Original Article

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Angiographic Studies of Coronary Artery Disease in Dhulikhel Hospital

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Abstract

Background

Coronary Artery Diseases (CAD), one of the the leading causes of death, is increasing globally. The number of CAD is also increasing in Nepal. Dhulikhel Hospital is also providing cardiovascular services to populations from semiurban and rural population of mid region of country. It started coronary angiography services from April 2012. This paper aims to analyze pattern of coronary artery occlusion in patients undergoing coronary angiography during April to September months of 2012.

Methods

There were a total of 36 cases of diagnostic angiography and coronary interventions done in Dhulikhel Hospital from April to September 2012. Among them 32 cases of coronary angiography done for Acute Coronary Syndrome and Stable Angina, were analyzed using SPSS 17.

Results

Males were higher in number than females and majority of the patients were above 55 years. Out of 32 cases, 13 (40.6%) had Acute Coronary Syndrome (ACS) and 19(59.4%) had Stable Angina. Six out of 32 were found to have normal coronaries. One patient with ACS had normal coronary. Out of all the patients with coronary stenosis, four had left main disease, 14 had LAD stenosis, 7 had LCX stenosis and 12 patients had RCA stenosis. Thirteen had severe coronary stenosis. Nine out of 12 ACS patients had more than one coronary artery involved, which is significantly higher than the stable angina group ($P<0.01$). Severe stenosis was found to be more common in ACS group ($p<0.001$) when compared to the stable angina group.

Conclusion

Coronary angiography is a useful diagnostic and therapeutic tool for CAD. Coronary status is significantly different in ACS and stable angina. ACS has more chance of having multivessel stenosis whereas stable angina has single vessel, less severe or normal coronaries. Severity of stenosis is also high in ACS than in stable angina.

Key words Acute Coronary Syndrome(ACS), Stable Angina, Coronary Angiography, Dhulikhel Hospital

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Background

The prevalence of Coronary Artery Diseases (CAD), one of the leading causes of death is increasing globally[1]. Each year, approximately 3.8 million men and 3.4 million women die from CAD[2]. It is becoming more significant and growing problem in most of the low-income countries as well[3]. A population based cross sectional study of one major municipality of Nepal showed the prevalence of CAD to be 5.7%[4]. As the number of cardiovascular diseases is increasing in major hospitals in Nepal, CAD has become one of the leading cardiovascular diseases. This can be accounted to the fact that the risk factors of CAD, i.e., smoking, hypertension, diabetes mellitus, dyslipidemia and obesity, have been increasing rapidly. The prevalence of hypertension in urban population is 29%, smoking 31%, diabetes mellitus 19%, metabolic syndrome is 22.5%[5,6,7].

Dhulikhel Hospital, Kathmandu University Hospital is located 30 kilometers east of the capital city Kathmandu of Nepal. This hospital mainly provides services to rural and semi urban population of Kavrepalanchok, Sindhupalhok, Ramechhap, Dolakha, Sindhuli, Bhaktapur and other districts. Hospital has been providing specialty service in cardiovascular diseases for last 10 years. Majority of patients in cardiology department in initial period were Rheumatic Heart Diseases, Cor Pulmonale, CADs and Hypertension. But in the last 5 years the trend has changed into CAD, Hypertension, Heart Failure, Cor Pulmonale and Rheumatic Heart Diseases.

With the increased burden of CADs in Dhulikhel Hospital, many cases need to be referred to centers in Kathmandu for coronary angiogram and other interventions. Duration of transportation from Dhulikhel to Kathmandu and affordability are always challenges for making decisions to refer such cases.

Dhulikhel Hospital started cardiovascular laboratory with Integris Phillips H5000S, Phillips Medical System since April 2012. Indicated cases of Acute Coronary Syndrome and stable Coronary Artery Diseases were investigated with coronary angiography and interventions were done according to necessity.

This paper aims to analyze pattern of coronary artery occlusion in patients undergoing coronary angiography during April to September months of 2012.

Methods

There were a total of 36 cases of diagnostic angiography and coronary interventions done in Dhulikhel Hospital from April to September 2012. Out of these, four peripheral vessels angiography were excluded from study. Remaining 32 cases of coronary angiography were included in the analysis.

