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Original Article

Investigating the Prevalence of Ectasia in Angiographic Patients with Acute Coronary Syndrome

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ABSTRACT

Coronary artery ectasia is dilatation of a segment of the coronary arteries leading to intense cardiac conditions. Among the patients undergoing angiography, it has a rare prevalence of 0.3 – 5.3%. It has been strongly associated with atherosclerosis as an evident cause of the dilation of coronary lumen. **Objective:** To determine the frequency of ectasia in patients of acute coronary syndrome undergoing coronary angiography. **Methods:** It is a cross sectional study conducted over six months. 160 patients from the Department of Cardiology, Mayo Hospital, Lahore were enrolled that fulfilled the study criteria of 30-70 years of age, presenting acute coronary syndrome, and undergoing angiography. The Angiography was done by an expert surgeon, simultaneously observed by one of the researchers. Ectasia was diagnosed in all the 160 based on its operational definition. Socio-demographic information including name, age, sex, diabetes (BSR>200mg/dl), hypertension (BP≥140/90mmHg), smoking, and type of acute coronary syndrome was collected with informed consent. Statistical analysis was performed using SPSS version 21. The chi-square test was practiced comparing ectasia in stratified groups of socio-demographic characters and type of acute coronary syndrome. **Results:** Ectasia was diagnosed in 54 (33.8%) patients. No significant association was seen between the age of patients and ectasia. However, frequency of ectasia was higher in patients in the age group 30-50 years. Frequency of ectasia was higher among male patients, but it was not statistically significant when compared with frequency of ectasia among female patients. No significant association was seen between ectasia and diabetes (p-value > 0.999), hypertension (p-value = 0.439) and smoking status (p-value = 0.140) of patients. **Conclusions:** Ectasia is a well-established condition of coronary artery but is an unconventional diagnostic finding of coronary angiography in patients affected with acute coronary syndromes.

INTRODUCTION

Coronary artery ectasia is a relatively familiar condition characterized by abnormal dilatation of the coronary vessels. Scientifically it is labeled with the presence of dilatation exceedingly more than 3 times the length of normal coronary artery and a diameter of the dilatation greater than 1.5 times that of a normal nearby segment [1]. Clinical manifestations include stable angina, acute coronary syndromes, heart failure and sudden death [2]. The scientific mechanism of its progression is unknown, but a different hypothesis suggests that there might be a coalescence of genetic susceptibility, atherosclerosis, and abnormal metabolism of vessel wall [3, 4]. The major trigger for coronary artery syndrome is plaque rupture caused by the dissolution of the fibrous cap [5]. The severity of ectasia decreases from type 1 to type IV [6, 7]. Increased concentration of a circulating marker of myocardial necrosis such as cardiac troponin I or T act as an effective diagnostic marker [8]. Coronary ectasia plays a role in periodic acute coronary syndrome (ACS) [1]. Coronary artery ectasia occurs in 0.3 to 5.3% of patients undergoing coronary angiography [8]. It has been reported in Pakistan, it was observed that frequency of ectasia was detected in 0.8% patients of acute coronary syndrome [9]. In a Turkish study, the frequency of coronary ectasia was

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reported in 1.59% cases of coronary artery disease [10]. While another study, done in Pakistan, it was observed that frequency of ectasia was detected in 5.3% patients of acute coronary syndrome.8 But one study, done in China, coronary ectasia was found in 67% patients o coronary angiogram [11]. The controversy exists in studies done in Pakistan and other regions which create a dispute whether ectasia is a rare or a significant factor leading to acute coronary syndrome.

The purpose of this study was to state the prevalence of ectasia in patients of acute coronary syndrome undergoing coronary angiography to get improved evidence for local population. In future we may be able to implement the screening and appropriate management of ectasia along with acute coronary syndrome to prevent complications.

