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Coronary angiography findings and outcomes of percutaneous coronary interventions in Tikur Anbessa Specialized Hospital, Addis Ababa, Ethiopia

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List of Abbreviations

ACEIs: Angiotensin converting enzyme inhibitors

ACS: Acute coronary syndrome

ARBs: Angiotensin receptor blockers

ASA: Aspirin

AHA: American heart association

BMI: Body mass index

BP: Blood pressure

CAD: Coronary artery disease

CRP- C- reactive protein

DM- Diabetes Mellitus

HTN- Hypertension

MI: Myocardial infarction

NSTEMI: Non ST segment elevation myocardial infarction

PCI: Percutaneous coronary intervention

PR: Pulse rate

RR: Respiratory rate

SPSS: Statistical Package for Social Science

STEMI: ST segment elevation myocardial infarction

TASH: Tikur Anbessa Specialized Hospital

UA: Unstable angina

ABSTRACT

Background: Some hospital based studies showed that CAD is a major cause of mortality and morbidity and the incidence of CAD is increasing in middle and low income countries like Ethiopia even though there is no country wide study done.

Objective: The purpose of this study is to describe the coronary angiography findings and outcomes of PCI in TASH.

Methodology: A retrospective cross sectional study was conducted on coronary angiography findings and outcomes of PCI at TASH using structured questionnaire from January 1/ 2017 to December 1 / 2020. Datas were analyzed and interpreted using SPSS version 26 software.

Result: Coronary angiography was done for 149 patients, of which, 124 (83.2%) patients were males and 25 (16.8%) patients were females with the age range of 24 to 88 years. The median age was 52 years with mean ages of 53.2+ 12.46, the most frequent age stratum being 45 to 55 years. ACS was the clinical diagnosis in 68 (45.6 %) of patients, of which 51 patients (34.2% of the total) had STEMI. With catheterization, 108 (72.5%) patients had evidence of CAD, of which, 41 (37.9%) patients had multivessel disease. PCI was done for 60 (40.2%) patients and TIMI III was achieved. The in hospital mortality was 0.67%. In a bivariate analysis, Diabetes was associated with multi-vessel disease (P=0.016), (COR 3.04) 95% CI(1.23-7.51).

Conclusion: CAD in Ethiopia occurs early in lfe mainly involving LAD and is associated with adverse consequences. PCI has been shown to have low complications and low in hospital mortality making it a safe procedure.

Key words: Coronary angiography, PCI, TASH

INTRODUCTION

Back ground

Coronary artery disease is a term used to describe the narrowing or blockage of coronary arteries usually caused by atherosclerosis. This narrowing or blockage of the artery ultimately causes myocardial cell death due to decreased oxygen supply which may present as chronic coronary syndrome, unstable angina (UA), non ST elevation myocardial infarction (NSTEMI) and ST elevation myocardial infarction (STEMI). Unstable angina and non ST elevation myocardial infarction are similar in pathophysiology except that there is elevation of myocardial necrosis biomarkers in NSTEMI, while STEMI characteristically shows significant ST segment elevation in 12 lead ECG together with biomarker elevation.

Coronary artery disease is the major cause of morbidity and mortality in the world affecting 16.5 million Americans (1) leading to premature death, disability and high financial cost. Chronic coronary syndrome represents the most common clinical manifestation of IHD and leading cause of mortality worldwide affecting up to 5% of adult population over the age of 40 years in developed countries (2). Acute coronary syndrome is a spectrum of presentation associated with abrupt reduction in coronary blood flow (3). The AHA estimates that in the US, there is one heart attack every 40 seconds. Additionally the life time risk factor for someone with no risk factor for cardiovascular disease is 3.6% for men and <1% for women which increases to 37.5% in men and 18.3% in women if the person has two or more risk factors for cardiovascular diseases (1).

There are many risk factors for CAD. Age greater than 65, being overweight , diabetes , family history of cardiovascular disease, being male, hypertension and dyslipidemia, lack of physical activities, smoking and African American race are among the traditional risk factors that are identified.

Patient can present with different symptoms, the most common being chest pain followed by other atypical symptoms like fatigue,dizziness,dyspnea and syncope. The chest pain is deep retrosternal described as squishing or crushing, often accompanied by nausea and vomiting.

Atypical presentation dominate in patients with diabetes, chronic kidney disease, demetia and those who are elderly. Chronic coronary syndrome can be referred based up on a classic history of angina pectoris in the presence of either risk factors for or known atherosclerotic cardiovascular disease.

