INCIDENCE OF CORONARY ARTERY ANOMALY IN SULAIMANI CARDIAC HOSPITAL

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ABSTRACT

Background

Coronary arteries are classified traditionally into three different groups according to their anatomy, normal anatomy, anatomical variations, and anomaly. The incidence of coronary artery anomaly (CAA) can vary from as low as 0.2% to as high as 5.64% of the general population.

Objectives

To find the incidence of coronary artery anomalies in the Sulaimani Cardiac Center.

Materials and Methods

A Prospective case study was carried out on patients undergoing emergency and elective coronary catheterization in Sulaimani cardiac hospital from January 2021 to January 2022. After a complete history and physical examination, their coronary angiogram reports were evaluated for the coronary anomaly.

Results

A total of 3,127 patients were evaluated, with coronary anomalies in 144 patients with an incidence of 4.6%. The mean age was 60.2± 11, ranging from 24 to 92 years. The male gender was 66.7%(n=96). The presenting complaint in this study was predominantly chest pain, 78.5%(n=48). The acute coronary syndrome was the cause of urgent coronary angiography in 22.9% (n=33). The myocardial bridge was the most predominant among our patients 41% (n=59), followed by the Separate origins of the Left Anterior Descending Artery and Left Circumflex Artery in the Left sinus of the Valsalva, 38.2%(n=55). While Anomalies of coronary termination (fistula) were found in 4.9% (n=7),

Conclusion

Coronary artery anomalies are uncommon findings in patients undergoing coronary angiography with an incidence of 4.6%, The most common anomaly detected in our study was myocardial bridging.

Keywords: *Coronary artery anomaly, Myocardial bridge, Sudden death.*

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INTRODUCTION

Coronary arteries are traditionally classified into three groups according to their anatomy [1], normal anatomy, anatomical variations, and anomaly. The incidence of coronary artery anomaly (CAA) can vary from as low as 0.2% to as high as 5.64% of the general population, according to different studies [2-4]. This variation is due to their accidental discoveries in different countries or parts of the world [3]. Although they are regarded as a benign condition and rarely cause the symptom, in young athletes, they are considered the second leading cause of sudden deaths after hypertrophic cardiomyopathy. Being different in their pathophysiological mechanisms and an adverse group of this congenital anomaly can lead to a spectrum starting with the benign disease to more serious clinical outcomes, such as syncope, myocardial infarction, arrhythmia, congestive heart failure, and sudden death [2]. The benign portion constitutes 80% of them, while the symptomatic and those may include life-threatening conditions accounts for 20% [5-6]. The magnitude of CAAs may cause diagnostic and therapeutic challenges, including difficult engagement of coronary Ostia, leading to longer fluoroscopy and multiple special catheters and maneuvers during angiography and angioplasty. Furthermore, unawareness of an anomaly during cardiac surgery may damage these vessels. [7] . The traditional and current standard imaging modality is coronary angiography, in which details of coronary anatomy were gained before intervention or surgery [5] . A non-invasive, safer, and effective approach is computed tomographic angiography for finding coronary anomalies and discovering the detail of their course. [8-9].

PATIENTS AND METHODS

A Prospective case study was carried out on patients undergoing emergency and elective coronary catheterization in Sulaimani cardiac hospital from January 2021 to January 2022; all patients consented to be involved in the study. After a complete history and physical examination, their coronary angiogram reports were evaluated for the coronary anomaly. Our study had no exclusion criteria as the indications of their coronary catheterization were decided by their cardiologist in charge, not by our research.

The information from our participants was analyzed by version 25 Statistical Package for the Social Sciences (SPSS). Frequencies and percentages, as well as mean with standard deviations, were given as Descriptive statistics for demographic and health-related factors.

The Ethical and Scientific Research Units approved the ethical consideration of the current study in the Directorate of Training Affairs of the Kurdistan Board for Medical Specialties.

RESULTS

A total of 3,127 patients were evaluated in our study during the proposed period, from which we found different types of coronary anomalies in 144 patients with an incidence of 4.6. Table I illustrates our study's demographic characteristics and risk factors in patients with the coronary anomaly. Their mean age was 60.2± 11, ranging from 24 to 92 years. Male gender was 66.7%(n=96). In terms of their risk factors, it was found that 45.1%(n=65) of them were smokers; Hypertension, diabetes mellitus, and family history of ischemic heart disease were 49.3%(n=71), 27.8%(n=40), and 10.4%(n=15) respectively.

The presenting complaint in this study was predominantly chest pain, 78.5%(n=113). The acute coronary syndrome was the cause of urgent coronary angiography in 22.9% (n=33) of our patients with coronary artery anomalies, while the rest were on an elective basis. Coronary angiograms showed no atherosclerotic stenosis or lesion in 38.9%(n=56) of our patients; single, two, and three vessels' diseases were found in 38.2%(n=56), 11.8%(n=17), and 11.1%(n=16) respectively. The lesions were located in LAD, LCX, and RCA with a rate of 38.9%(n=56), 22.9%(n=33), and 31.9%(n=45), respectively, Table 2.

