RESEARCH ARTICLE

Angiographic Findings in Patients presenting with Chest Pain in Eastern Zone of Afghanistan

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Abstract

Aim: Coronary artery disease is the leading cause of mortality and morbidity globally. Its diagnosis starts with a workup of routine examinations and is confirmed by coronary angiography. The main purpose of the study was to find out angiographic findings in patients presenting with chest pain with or without electrocardiogram abnormalities.

Methods: It was a retrospective descriptive single-setting hospital-based study conducted at Afghan Momand Medical Complex, a tertiary care center in Nangarhar, Afghanistan. The study included 372 patients with chest pain with or without electrocardiogram abnormalities.

Results: Mean age of the study population was 56.6 ± 11.7 years. 50 (13.4%) patients with chest pain had normal coronary angiography (CAG) while 64 (17.2%) patients had non-critical CAG and the rest had significant disease on CAG described as64 (17.2%) patients had single vessel disease (SVD) while 40 (10.8%) had double vessel disease (DVD) and the rest 82 (22%) had triple vessel disease (TVD). The left anterior descending coronary artery was the leading involved artery (206, 45%) followed by the right coronary artery (133, 29%) and left circumflex (119, 26%) respectively. Incidences of TVD increased with increasing age as it was not involved in the lowest two age groups (0. 0%) while it was in involved in 24 (29.3%), 33 (40.2%), and 15 (18.3%) in the age groups 50-59, 60-69, and 70 through highest age groups respectively.

Conclusion: We concluded that coronary angiography precisely prescribed is a gold standard investigation to find out ischemic heart disease in patients with chest pain and/or electrocardiogram abnormalities. In fact, left anterior descending coronary artery was the leading diseased artery in the forms of both single-vessel disease and multiple-vessel disease. Moreover, the prevalence of triple vessel disease significantly increased with increasing age. Angioplasty was a matter of concern that needs to be evaluated with further research about why some patients with single-vessel disease did not undergo subsequent angioplasty and some with triple-vessel disease underwent angioplasty.

Keywords: Angiography, Chest pain, PCI, Coronary, Afghanistan.

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Introduction

Chest pain is a horrible symptom among the Afghan population as it is considered cardiac in origin. Most patients visit primary care physicians for their chest pain and take medication accordingly without undergoing initial workups. In addition, some patients are advised home rest which in turn causes anxiety and depression to both the patient and their families. The typicality of chest pain is underrated by some studies as Cooke *et al.* reported that patients with atypical chest pain under the age of 55 had abnormal coronary angiograms in 2% cases while those over the age of 55 had abnormal coronary angiograms in 12% of cases.[1] Meanwhile, initial workup like an electrocardiogram remains negative for coronary artery disease in a small number of patients as demonstrated in a study by Martinez-Rios *et al.* that 21 patients out of 480 with normal electrocardiogram showed significant disease of one or more vessels and the absence of ECG abnormalities is believed to be due to the presence of collateral vessels.[2] Even 9% of patients with normal coronary angiogram were reported to have had typical chest pain.[3] Hence, Coronary angiography is considered gold standard test for the diagnosis of coronary artery disease.[4] In fact, radial access in comparison to femoral access is significantly associated with fewer puncture site complications.[5] Although a great part of the patients with chest pain are considered to be due to anxiety or depression and are put on anxiolytics and antidepressants specifically in our country due to the current unfavorable conditions, a study revealed that every 1 point increase in depression or anxiety scale causes 5 to 6% increase in coronary angiographic abnormality.[6] Coronary artery disease is significantly associated with increasing age as it is reflected by the finding of a study by Badran *et al.* that increasing age increases the risk of triple vessel disease on coronary angiography while patients at a younger age with

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typical chest pain usually suffer from single vessel disease on invasive coronary angiography.[7]

Despite much research on the important topic, evidence is not available about the disease of the coronary arterial territory and the number of vessel diseases in patients presenting to hospitals with chest pain. In other words, angiographic abnormality is not known in such patient groups. So we aimed to find out angiographic abnormalities in patients with chest pain and/or ECG changes and also investigate whether there is overuse/underuse of coronary angiography and subsequent angioplasty.

