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Implication and Outcome of Coronary Angiography with Special Reference to Complications Related to the Procedure

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Abstract: This is an observational, descriptive study of 150 cases of Acute Coronary Syndrome as diagnosed on basis of symptomatology, clinical findings, ECG changes and cardiac biomarkers who underwent coronary angiography including STEMI cases after thrombolysis. Lifestyle related and co-morbidity risk factors were recorded. Coronary angiographic findings were analyzed under occlusive and non-occlusive (sub-critical obstruction and normal coronaries). Severity/extent of disease was co-related with risk factors. Prevalence of non-occlusive coronary artery disease was noted. The p value was 0.94 and 0.97, respectively for relation of complication with diabetes and hypertension, showed that risk of occurrence of complication in patient was independent of presence of risk factors like diabetes mellitus or hypertension.

INTRODUCTION

Coronary angiography is the procedure to visualize the blood vessels radiologically, using x-ray, after injecting radio opaque dye. This procedure helps to define coronary artery anatomy. It is also used to determine degree of luminal obstruction of the coronary arteries. It even helps to assess blood flows and coronary collateral. It is mainly used to diagnose Coronary Artery Disease (CAD). When blood supply to the myocardium is temporarily reduced, it demands for oxygenated blood is not met and myocardial ischemia results. Due to ischemia patient gets chest discomfort which is called as angina pectoris. In contrast to this total occlusion of a coronary artery causing total blockage of blood supply to the myocardium results in myocardial infarction. Since, CAD is the world's leading cause of mortality (American Heart Association, 2005) and will be the leading cause of disability by 2020 (Murray and Lopez , 1997). The death rates due to CAD are rising in India along with its prevalence which has increased from 1.1-7.5% and 2.1-3.7% in urban and rural population respectively in last three decades (Chadha *et al*., 1990). Coronary angiography has a slight but definite risk correlated with this. Large incidents are uncommon, although may involve death, myocardial infarction, stroke, aortic or coronary dissection, heart failure, air embolism, cardiac arrhythmias and entry site peripheral vascular damage. Minor complications are relatively common and include arterial puncture site hematoma, short-lived periods of angina pectoris, vasovagal reactions and antibodies to comparison agents and medications. The study found that the most common complication was either localized pain or puncture site hematoma and bruising (Gradinscak *et al*., 2004).

There have been various studies done to establish risk factors associated with CAD and the outcome after it, very few study have been done to investigate on the

indication and outcome of coronary angiography. It has been establish that it is an important procedure to diagnose and manage CAD. This study has thus been undertaken to study angiography indication and outcome.

Aims and objective: To assess the outcome and to study the complications after coronary angiography. To relate outcome of coronary angiography with age, gender and risk factors. To relate complication due to coronary angiography with approach for coronary angiography.

Literature review: Coronary implies the ring of blood vessels that surround the heart and provide it with oxygen and other nutrients. Angiography is a technique for observing blood vessels after radiopaque dye is applied that shows them on x-rays. Coronaries are greatly enlarged vasa vasorums originating from 2-3 sinuses at the root of the aorta. Coronary arteries carry blood to the heart muscle. The coronary arteries comprise of two primary pathways: the coronary arteries right and left (Ferenock *et al*., 2006).

So, coronary angiography is a procedure where dye or contrast material is used with x-rays for imaging study of blood flow in coronary vessels. It is considered to be most accurate method for evaluating and locating coronary artery disease. It classifies indication for coronary angiography according to level of evidence of usefulness of procedure into class I, II, III (Elliott and Joseph, 2012). Retroperitoneal hematoma is suspected if the patient has unexplained hypotension or ipsilateralflank pain. Diagnosis is confirmed by CT abdomen or ultrasound sonography supports the condition but the procedure is generally expectant i.e. bed rest, blood transfusion rather than surgical. Ventricular tachycardia developed in patients with acute myocardial infarction in 4.3% of patients with ST elevation MI after cardiac catheterization in the PAMI trial (Samal and White, 2002).

MATERIALS AND METHODS

A total of 150 consecutive patients admitted in the medical wards of the tertiary care centre, Karad and satisfying the above criteria were included in this study. All patients of acute coronary syndrome who were subjected to coronary angiography in the cardiac catheterization laboratory of the tertiary care centre, Karad Formed the data base for this study. All patients and their cardiac rhythm have been monitored in the intensive care unit for 24 h after the procedure. Patients with suspected complications have been observed long as required. Patients general condition pulse peripheral pulse and blood pressure have been monitored immediately post angiography and after 6, 12, 24 h after the procedure. Routine 12 lead ECG has been recorded at 6 and 24 h post angiography.