Coronary Angiography was performed in ACS according to their presentation. Stable angina patients having continued chest pain were evaluated with angiography.

Coronary angiography and intervention were done using Integris Phillips H5000S, Phillips Medical System. All coronary angiographic studies were performed from femoral approach using standard catheters and techniques. Each coronary artery was selectively viewed in at least two projections.

Two separate observers analyzed the reports, imaging materials and documents independently. Data analysis was done using SPSS 17.

Grading of Stenosis was done as per the following criteria:

O Normal	Absence of plaque and no luminal stenosis
1 Minimal	Plaque with <25% stenosis
2 Mild	25% - 49% stenosis
3 Moderate	50% - 69% stenosis
4 Severe	70% - 99% stenosis
5 Occluded	

Based on disease severity, obstructive CAD was classified as single-, double-, or triple- vessel disease. More than 50% of stenosis was considered to be significant occlusion.

Results

The age and sex distribution of the patients is listed in Table 1. Males were higher in number than females and majority of the patients were above 55 years.

Table 1: Age and Sex distribution

Sex	(n=32)	Percentage
Male	19	59.4
Female	13	40.6
Age	(n=32)	
30-44	5	15.6
45-54	2	6.3
55-64	10	31.3
>65	15	46.9

Regarding the clinical diagnosis prior to coronary angiography, 13 (40.6%) had Acute Coronary Syndrome (ACS) and 19(59.4) had Stable Angina.

Table 2 shows the risk factors of CAD among the patients.

Table 2: Risk Factors of CAD among the patients who underwent coronary angiography.

Risk Factors	Number	Percentage
Hypertension	11	34.4
Diabetes Mellitus	10	31.2
Dyslipidemia	4	12.5

The angiographic findings showed that majority of the cases had coronary stenosis. (Table 3)

Table 3: Angiographic Findings

Angiographic findings		Percentage
Coronary stenosis	26	81.3
Normal coronary arteries	6	18.7

Six out of 32 were found to have normal coronaries. One patient with ACS had normal coronary .

Out of all the patients with coronary stenosis, four had left main disease, 14 had LAD stenosis, 7 had LCX stenosis and 12 patients had RCA stenosis. Thirteen had severe coronary stenosis. The coronary stenosis in different epicardial arteries is listed in table 4

Table 4: Stenosis Grading in different coronaries

	<25%	25-49%	50-69%	70-99%
Left Main (n=4)	3	-	-	1
LAD prox (n=14)	4	5	3	2
LAD mid (n=10)	7	2	-	1
LAD distal (n=6)	3	-	1	2
LCX prox (n=7)	5	1	-	1
LCX distal (n=7)	3	2	-	2
RCA prox (n=12)	6	4	1	1
RCA mid (n=12)	5	3	1	3

(LAD= left anterior descending, LCX= left circumflex, RCA= right coronary artery)

Table 5 shows the classification of coronary stenosis between ACS and Stable Angina groups in terms of number of vessels involved. Nine out of 12 ACS patients had more than one coronary artery involved, which is significantly higher than the stable angina group (*P<0.01*).

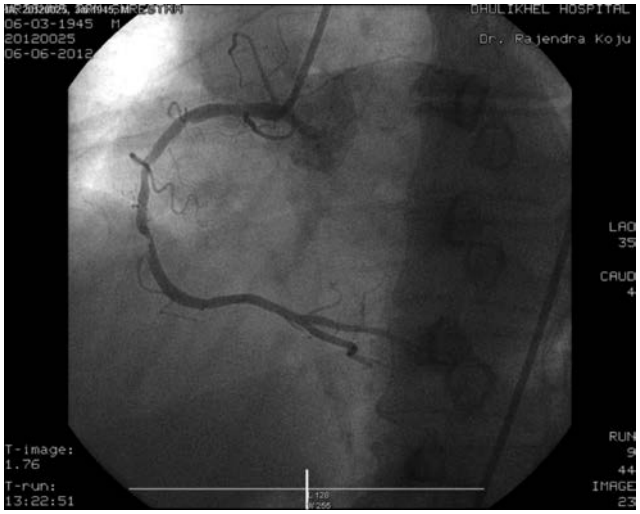
Table 5: Coronary Stenosis classification