Materials and Methods

It was a retrospective descriptive hospital-based study conducted at Afghan Momand Medical Complex, a tertiary care center located in Nangarhar, Afghanistan. The study included 372 both male and female patients complaining of chest pain with specific or unspecific electrocardiographic changes from March 2022 to February 2023. In other words, the study was conducted on patients who were undergoing coronary angiography for indicated reasons. Patients with chest pain of specific non-cardiac origin without specific electrocardiographic changes were excluded from the study. Data was collected from the medical record room of the relevant hospital under formal authorization concealing patients' identities for ethical purposes. Significant coronary artery disease was considered by the operating physician in the cathlab as arterial diameter shortening greater than 50% in comparison to the reference vessel. Data was analyzed using Statistical Package for Social Sciences version 26 (SPSS) using mean ± standard deviation for continuous variables while percentages and frequencies for categorical variables.

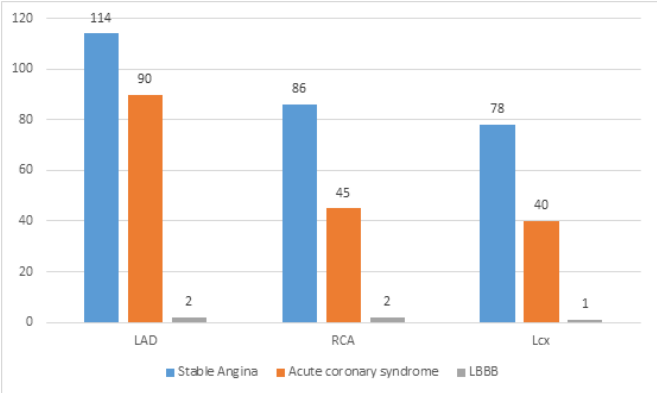

Figure 1: Coronary arterial disease across types of coronary artery disease

Table 1: Frequency and Percentage of CAG findings

Coronary angiography	*Frequency (%)*
Normal CAG	50 (13.4%)
Non-critical CAG	64 (17.2%)
Single vessel disease	136 (36.6%)
Double vessel disease	40 (10.8%)
Triple vessel disease	82 (22%)
Total	372 (100%)

CAG= Coronary angiography

Results

The study included 372 patients with typical chest pain and/or electrocardiographic changes, of which only 259 (69.6%) patients had chronic stable angina while 109 (29.3%) patients were diagnosed with acute coronary syndrome and only 4 (1.1%) patients were included in the study as having left bundle branch block. Mean age of the study population was 56.6 ± 11.7 years.

In fact, 258 (69.4%) patients had significant disease on coronary angiography; whereas, 50 (13.4%) patients had normal and 64 (17.2%) patients had non-critical coronary angiography being considered as coronary artery stenosis less than 70% (Table 1).

Different coronary arterial diseases across the types of coronary artery disease are shown in Figure 1.

LAD= Left anterior descending, RCA= Right coronary artery, Lcx= Left circumflex

Figure 1 shows that LAD was the leading diseased artery across any type of coronary artery disease followed by RCA and Lcx respectively.

In fact, 162 (62%) out of 258 patients with significant coronary artery disease on coronary angiography underwent subsequent angioplasty. In addition, indication for coronary angiography in patients with chest pain was considered in tight precision regarding age i.e. only one patient in the lowest age category of 20-29 was advised coronary angiography and was found to have single vessel disease. CAG reports across different age groups are shown in Table 2.

Left anterior descending coronary artery was found diseased in most cases in the form of single vessel or multiple

Table 2: CAG findings across age groups

Age Groups	*Normal CAG*	*Non-Critical CAG*	*SVD*	*DVD*	*TVD*
20-29	0 ((0%)	0 (0%)	1 (0.7%)	0 (0%)	0 (0%)
30-39	8 (16%)	5 (7.8%)	7 (5.1%)	2 (5%)	0 (0%)
40-49	12 (24%)	18 (28.1%)	18 (13.2%)	1 (2.5%)	10 (12.2%)
50-59	12 (24%)	17 (26.6%)	43 (31.6%)	13 (32.5%)	24 (29.3%)
60-69	13 (26%)	16 (25%)	40 (29.4%)	15 (37.5%)	33 (40.2%)
70 through highest	5 (10%)	8 (12.5%)	27 (19.9%)	9 (22.5%)	15 (18.3%)