METHODS

This cross-sectional study was conducted in the Department of Cardiology, Mayo Hospital, Lahore over a six-month period starting from 11-3-2022 to 12-9-2022. A sample of 160 patients was selected with 95% confidence level and 3.5% margin of error, using non-probability consecutive sampling technique. The percentage of ectasia was 5.3% of the sampled patients with acute coronary syndrome. Inclusion criteria was patients aged 30-70 years of either gender presenting acute coronary syndrome (as per operational definition) and undergoing coronary angiography. Whereas patients with previous history of any coronary revascularization were excluded. With informed consent demographic information, including name, age, sex, diabetes (BSR>200mg/dl), hypertension (BP≥140/90mmHg), smoking, and type of acute coronary syndrome, was also taken. Then patients underwent coronary angiography by an expert cardiologist having at least 4 years' experience in angiography with assistance of researcher. If in any coronary artery the presence of dilatation exceeded 3 times the length of normal artery and a diameter of the dilatation exceeding 1.5 times the diameter of a normal adjacent artery, the condition was detected as ectasia as per operational definition. Patients were managed as per hospital protocol. The collected data was analyzed statistically using SPSS version 21. Quantitative variable of was presented in form of Mean ± Standard deviation. Qualitative variables like gender, diabetes, hypertension, smoking, type of acute coronary syndrome and ectasia were presented in form of frequency and percentage. Data was stratified for age, gender, diabetes, hypertension, smoking, and type of acute coronary syndrome. To make comparisons of ectasia in stratified groups, post-stratification and chi-square test was applied.

RESULTS

Table 1 shows the socio-demographic characters of 160 patients. The mean age was 52.66 years with a standard deviation of 8.62. Moreover, among the 160 patients 120 (75%) were males and 40 (25%) were females. In case of the occurrence of lifestyle anomalies in subjects, 97 (60.6%) were diabetic, 97 (60.6%) were hypertensive and 70 (43.8%) were smokers. This validates the general perception of diabetes, hypertension, and smoking being among the risk factors of coronary diseases.

Table 1: Demographic characters of subjects with acute coronary syndrome

Socio-demographic Characters	Statistics
Age (Mean ± SD)	52.66 ± 8.62
Gender N (%)	
Male	120 (75)
Female	40 (25)
Lifestyle Anomalies N (%)	
Diabetes	97 (60.6)
Hypertension	97 (60.6)
Smoking	70 (43.8)

Table 2 demonstrates the penetrance of ectasia among the total subjects along with other types of acute coronary syndromes. Among the subjects 44 (28.1%) were diagnosed with UA, 59 (38.1%) with ST-Segment Elevation Myocardial Infarction (STEMI) and 54 (33.8%) with Non-ST-Elevation Myocardial Infarction (NSTEMI). This shows that ectasia possesses a comparatively significant proportion of occurrence in acute coronary syndrome patients.

Table 2: Frequency proportions of ectasia and type of acute coronary syndrome in sample population

Condition	N (%)
Ectasia	54 (33.8)
Types of acute coronary syndrome	
Unstable angina (UA)	44 (27.5)
STEMI	59 (36.9)
NSTEMI	54 (33.8)

Table 3 highlights the proportion of ectasia positive subjects (33.8%) in relation to the socio-demographic frequencies of age, gender, diabetes, hypertension, smoking habit, and type of acute coronary syndrome. No significant association was seen between the age of patients and ectasia (p-value = 0.174). However, frequency of ectasia was higher in patients in age group 30-50 years (51.9%). Frequency of ectasia was higher among male patients (77.8%) but it was not statistically significant when compared with frequency of ectasia among female patients (22.2%). Among the type of acute coronary syndromes, the frequency of ectasia was higher among patients who were presented with NSTEMI (38.9%) as compared to those with STEMI (29.6%) and lowest

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frequency was seen in patients with UA (1.5%); however, no significant association was seen between type of syndrome and frequency of ectasia. Lastly, no significant association was seen between the proportion of ectasia positive subjects with diabetes (p-value > 0.999), hypertension (p-value=0.439) and smoking habits (p-value=0.140).

Table 3: Frequencies of ectasia in relation to age, gender, type of acute coronary syndromes, and lifestyle anomalies (N=54).