Although the cardiovascular death rate has been decreasing in developed countries, the disease incidence is rising in developing countries over the past few years (4) which is attributed to changes in life style and increase in prevalence of risk factors like diabetes and hypertension. Thus low income countries like sub Saharan African countries are facing double jeopardy with both communicable and non-communicable diseases (5)

Statement of the problem

According to the 2017 World Health Organization global estimate, each year 17.9 million people die from cardiovascular diseases (CVDs) and >75% of these deaths occur in low- and middle-income countries (6) which causes high financial catastrophe, premature death and disability. In developing or resource limited areas most patients affected are at younger age than those seen in developed countries (7).

The prevalence of risk factors for coronary artery disease is increasing in developing countries like Ethiopia possibly due to globalization and sedentary life style. A population based prevalence study conducted in 2009 in Addis Ababa, Ethiopia indicated that the prevalence of hypertension was 31.5% in males and 28.9% in females (8).

Another community based comparative cross sectional study done in Ethiopia reported that the prevalence of diabetes was 3.5% while this varies between rural and urban settings as 2% and 4.6% respectively (9).

Significance of the study

Currently PCI is being done widely in many countries and this intervention is also being practiced in developing countries like Ethiopia increasing from time to time. PCI is also feasible,

safe and effective in many patients with stable CAD who remain symptomatic despite medical treatment (10).

There are limited researches on coronary angiography findings and outcomes of PCI in Ethiopia. This study is conducted to review patient outcomes after PCI and patterns of coronary artery involvement described by angiography in the time period of three years, from January 2017 to December 2020 at TASH. This study will help us to know the current information related to the use of PCI in our set up and can be used to advocate for adopting standard treatment and improve the service based on updated result of this study.

LITERATURE REVIEW

Burden of the disease

The global burden of CAD was 154 million in 2016 representing 32.7% of the global burden of cardiovascular disease and 2.2 % of overall global burden of diseases (11).

Based on National health survey collected from 2009 to 2012, the American heart association estimated the prevalence of coronary artery disease to be 15.5 million in which 7.6% of men and 5% of women in USA are living with CAD (12).

In France the incidence of coronary heart disease ranged from approximately 1% /year in men aged 45-65 years to about 4% in patients aged 75-84 years regardless of sex.(13)

In 2013, one million deaths were due to cardiovascular diseases in sub-Saharan Africa alone which is a high number and constituted 5.5% of all global cardiovascular related deaths and 11.3% of all deaths in Africa (14).

Socio-demographic data

As from different literatures showed elderly people have high risk of developing coronary artery diseases. According to the RIVERA study the mean age at presentation was 59 years (15). Another study in Nigerian showed that most patients were between the age of 51 and 60 years with a mean age of 60.3+/- 9.6 years (16).

A study done in Mekelle, Ethiopia from August 2013 to July 2018 in Ayder specialized comprehensive care, the mean age was 59.12 years (17). A similar study in Addis Ababa, Ethiopia in ABET hospital and TASH showed the mean age for men to be 57.5 +/- 12.09 and 57.8+/- 12.76 for women (18).

The sex distribution based on the 2019 journal of American heart association, 92% (698/756) of females and 91% (108/1185) of males (19) had CAD. In contrast to this study, a study done in Nigeria in 2014 showed the prevalence of CAD to be 66.3% in males and 33.8% in female (16).The ACESS study in south Africa reported an overall 76% male and 24% female gender distribution (20). A similar result was shown in a study conducted in Ethiopia, Addis cardiac hospital which showed 83% prevalence in men and 17% in women, which has shown a predominance of males regarding to CAD (21).

Risk factors

The incidence of cardiovascular events remain high also in patients with stable CAD. Ejection fraction, diabetes, previous MI and CRP independently predicted increased risk factors (22)

The prevalence of various risk factors for CAD in a study conducted in Nepal in 140 subjects was found to be hypertension in 35.3% of patients, diabetes (15.9%), history of current smoking (38.7%) and family history of coronary artery disease in 19.3% of patients (23).

These modifiable and non-modifiable risk factors are also shown to be present in other different studies, for instance according to a study done in Egypt, hyperlipidemia (69.7%) and cigarette smoking (66.6%) were the main risk factors followed by family history of CAD (53.12%) and hypertension (46.2%) (24).