RESULTS

Statistical research was conducted utilizing the Ms Excel and SPSS 20.0 edition software packages. Frequencies have been calculated by utilizing concise estimates. Statistically important variations between various groups were calculated through the use of Pearson's Chi-square (χ^2) study. Distinctions were found to be statistically meaningful when $p<0.05$.

Table 1 shows that 150 patients who were enrolled, it was observed that the age ranged from 32-85 years, most number of patients were in the age group of 60-69 years constituting 55 patients (37%), mean age being 58.62 years.

As Table 2 presents, there were 100 males and 50 females, with a mean age of a male being 57.60 years. females with a mean age of 61.18 years. Mean age 58.62 years.

Patients in this study presented with chest sensation (including chest heaviness, tightness, chest pain, retrosternal discomfort) with a frequency of 147(98%). This was followed by sweating 68.67% and then breathlessness (including dyspnoea at rest, dyspnoea on exertion) 36.67% and associated symptoms (palpitations-6% and giddiness-7.33%). Many of the symptoms were overlapping each other as the presenting chief complaints.

In Table 4, at the time of presentation ECG was recorded and interpreted to have 40 (26.67%) patients with Acute Coronary Syndrome and 9(6%) patients with NSTEMI. The Anterior wall was most commonly involved in 20% patients, followed by inferior wall in 18.67% patients.

Table 1: Age distribution

Age (years)	Frequency	Percentage
30-39	6	4
40-49	18	12
50-59	44	29
60-69	55	37
>70	27	18
Total	150	100

Table 2: Gender distribution

Gender	Frequency	Percentage
Male	100	66.67
Female	50	33.33

Table 3: Symptoms frequency

Symptoms	Frequency	Percentage
Chest sensation	147	98.00
Sweating	103	68.67
Breathlessness	55	32.00
Giddiness	11	7.33
Palpitations	9	6.00

Table 4: ECG findings

ECG findings	No. of patients	Percentage
Acs	40	26.67
Ant wall + ant-septal wall	30	20.00
Ant-lat wall	26	17.33
Inf wall	28	18.67
Inf wall with RV extension	6	4.00
Inf-lateral wall	2	1.33
Inf-posterior wall	6	4.00
Lateral wall	2	1.33
NSTEMI	9	6.00
Post wall	1	0.67

DISCUSSION

This observational, descriptive study was done in tertiary care centre, KARAD which caters services to rural areas of south west Maharashtra. In this study, majority of people who came for coronary angiography after Acute Coronary Syndrome (ACS) presented with mean age of 58.62 years. It was consistent with previously published study on ANGIOGRAPHIC PROFILE and mortality in acute coronary syndrome patients by Rajni Sharma (Chen *et al*., 2008), Shivkumar Bhairappa, in which mean age was 54.71 and CREATE registry (Xavier *et al*., 2008) and Jose and Gupta study (Gupta, 2005). The prevalence of diabetics in this study was 19.33% which was comparable with the INTERHEART study -18.5%.

Out of 29, 17 patients were males and 12 female's patients. According to Johnson *et al*. (1989) and Taliercio *et al*. (1989) diabetics were at increased risk of myocardial infarction and nephrotoxicity respectively. Indian natives now constitute the largest population of diabetics in the world. According to Davis *et al*. (1979), hypertensive patients had increased risk of mortality. Complications in hypertensive patients can be prevented by stabilizing the blood pressure to optimal level. ECG recorded on admission was interpreted to have anterior wall myocardial ischemia and infarction in 20% and inferior wall myocardial ischemia and infarction in 18.67%.

CONCLUSION

Patients between age of 60-69 years are more prone to coronary artery disease. In present study, mean age was 58.8 years. Male were more prone to coronary artery disease. In the present study, majority of angiographies were done through radial approach. Patients age ≥60 years had most of the complications. Femoral approach had more risk of complication. Complications seen during this study were coronary spasm, arrhythmias, hypotension, hematoma and pseudoaneurysm. The incidence of complications in present study of 150 patients was 13.33%. In present study, majority of complications occurred during the procedure and with in 4 h of procedure.

Overall single vessel disease was most prevalent coronary angiographic finding in ACS patients. LAD was most common artery involved and LMCA was the least commonly involved artery. Patients with risk factors like DM and/or Hypertension were more prone to multiple vessel involvement. Patients with Low HDL level were more prone to coronary artery disease. The level of HbA1c and incidence of complication was directly proportional to each other. Majority of complications were observed intra procedure. Male and female both were at equal risk of developing complications. Multi vessel diseases were more prone to angiography related complications.

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