BM, Silvester W, Gutteridge G, et al. (2002). Treatment of comatose survivors of out-of-hospital cardiac arrest with induced hypothermia. *N Engl J Med* 346: 557 – 563
22. Boden WE, O'Rourke RA, Teo KK, et al. (2007). Optimal medical therapy with or without PCI for stable coronary disease. *N Engl J Med* 356:1503-1516
23. Budoff MJ, Dowe D, Jollis JG, et al. (2008). Diagnostic performance of 64-multidetector-row coronary computed tomographic angiography for evaluation of coronary artery stenosis in individuals without known coronary artery disease. *J Am Coll Cardiol* 52:1724–32.
24. Cannon CP. (2004). Revascularisation for everyone? *Eur Heart J* 25:1471–1472