In hospital based retrospective study in Addis Ababa, Ethiopia, dyslipidemia was the most commonly identified risk factor for ACS which occurred in 63 % of patients followed by Hypertension in 61.2 % and diabetes in 41.1 % of patients. Of these 91.3 % of patients had at least one risk factor for CAD (18)

Clinical presentation

The common symptom of CAD is chest pain although other atypical symptoms can present frequently. According to the journal of American heart association, the most common presentation was chest pain which occurred in 92% of females and 91% of males and symptoms were more typical in women (25).

Another study done in Mekelle, Ethiopia also showed a similar finding. From 151 patients, 87.4% of patients presented with chest pain followed by shortness of breath (33.8%) and nausea or vomiting (33.8%). The time of symptom onset to hospital arrival was 95-85 hours and only five patients arrived within one hour of symptom onset (17).

A study conducted in Addis Ababa, Ethiopia, hospital based retrospective study showed that the average time from symptom onset to hospital arrival was 2.4 days and no patient arrived within one hour of presentation. In this study 26 patients out of 142 (18.3%) had no chest pain at presentation. (18).

Type of CAD and coronary angiography findings

A three year retrospective study published in India, which was done on the prevalence and pattern of coronary artery disease in women showed that 102 patients out of 500 had clinical diagnosis of STEMI, 28/500 had NSTEMI and 85/500 had unstable angina. The angiography findings showed that 45.4% (22 patients) had obstructive coronary artery disease and the rest 20.4 % (102 patients) had non-significant lesions. Based on the angiographic distribution LAD was the most common involved vessel which accounted for 35.2% and LMCA was the least involved vessel (3.4%) (26).

Another study in Nigeria reported that majority of the clinical diagnosis were STEMI (40%). NSTEMI/UA accounted for 25% and stable angina was 26.3%. Majority of patients had multi-vessel disease (38.8% of patients had three vessel and 28.8% had two vessel disease). Those with a single vessel disease accounted for 32.5% (16).

According to a one hospital based retrospective study in Ethiopia, Addis Ababa, 161/300 patients had a clinical diagnosis of acute coronary syndrome, of whom 100 patients (33.3 %) had STEMI, 61 (20.3%) had UA/NSTEMI and the rest 57 (19%) had stable angina. 227/300 (75.7%) had evidence of coronary artery disease on angiography of which 193 (85 %) had significant disease (> 50% stenosis in LMCA and > 70% stenosis at other coronary beds) .On the contrary 15 % had no significant coronary artery disease. Regarding vessel distribution, 98 patients (43.2%) with evidence of coronary artery disease had a single vessel disease while 92 patients (40.5%) had multi-vessel disease and 3 patients (1.3%) had left main coronary artery disease (21). In this study PCI was done for 126 patients (65.3%) compared to PCI done in Mekelle, Ayder comprehensive specialized Hospital which was only 3.9% (17).

Complications and in hospital mortality

In out patients with stable CAD, angina symptoms with or with out ischemia on non invasive testing appear to be associated with an increased risk of adverse cardiovascular outcomes (27).

There has been shown improvement in mortality after ACS due to increased use of PCI and other managements like fibrinolytics and medical drugs like aspirin, ACEIs and beta blockers. In hospital mortality was 0.3% in the REVERA study done in 2007 from 144 hospitals in 23 countries.In the same study, the rate complication after angiography was 3.7% for coronary dissection, 3.4% for any bleeding, 2% for no reflow and 1% for myocardial infarction. The strongest independent predictors of death and myocardial infarction were clinical presentation with NSTEMI/STEMI and administration of GPIIb/IIIa inhibitors (15).

The in hospital mortality according to a study done in Mekelle, Ethiopia was reported as 24.5%, where 67.5% had STEMI. 71.5% of patients were discharged improved after an average duration of hospitalization of 10.73 days (17).

Another similar study in Ethiopia, Addis Ababa, out of 142 patients with ACS, the complication rates during hospital stay were congestive heart failure (24.6%) followed by major arrhythmia (9.8%). 128 patients (90.1 %) were discharged alive while the in hospital mortality was reported to be 9.9%. Mortality rate increased with advanced age, STEMI, being female and symptom onset to presentation more than 48 hours (18).

OBJECTIVES

General objective

- To describe the coronary angiographic findings and outcomes of PCI at TASH, Addis Ababa, Ethiopia from January 2017 to December 2020.