The myocardial bridge was the most predominant among our patients, 41%(n=59), followed by the separate origins of LAD and LCX in LSV, 38.2%(n=55). In comparison, Anomalies of coronary termination (fistula) were found in 4.9%(n=7). Anomalies of origination and course constitute a significant portion of the anomaly subgroup, including Separate origins of LAD and LCX in LSV, Abnormal origin from the right sinus of Valsalva, LCX from RCA or RSV, RCA from LSV, LMS arising from right RSV with a rate of 38.2%(n=55), 2.8%(n=4), 4.9%(n=7), 6.3%(n=9), 2.1%(n=3) respectively, Table 3.

Table 1. Demographic and other Characteristics of the Patients with coronary artery anomalies.

Parameter (%)	Value (%)
Mean age ± SD (years)	60.2 ± 11
Age range (years)	24-92
21-50 year	18.8
51-60 year	33.3
>60 years	47.9
Male	66.7
Female	33.3
Smokers (%)	45.1
Hypertension	49.3
Diabetes mellitus	27.8
Family history of IHD	10.4

Table 2. Clinical characteristics of patients with coronary artery anomalies.

Parameters		Value (%)
Symptom	Chest pain	78.5
	Epigastric pain	3.5
	Breathlessness	11.8
	Palpitation	6.3
Presentation	ACS	22.9
Number of diseased coronary artery (%)	No lesion	38.9
	Single vessel disease	38.2
	Two vessel disease	11.8
	Three vessel disease	11.1
Diseased coronary artery	LAD	38.9
	LCX	22.9
	RCA	31.9

Table 3. Pattern and incidence of coronary artery anomaly.

Anomaly type	Frequency	Percentage inside CAA (%)	Incidence
Total coronary anomaly n=144/3127	144	100	4.6
myocardial bridge	59	41	1.9
Separate origins of LAD and LCX in LSV	55	38.2	1.8
RCA from LSV	9	6.3	0.3
Fistula	7	4.9	0.2
LCX from RCA or RSV	7	4.9	0.2
Abnormal origin from the appropriate sinus of Valsalva (high origin)	4	2.8	0.12
LMS arises from the right RSV	3	2.1	0.09

DISCUSSION

Although coronary artery anomalies are uncommon, they can be serious in some cases. Multiple classifications have been proposed aiming at a proper classification, and yet further classification is expected to emerge to have a better result. We traced Angelini et al. classification for our study, which classified coronary anomalies into four subgroups, from which anomalies of coronary artery origin and course have the most significant attention in terms of challenging coronary Ostia engagement during angiography as well as causing ischemia or sudden death when the system is abnormal, additionally, it may be sutured during cardiac surgery [10].

In our prospective study covering one year and 3127 patients referred to Sulaimani cardiac hospital for elective and urgent coronary, Coronary artery anomalies were detected in 144 cases (incidence:4.6%). The incidence of coronary anomalies with a range of 0.2% to 5.64% is found in many angiographic studies, while in autopsy series, it is around 0.3% [2, 5, 12]; our result is well within the range of angiographic study. As there is an enormous diversity in the result of publications on CAA, which may not represent the general population, the size of the studies, the type of study population, and the diagnostic tool may affect the study result. However, the result obtained from the same diagnostic tool is still a significant difference.

The study population is difficult to select randomly from the general population. It is mainly determined by the degree of suspicion of coronary artery disease to choose the type of diagnostic modalities. As shown in previous reports on CAA, the gender of the population represents the common population of ischemic heart disease where the male gender is higher among them, which is related to the fact that coronary artery disease is more common in male and the female patient may be delayed in referral for angiography [11]. We reported that the male-to-female ratio is 2:1, similar to an Indian study of 2.07:1 and other reports of 3:1 [2,3]. Moreover, like most of the previous studies[2,8,12], chest pain (78.5%) was the leading cause of referral, and finding coronary artery disease (61.1%) was the most predominant among them.

In our study, anomalies of origin and course were the highest among the four subgroups at 54.1%, similar to other studies with some difference in their value, 62% [2]. The following subgroup was anomalies of the intrinsic coronary artery, which was 41%, the second highest record in many reports with lower and higher results, 0.34% [2] and 68% [11]. While anomaly of termination was the least among this subgroup, we could not find anomaly of anastomosis, possibly due to the small sample size and the short period of our study concerning these rare findings.

The myocardial bridge was the most common anomaly detected in this study (41%), which was similar to the finding in other reports [15,16]. Although reports stated that the absent left main trunk with separate origin of LAD and LCX from the left sinus is the first highest anomaly, followed by the myocardial bridge, in this study, it was the second most common anomaly (38.2%), which goes parallel with the results of other studies [15, 16].

Following the separate origin of LAD and LCX, it is reported that abnormality of RCA will be the next most common and very close to the current study was documented in turkey [15] in which RCA from left coronary sinus was making up ten patients of total coronary anomalies (8.9%). This abnormality and LMS arising from the right coronary sinus could be the most serious type of anomaly and may present with sudden death; we discovered that 2.1% of our coronary anomalies are of this type. It is supported by a study done in China with 2.3% [7].

The anomaly of termination is found in 5 cases draining into the right ventricle, and 2 cases into the left ventricle constituted 4.9% of our cases with CAA. Although it is very close to what is recorded by a study in Serbia at 4.44%, it contradicts an Indian study of 1.5%. [2]. Conclusion Congenital coronary artery anomalies are uncommon findings in patients undergoing coronary angiography. However, myocardial bridging was this study's most common detected coronary anomaly.

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