SVD= Single vessel disease, DVD= Double vessel disease, TVD= Triple vessel disease

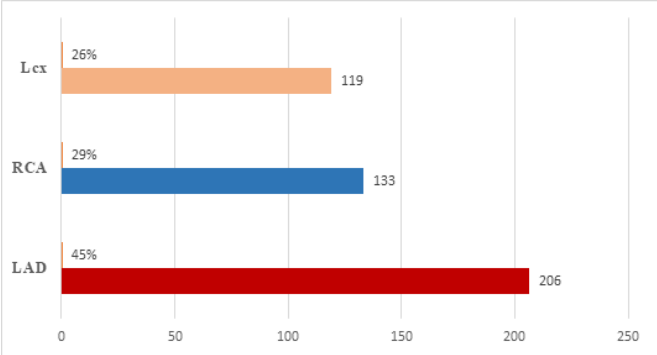

Figure 2: Diseased arteries

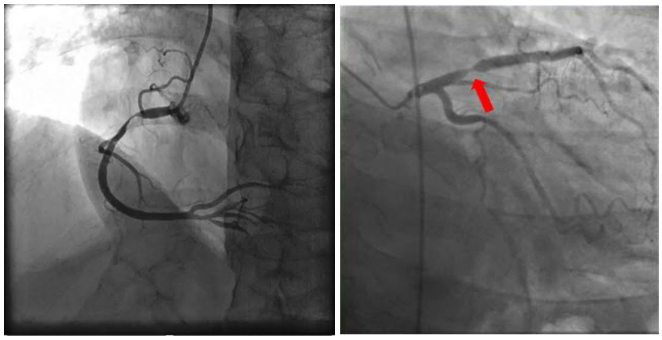

Figure 3: Abnormal condition CAD (SVD)

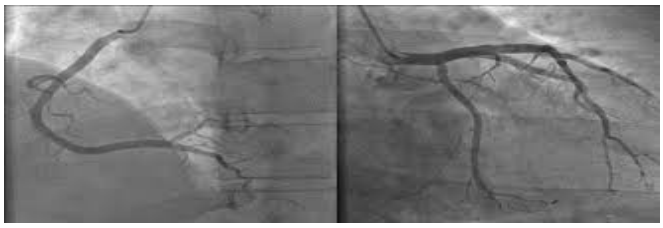

Figure 4: Normal condition of the Arteries

vessel disease i.e. 206 (45%) patients had LAD disease. The rest of the diseases are shown in Figure 2.

Figure 2 further shows that right coronary artery was the second most diseased artery as being involved in 133 (29%) patients followed by left circumflex coronary artery as being involved in 119 (26%) patients. Figure 3 and Figure 4 respectively show diseased right coronary artery and left anterior descending coronary artery and their normal conditions. Single vessel was mostly diseased across any type of coronary artery disease including stable angina