Specific objectives

- To describe the pattern of coronary artery involvement by angiography
- To identify the risk factors associated with CAD
- To describe identified complications during hospital stay
- To assess the in hospital mortality
- To demonstrate outcome of patients at hospital discharge

METHODOLOGY

Study setting

Study area

The study was conducted at TASH which is the main tertiary referral center in Ethiopia located in the capital, Addis Ababa. TASH is one of the largest leading referral tertiary health facility that provides specialized and comprehensive medical care. It is also an institution where specialized clinical services that are not available in other public or private institutions are rendered to the whole nation. It is now the main teaching hospital for both clinical and preclinical trainings of most disciplines. The various departments, faculties and residents under specialty training in the school of medicine provide patient care in the hospital. It has its own cardiology unit which gives service and also teaches the undergraduate students, residents and cardiology fellows. The unit also does many interventional procedures like PCI ,valvotomy and other procedures.

Study period

The study was conducted on patients who underwent coronary angiography and PCI at TASH, Addis Ababa University over a period of 03 years from January 1, 2017 to December 1, 2020.

Study Design

A Retrospective cross-sectional hospital-based study was conducted to describe the coronary angiography findings and outcomes of PCI at TASH, Addis Ababa University over a period of 03 years, from January 1 2017 to December 1 2020

Source and Study population

Source population

All patients who presented to TASH with clinical diagnosis of ischemic heart disease over the past 3 years, from January 1 2017 to December 1 2020.

Study Population

All patients who underwent coronary angiography and PCI at TASH over the past 3 years, from January 1, 2017 to December 1, 2020.

Sample size and Sampling technique

All patients who had coronary angiography and underwent PCI from January 2017 to December 2020 were included in the study

Inclusion and exclusion criteria for patients

Inclusion criteria

- Age 18 years and above
- Patients who had angiography and PCI in the past 03 years, from January 1/ 2017 to December 1/2020

Exclusion criteria

- Patient chart records with incomplete information for the objective of this study
- patients transferred to another hospital
- patients discharged against medical advice

Study Variables

Dependent variables

- Coronary angiography findings
- Outcomes of PCI

Independent variables

- Socio-demographic status of the patient
- Clinical symptom at presentation
- Blood pressure, pulse rate, respiratory rate and BMI during admission
- Time of onset from presentation
- Associated risk factors of CAD
- Diagnosis type
- Kliip class
- Ejection fraction and serum lipid level
- Complications and in hospital mortality
- In hospital medical therapy

Operational Definitions

A**. ST-segment elevation myocardial infarction (STEMI):** is a clinical syndrome defined by symptoms of myocardial Ischemia in association with persistent ECG ST elevation and subsequent release of biomarkers of myocardial necrosis.

B. **Non-ST-STEMI (NSTEMI):** patient with documented clinical features develops evidence of myocardial necrosis, as reflected in abnormally elevated levels of biomarkers of cardiac necrosis

C. **Unstable angina (UA):** a patient with documented ischemic symptoms suggestive of an

ACS and no elevation in troponin, with or without ECG indicative of ischemia.

D. **Prior angina:** History of angina before the current admission. Angina refers to evidence

or knowledge of symptoms before this acute event described as chest pain or pressure, jaw pain, arm pain, or other equivalent discomfort suggestive of cardiac ischemia.

E. **Previous myocardial infarction (MI**): The patient has had at least 1 documented previous

MI before admission.

F.**Family history of premature CAD:** Documented history of any direct blood relatives

(parents, siblings, and children) who have had any of the following at age less than 55 years (for first degree male relatives) and 65 years (for first degree female relatives): angina, MI, or sudden cardiac death without obvious cause.

G. **Dyslipidemia:** The patient has had at least 1 documented dyslipidemia or who have elevated lipid profile level on admission.

H. **Smoking History:** Patient who were / are smokers.

I. **Outcomes of PCI:** Complications like post procedural major bleeding requiring transfusion, stroke, major arrhythmia and death following PCI.

J. **Killip class:** Killip class of the patient at the time of hospital admission:

o Class 1: Absence of documented Rales over the lung fields and absence of S3 gallop

o Class 2: Documented Rales over 50% or less of the lung fields or the presence of an S3 gallop

o Class 3: Documented Rales over more than 50% of the lung fields

o Class 4: Documented shock

Data collection procedures

Data collection instruments

A structured English version questionnaire was developed from other researches related to this study and a retrospective data from hospital records including socio-demographic characteristics, associated risk factors of CAD, clinical presentation before admission and time of onset from symptom to admission, in hospital complications and mortality of patients were assessed. Medical charts were taken from patient registry log book from coronary cardiac unit in TASH and were given to chart room staffs to get patients chart and the required datas were retrieved by the principal investigator.