Variables	Ectasia Detected N (%)	p-value
Age (years)		
30-50	28 (51.9)	0.174
51-70	26 (48.1)	
Gender		
Male	42 (77.8)	0.562
Female	12 (22.2)	
Type of acute coronary syndromes		
UA	17 (1.5)	0.285
STEMI	16 (29.6)	
NSTEMI	21 (38.9)	
Lifestyle Anomalies		
Diabetes	32 (60.4)	>0.999
Hypertension	35 (64.8)	0.439
Smoking	28 (51.9)	0.140

DISCUSSION

Morgagni was the first to explain the existence of coronary artery ectasia in 1761 [12]. Since then, globally it has been acknowledged as a frequently occurring disease of coronary arteries. The pathological entity is regarded as the swelling of the coronary artery as compared to normal nearby artery [13]. Coronary ectasia is present in 3-8% of patients undergoing coronary angiography. It may involve the localized area or may be of diffuse variety. In 50% of patients the underlying cause is atherosclerosis while in 30% cases it may be congenitally acquired. In 10-20% it is associated with connective tissue disorders [14, 15]. In this study we determined the frequency of ectasia in patients of acute coronary syndrome undergoing coronary angiography. As per operational definition ectasia was diagnosed in 54 (33.8%) patients. Muhammad *et al.*, reported in Pakistan that ectasia was observed that frequency of ectasia was detected in 0.8% patients of acute coronary syndrome [16]. In a Turkish study, Aksu *et al.*, declared that the frequency of coronary ectasia was reported in 1.59% cases of coronary artery disease [10]. While in another study done in Pakistan by Arshad *et al.*, it was observed that frequency of ectasia was detected in 5.3% patients of acute coronary syndrome [17]. Frequency of coronary ectasia in this study is higher as compared to above mentioned studies. Another recently published study from Pakistan done by Hartnell *et al.*, reported the frequency of ectasia as 62.83% which was quite higher as compared to this study [15]. In China, Wang *et al.*, stated that coronary ectasia was found in 67% patients of coronary angiogram [11]. In a recently published study from India, Lazzarin *et al.*, stated the penetrance of coronary ectasia among North Indian patients who underwent coronary angiography as 4.1% [14]. In the present study, 64.8% of patients with ectasia faced hypertension, 60.4% of the patients were diabetic and 51.9% were smokers. These risk factors for coronary artery disease have been shown to be linked with ectasia in the corresponding study conducted by Ahmed *et al.*, and Iqbal et al. [18, 19]. Histopathological studies could have depicted to an improved degree the frequency of ectasia obtained from each causative factor. Possibly, the redundancy of etiologic factors results in the occurrence and progression of ectasia. Age (30-50 years=51.9% vs. 51-70 years=48.1%, p-value=0.174), gender (male=77.8% vs. Female=22.22%, p-value=0.562), diabetes (60.4%), hypertension (64.8%, p-value=0.439) and smoking status did not show statistically significant association for ectasia. Contrary to these findings a recently published study reported by Hartnell *et al.*, described significant association for these factors with ectasia [15]. As per his finding's male patients, diabetic, hypertensive and smokers had higher frequency of ectasia. Studies have proven that the clinical horizon of ectasia is inconsistent, including stable angina pectoris, unstable angina, and myocardial infarction. It may occur in a few ectasia patients in the absence of coronary artery disease. Ectasia has correlations to different connective tissue disorders as well. Authors state that ectasia is not specifically linked to angiographic diagnosis alone. Ecstatic people are medically at risk of catching acute coronary syndromes despite the absence of any plaque syndrome. As mentioned by Sultana *et al.*, the dilatation of vessels changes the fluid dynamics resulting in abnormal spasms and partition of blood vessels [20].

CONCLUSIONS

As per the findings of this study, ectasia was diagnosed in 33.8% of the sampled subjects undergoing angiography. Ectasia is a well-established condition of coronary artery but is an unconventional diagnostic finding of coronary angiography in patients affected with acute coronary syndromes.

Authors Contribution

Conceptualization: AF
Methodology: AF, AA
Formal analysis: AT
Writing-review and editing: AS, WA, ASH

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Conflicts of Interest

The authors declare no conflict of interest.

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