	Normal	Single	Double	Triple	Level of significance
ACS	1	3	6	3	
Stable Angina	11	4	3	1	P<0.01

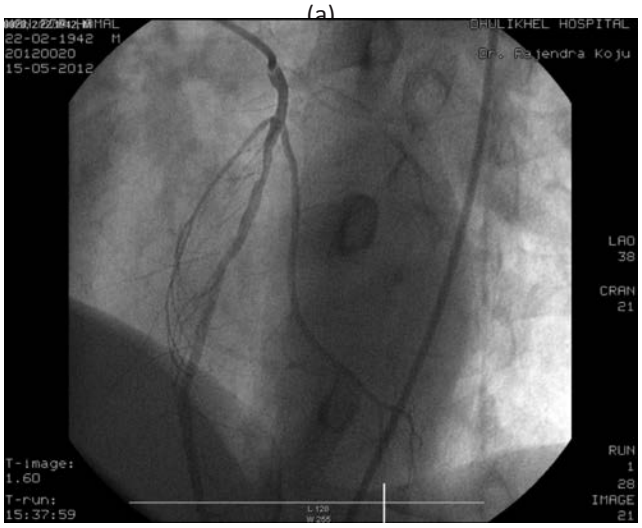
Table 6 shows the level of stenosis between two groups. Severe stenosis was found to be more common in ACS group (*p<0.001*) when compared to the stable angina group. (Table 6)

Table 6: Grading of Coronary Stenosis

	Less Severe Stenosis (<70%)	Severe Stenosis (>70%)	Level of significance
ACS	2	10	p < 0.001
Stable Angina	5	3	



(a)



(b)

Figure: Coronary Stenosis in RCA(a) and LAD(b)

Discussion

Acute coronary syndrome and stable angina are the clinical presentations of coronary artery disease. Majority of CAD is due to atherosclerosis. The clinical presentation depends upon the pathology of atherosclerosis. The process of atherosclerosis may vary between patients. The atherosclerosis causing stenosis and complete blockade can be assessed with coronary angiography, computed tomography. The coronary angiography helps to identify the coronary anatomy and luminal diameter correctly. With its multiple view, coronary lumen can be better evaluated and intervened as per necessity.

Studies have found that majority of patients (60%) were male. Patients more than 65 years were 47%. Majority of CAD has multiple risk factors. This study also shows that

that 34% of studied population had hypertension, 31% had diabetes mellitus and 12% had dyslipidemia.

Not all ACS or stable angina cases in this study had coronary stenosis which supports the report by Germing A et.al.[8] Our study showed that 19% of study population who had either ACS or stable angina had normal coronaries. In comparison to stable angina, normal coronaries were less frequent in ACS group.

The progression of coronary artery disease is commonly observed with history of stable angina. Progression in acute presentations of ACS usually evolves from a previously insignificant rather than a previously significant stenosis[9]. Our study showed that 58% of stable angina had normal coronaries, 26% had less severe stenosis and only 16% had severe form of stenosis. In ACS group 77% had severe stenosis, 22% had less severe stenosis and only 0.8% had normal coronaries.

This study found that 70% of ACS patients had more than one vessel involved whereas 21% of stable angina patients had more than single vessel involved. Looking at the severity of stenosis and number of vessels involved, ACS had more complex in nature. Ambrose JA et.al., reported that unstable angina has more irregular and multiple narrowings compared to stable angina[10]. This finding is also supported by Manukov IH et.al. who found that the incidence of acute coronary syndrome - unstable angina or myocardial infarction – is higher in complex stenosis[11].

Conclusion

Coronary angiography is a useful diagnostic and therapeutic tool for CAD. Coronary status is significantly different in ACS and stable angina. ACS has more chance of having multivessel stenosis whereas stable angina has single vessel, less severe or normal coronaries. Severity of stenosis is also high in ACS than in stable angina.

Limitation

One of the major limitations of this study is the small sample size. Moreover, the evaluation of coronary lesion was also limited. Further studies with higher number of individuals and more elaborated evaluation are required to identify the pattern of coronary artery problems in patients undergoing coronary angiography.

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