Data quality management

After questionnaire development pretest was done on 5% of sample and modification was done on the questionnaire accordingly. Data was collected and continuous monitoring was done by the principal investigator and quality of data was checked on daily basis for completeness, clarity and accuracy before data entry.

Data analysis and presentation

Each collected data was verified, validated and recorded before the analysis. The IBM SPSS Statistics software package version 26 was used for entry of statistical data and analysis.

Descriptive statistics was used as a statistical data analysis method and was expressed as frequencies and percentages with their corresponding confidence intervals. Simple frequencies and percentages were organized in tables so as to help in communicating the results.

Continuous variables were represented as means, standard deviations and minimum and maximum values, and categorical variables as frequencies. 95% confidence interval was estimated for all variables and a P-value < 0.05 was considered statistically significance.

Ethical consideration

Ethical clearance was obtained from the Department of Internal Medicine and Research & Publications Committee of the School of Medicine, College of Health Sciences, Addis Ababa University.

As the study was conducted by reviewing individual patient's document, data was collected anonymously and was kept confidential. No personal identifiers was used on the data collection form. Collected data was only accessed by the investigators and confidentiality was maintained at all levels of the study.

Dissemination of the results

As this study is being done for fulfillment of residency training, the result will be presented for defense and the research output will also be submitted for scientific reviewers for possible publication on scientific journals.

Results

Two hundred seventy cases were seen in TASH during the study period, of which 149 cases qualified the inclusion criteria and their data was analyzed in the study.

From January 1, 2017 to December 1, 2020 diagnostic coronary angiography was done for 149 patients, of whom 124 patients (83.2%) were males and 25 patients (16.8%) were females with the age range of 24 to 88 years. The median age was 52 years with similar mean age of 53±12.46 years, the most frequent age stratum being 45-55 years. Of the 149 patients, 127 (85.2%) were from urban areas, while 22 patients (14.8%) came from rural areas (Table-1).

Table 1: **Socio-demographic characteristics of study**

Descriptive Statistics – Age

	N	Minimum	Maximum	Mean	Std. Deviation
Age in years	149	24	88	53.08	12.461
	149				

Frequency Table - Sex

	Frequency	Percent	Valid Percent	Cumulative Percent
Male	124	83.2	83.2	83.2
Female	25	16.8	16.8	100.0
Total	149	100.0	100.0	

Frequency table – Residency

	Frequency	Percent	Valid Percent	Cumulative Percent
Urban	127	85.2	85.2	85.2
Rural	22	14.8	14.8	100.0
Total	149	100.0	100.0	

The most frequent clinical presentation was typical chest pain which occurred in 126(84.6%) of patients followed by SOB in 92(61.7%), diaphoresis in 34 (22.8%) and nausea and vomiting in 15 (10.1%) of patients (fig 1).

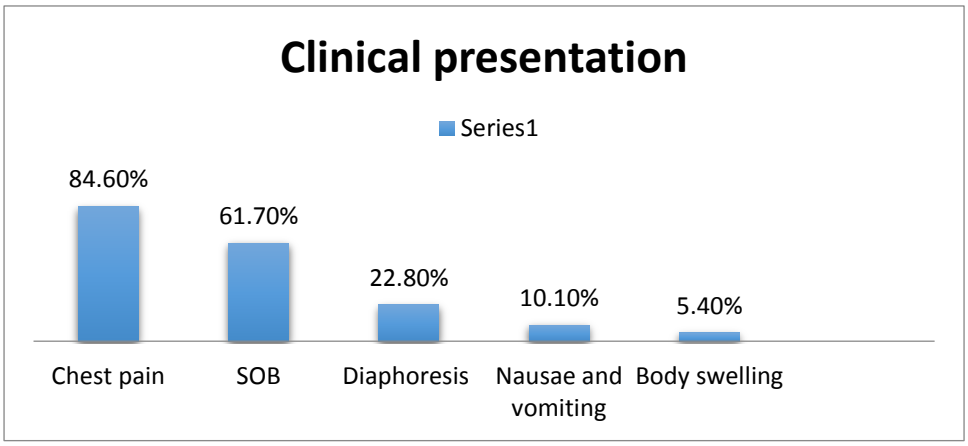

Figure 1

The most frequent clinical diagnosis in those who were subjected to coronary angiography was stable angina which was found in 81 patients (54.4%). The rest 68 patients has acute coronary syndrome of which 51 patients (34.2% of the total) had STEMI, 9 patients (6.04%) had NSTEMI and only 8 patients (5.37%) had unstable angina (Fig- 2).