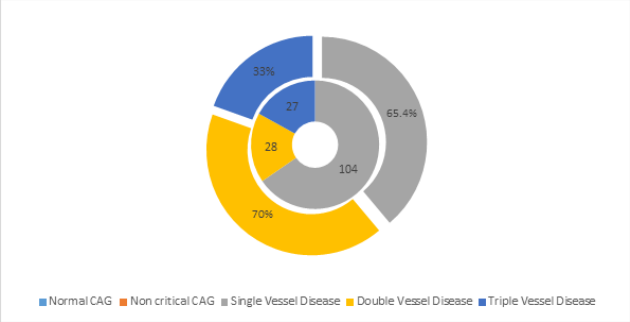

Figure 5: Angioplasty across different types of vessel disease

and acute coronary syndrome as it was diseased in 72 (28%) patients with stable angina, 64 (59%) in patients with acute coronary syndrome. Table 3 shows the numbers of vessels diseased Figure 5: Angioplasty across different types of vessel disease and normal or non-critical coronary angiography across types of coronary artery disease and left bundle branch block diagnosed via electrocardiogram. Figure 5 shows the status of angioplasty following abnormal coronary angiogram where only 21 (5.6%) patients out of 372 had positive Troponin I i.e. they had more than normal serum Troponin I levels. Angioplasty was a matter of concern since all patients with single vessel disease did not have their subsequent angioplasty i.e. only 104 (76.5%) out of 136 patients with significant LAD disease went under angioplasty. The rest of the angioplasty results are shown in Figure 3. Figure 1 shows that most patients with LAD disease had their angioplasty done while only the remaining 23.5% were not served with angioplasty. In addition, 28 (70%) out of 40 patients with significant double vessel disease were served with subsequent angioplasty. Interestingly, 27 (33%) out of 82 patients with triple vessel disease were served with subsequent angioplasty.

Discussion

The major finding of the study demonstrates that two-third of the patients with typical chest pain and/or electrocardiographic changes had significant disease on coronary angiography. In fact, most patients with significant coronary artery disease were found out to have disease in left anterior descending coronary artery followed by right coronary artery and left circumflex respectively. Almost ¼ of the patients with chest pain had a normal coronary angiogram which is concordant with a study by David

Table 3: Coronary angiography in types of coronary artery disease and left bundle branch block

Coronary angiography	*Stable angina*	*Acute coronary syndrome*	*Left bundle branch block*
Normal CAG	48 (18%)	1 (1%)	1 (25%)
Non-critical CAG	61 (24%)	2 (2%)	1 (25%)
Single vessel disease	72 (28%)	64 (59%)	0 (0%)
Double vessel disease	25 (10%)	14 (13%)	1 (25%)
Triple vessel disease	53 (20%)	28 (25%)	1 (25%)
Total	259 (100%)	109 (100%)	4 (100%)

et al. who revealed normal coronary angiogram in 20% of patients;[8] on the other hand, intravascular ultrasound studies stated that encroachment of the lumen is a later process in atherosclerosis, thus these patients will develop significant disease later.[9] Moreover, chest pain in patients with normal coronary angiography is considered a multifactorial pathophysiologic state originating from abnormality is endothelial function to abnormalities in endothelial and non-endothelial factors reserving flow as slow flow phenomenon, vaso-spasm and others.[10] Repeat coronary angiography in such patients show that 1/3 upto ¼ patient with previously normal coronary angiogram develop significant disease each year.[11, 12]

Patients were selected in tight precision for coronary angiography as only one patient in the lowest age group was advised to have coronary angiography and was found to have single vessel disease. Furthermore, normal CAG finding was more prevalent in patients with the diagnosis of stable angina while patients with acute coronary syndrome had highest rate of CAG abnormality.

Younger patients in the study presented mostly with single vessel disease in case of abnormal coronary angiography while the chances of triple vessel disease considerably increased with increasing age. These findings in fact, are concordant.[13, 14]

More than half of the patients with significant coronary artery disease were served with subsequent angioplasty. The reasons for the rest of the patients include triple vessel disease which are advised coronary artery bypass graft,[15] poor financial status and lack of awareness and knowledge which resulted in poor decision-making as most of the patients and their attendants believed medicine would open their diseased arteries. A small number of the patients with triple vessel disease in our study were served with angioplasty rather than angiography; possible reasons for the concern include guidelines that state to open culprit artery and then facilitate coronary artery bypass graft, fear of coronary bypass graft being an open surgery and financial matters.

Conclusion

We concluded that coronary angiography precisely prescribed is a gold standard investigation to find out ischemic heart disease in patients with chest pain and/or electrocardiogram abnormalities. In fact, left anterior descending coronary artery was the most leading diseased artery in the forms of both single-vessel disease and multiple-vessel disease. Moreover, the prevalence of triple vessel disease significantly increased with increasing age. Angioplasty was a matter of concern that needs to be evaluated with further research about why some patients with single-vessel disease did not undergo subsequent angioplasty and some with triple-vessel disease underwent angioplasty.

Recommendation

Measures should be taken to triage patients for coronary angiography, increase social awareness about chest pain, and convince patients to go for subsequent angioplasty if indicated. We also encourage large sample studies to evaluate triage strategies to confine and precise the use of angiography in such patient groups.

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