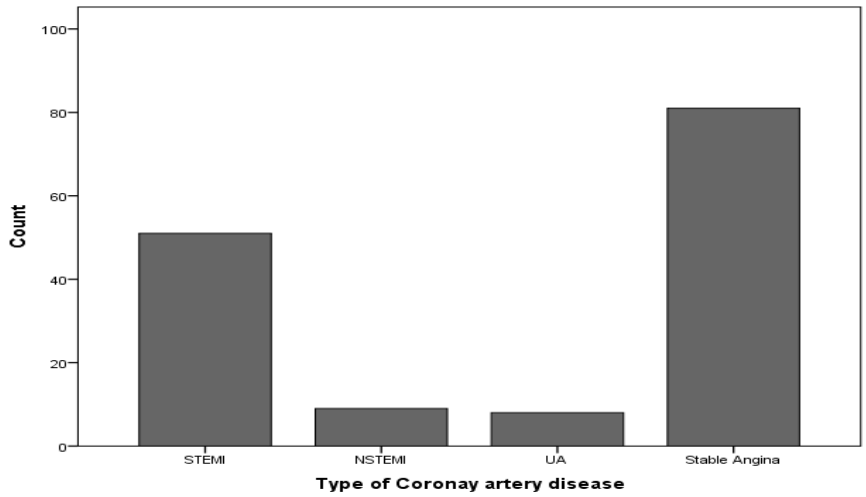

Figure 2

According to the pre-angiographic evaluation, the two most frequent risk factors of CAD were hypertension and dyslipidemia occurring in 60.4% and 59.1% of patients respectively followed by diabetes which was found in 88 (43%) of patients. Forty one patients (27.5%) had previous MI, while 20.8% had history of smoking (fig 3).

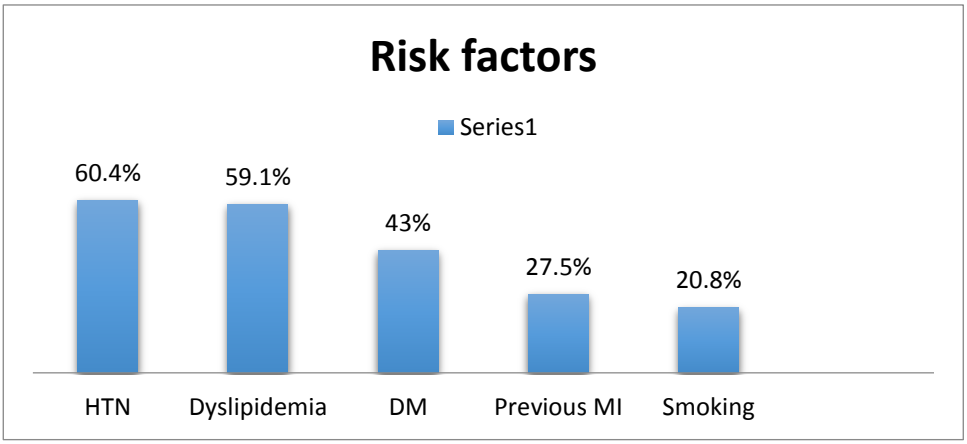

Figure 3

Among the 149 patients who underwent coronary angiography 108 patients (72.5%) had evidence of abnormal coronary arteries while 41(27.5%) patients had normal coronary arteries Females accounted for 6.7% of those with normal coronaries, while only 10% of those with CAD were females.

Of those with evidence of CAD on coronary angiography Sixty seven patients (62%) had single vessel disease whereas 41 patients (37.9%) had multi-vessel disease. The major involved vessel was LAD which occurred in 59.7% of patients (fig 4).

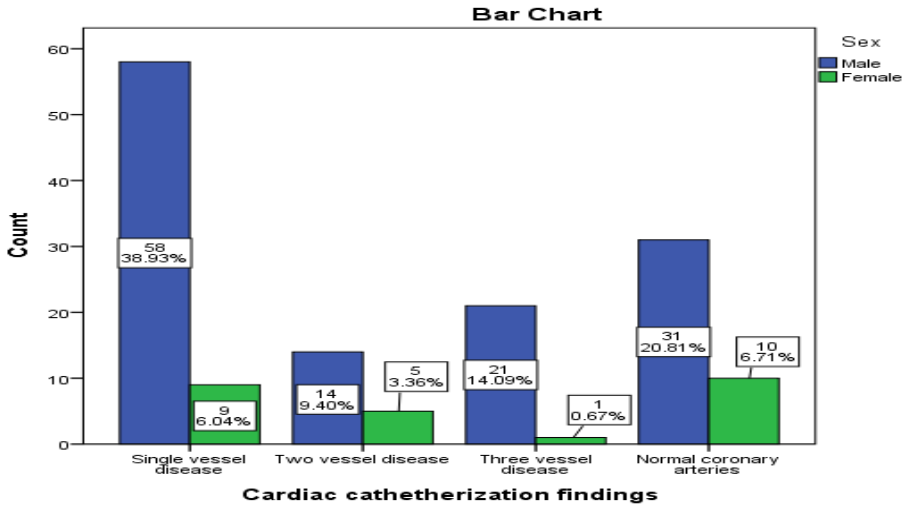

Figure 4

In a bivariate analysis, diabetes was associated with multi-vessel disease (P=0.016), (COR 3.04) 95% CI(1.23-7.51).

PCI was done for 60 (40.2%) patients of which in 51 patients had elective procedure. TIMI-III flow was achieved in all patients of those treated with PCI. There were two myocardial re-infarction and three major arrhythmias which were managed with immediate electrical cardioversion.There was one death (0.67%), which was due to myocardial re-infarction and cardiogenic shock. One hundred eleven patients (74.5%) were discharged improved.

Majority of patients were on medical therapy, ASA (97.3%), statins (98.7%), beta blockers (93.3%), clopidegrol (87.9%) and ACEIs/ARBs (81.2%).

Discussion

The age distribution of CAD patients in TASH was 53.1 ±12.46 years which is in line with that of a study made in SPACE Registry 57.1±13.6 years (28) and Ethiopia 56±11.3 years (21) but lower than that of Global Registry of Acute Coronary Events (The GRACE registry) (66.3 ±10 years) which is a multinational registry of ACS (29). This study also shows that the majority of patients are males (83.2%), which is consistent with another study done in Ethiopia (83%) (21) and a study done in Kenya (82%) (30) but higher than a study done in Nepal (64%) (31).

In this study, chest pain was the chief complaint in 84.6% of patients during admission. 61.7% of patients had SOB, 22.8% of patients had diaphoresis and 10.1% of patients had experienced nausea and vomiting during admission. This is similar with a study done in Ethiopia (81.7% of patients had chest pain) (18) but in contrast to study done in Senegal in which 95.2% of patients had chest pain during admission (32).

Regarding risk factors, HTN and dyslipidemia were the leading risk factors in this study, 60.4% and 59.1% respectively, while smoking history was found in 20.8% of patients. The Kenyan study also reflects the same finding as hypertension and DM were the leading risk factors for development of ACS (30). This is in contrast with a study done in Senegal (32) and GRACE (29) study in which smoking was the main risk factor occurring in 52.4% and 56.7% respectively.

According to this study, STEMI was the clinical diagnosis in 34.2% of patients, whereas majority of patients (54.4%) had diagnosis of stable angina. This is contrast to most studies done in Ethiopia (21) and also Senegal (32). The lower proportion of STEMI cases in TASH may be due to the referral of many patients from private hospitals with the diagnosis of stable angina with failure of medical therapy and discharge of STEMI patients from emergency department before admission for catheterization.

This study shows that 72.5% of patients had evidence of CAD, of this 62% had single vessel while 37.9 had multi-vessel disease with LAD being the most commonly involved vessel (59.7%) and females accounting for the majority of normal coronary arteries. This is in line with a study done in Addis cardiac hospital, Ethiopia (21). Of the 149 patients, PCI was done for 60 patients (40.7%), which is lower compared to a study done in Nigeria (16) and ACCESS study (20) in which PCI was done in 53% and 63.3% respectively. This lower PCI in TASH may be due to limited access to the materials.

The in-hospital mortality of patients in TASH who underwent coronary angiography catheterization and PCI was low (0.67%), which is consistent with the RIVERA (15) study. This is because of the evidences that shows reduced mortality from PCI. Stoke and major bleeding did

not occur in contrast to a study done in Mekelle, Ethiopia, where stroke occurred in 9.3% of patients (17).

Limitation of the Study

The major limitations of this study are: it is a single hospital based study and its small sample size may not be a good representative of the whole population of the nation. Since a retrospective method was used, certain data were missed. Some points like long term post discharge event rates, adherence to medications and life style recommendations and economic costs were not addressed in this study.

Conclusion

This study shows that CAD in Ethiopia occurs early in lfe mainly involving the LAD and is associated with adverse consequences. PCI has been shown to have low complications and low in hospital mortality making it a safe procedure.

Recommendation

Based on this study, focus should be given on prevention strategies and management of risk factors for CAD and PCI should continue to be part of routine management in eligible patients. This study also shows the need for further studies in Ethiopia.

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Annex 1: Declaration

I, the undersigned, declare that this postgraduate thesis is my original work, has not been presented for a degree in this or any other university and that all sources of material used for the thesis have been duly acknowledged.

Postgraduate Candidate: Akberet Semere (MD, Internal Medicine Resident)

Signature: …….

Date of Submission: December 29, 2020

This thesis has been submitted with my approval as advisor.

Advisor: Bekele Alemayehu (MD, Internist, Interventional Cardiologist)

Signature: …….

Date: …….

Place: Addis Ababa, Ethiopia

Annex 2

Questionnaire

This section describes a systematic and efficient procedure for collecting data on patients who had angiography and those who had percutaneous coronary intervention in TASH during the past 03 years from January 1/2017 to January 1/ 2020. It includes data collection by reviewing medical charts / i-Care registry.

Questionnaire number _____

Card number _____

Date of admission----------

Date of discharge or death ----------

1.Part one – Socio-Demographic Characteristics

1.1.Age in years	-
1.2. Sex	a. male b. female
1.3. Residency	a. urban b. rural

Part two- clinical sign and symptoms on admission

2. Symptoms	
2.1 Chest pain	a. yes b. no
2.2. Shortness of breath	a. yes b. no
2.3. Nausea/vomiting	a. yes b. no
2.4. Diaphoresis	a. yes b. no
2.5 Others	Specify
2.6. Length of hospital stay in days	
2.7. BP	
2.8. PR	

2.9. RR	
2.91.BMI	
2.92.Kliip class	a.I b. II c. III d. IV

3. Part three:-Risk factors

3.1.Hypertension	a. yes b. no c. unknown
3.2. Diabetes	A .yes b. no c. unknown
3.3. Dyslipidemia	a. yes b. no c. unknown
3.4. Obesity	a. yes b. no c. unknown
3.5. Family history of CAD	a. yes b. no c. unknown
3.6. Previous MI	a. yes b. no c. unknown
3.7. Current smoker	a. yes b. no c. unknown
3.8. Previous smoker	a. yes b. no c. unknown
3.9. Never smoked	a. yes b. no c. unknown

4. Part four: Type of CAD

4.1. STEMI	a. yes b. no
4.2. NSTEMI	a. yes b. no
4.3. UA	a. yes b. no
4.4. Stable Angina	a. yes b. no

5. Part five: Investigations and procedures

5.1. ECG done	a.yes b.no
5.2. ECHO done	a.yes b.no if yes, LVEF-------
5.3. Lipid profile measured during admission	5.5.1. TC a. yes b.no if yes value----- 5.5.2. LDL a. yes b.no if yes value----- 5.5.3. HDL a. yes b.no if yes value----- 5.5.4..TGA a. yes b.no if yes value-----
5.4. Cardiac catheterization done	a. yes b. no
5.5. Findings of coronary angiography	a. normal coronary arteries b. single vessel disease c. multivessel disease
5.6. Vessels involved	Specify
5.7. PCI done	a. yes b. no I. If yes, the 1st procedure is .emergency II. rescue III. elective i. If no, the reason not indicated ii. contraindicated iii. patient can't afford iv. delayed admission time v. unknown

6. Part six: In hospital medical therapy initiated

Drug name	a. Yes	b. No
6.1. ASA	✓ Loading dose------- ✓ Maintenance dose-----	
6.2. Clopidogrel	✓ Loading dose------- ✓ Maintenance dose-----	
6.3. Anticoagulant		
6.4. Beta blockers		
6.5. ACEIs/ARBs		
6.6. Morphine		
6.7. Nitrate		
6.8. Calcium channel blockers		
6.9. Statins		

7. Part seven: Major in hospital complications and hospitalization outcomes

7.1. Major arrhythmia	a. yes b. no
7.2. Myocardial re infarction	a. yes b. no
7.3. Stroke	a. yes b. no
7.4. Major bleeding episode	a. yes b. no
7.5. Contrast allergy	a. yes b. no
7.6. Discharged improved	a. yes b. no c. same
7.7. Death	a. yes b. no