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A CROSS SYUDY ON ANOMALIES OF CORONARY CIRCULATION CASES

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ABSTRACT
The coronary arteries run The right and left coronary arteries arise from the anterior & left posterior aortic sinuses at the proximal part of the ascending aorta, just superior to the aortic valve. The stems of these two arteries & their major anastomosing branches encircle the heart like an obliquely inverted crown. The left main coronary artery (LMCA), which divides into the left anterior descending artery and the circumflex artery, supplies blood to the left ventricle and left atrium. Coronary artery anomalous course is rare, reported incidence is approximately 0.3–1.3% of patients undergoing coronary angiography and approximately 1% of routine autopsy examinations. A single coronary artery is an unusual congenital anomaly where only one coronary artery arises from the aortic trunk from a single coronary ostium, supplying the entire heart.

INTRODUCTION

Cardia word is derived is from the Greek word *Kardia*, meaning heart. Heart receives its blood supply from the coronary vessels. The word coronary is derived from the Latin word *co-ro-ne* or Greek word *ko-ro-ne*, means anything hooked or curved and coronary means 'encircling in a manner of crown'. The pair of coronary arteries branch in such a manner that they occupy atrioventricular and interventricular groove in the shape of a crown. Hence they are called the coronary arteries [1]. Coronary arteries supply blood to the heart muscle. The coronary arteries run along the outside of the heart and have small branches that supply blood to the heart muscle [2]. The right and left coronary arteries arise from the anterior & left posterior aortic sinuses at the proximal part of the ascending aorta, just superior to the aortic valve [3]. The stems of these two arteries & their major anastomosing branches encircle the heart like an obliquely inverted crown [4]. The two main coronary arteries are the right main and left coronary arteries. The left main coronary artery (LMCA), which divides into the left anterior descending artery and the circumflex artery, supplies blood to the left ventricle and left atrium.

Anomalies of Coronary circulation

Variations are rare but the two may start separately or in common from the same sinus, three or even four coronary arteries have been observed. The left coronary opening may be double, leading into major initial branches, the circumflex, & anterior interventricular; one may lead into a stem common to one such branch & a diagonal ventricular ramus [5].

Coronary artery anomalous course is rare, reported incidence is approximately 0.3–1.3% of patients undergoing coronary angiography and approximately 1% of routine autopsy examinations. A single coronary artery is an unusual congenital anomaly where only one coronary artery arises from the aortic trunk from a single coronary ostium, supplying the entire heart [6].

Congenital anomalies of coronary arteries are a group of disease, which is infrequently found. Their prevalence has been reported to range from 0.6% to 1.3%.

Most clinical manifestations are benign and asymptomatic [7].

Significance of the study

During the surgical procedures used in the treatment of arrhythmia, injury to coronary arteries remains important possibility. So coronary arteries & nodal arteries are studied in detail in terms of origin & course. Such detailed information regarding coronary arteries will be helpful in the application of cardiac surgery. This current study is also done to throw light upon the arterial supply to sinuatrial node and atrioventricular node, termination of right coronary artery and left anterior descending branch of left coronary artery and the predominance of heart. This is to help the cardiologists for a better approach to cardiac disease for a precise cure.

AIMS AND OBJECTIVES

- To study the origin of Coronary Arteries
- To study anomalies of Coronary Arties.

MATERIALS AND METHODS

Type of Study is Cross section.
Sample size is calculated by formula $(Z)^2 P q/d^2$.
Sample size =43
Sample size in this study is taken as 100.
Sampling Technique: is convenient technique.
Duration of study: July 2013 to January 2014.

Place of study: Billroth Hospital, Shenoy Nagar, Chennai, Tamil Nadu.
Inclusion Criteria: All angiogram of males and females.
Exclusion Criteria: CD copied get corrupt or damage.

The coronary angiograms are be copied on CDs. Data is collected in pretested questionnaire.

Observations are tabulated in Microsoft excel. Analysed is done for statistical significance using SPSS trail version 17.0 for window, version 7. Means, Standard deviations, t test, z test, chi square test, & Fisher's exact test are calculated. P value of less than 0.05 is considered to indicate a significant difference. Institutional Research Committee and Ethical Committee clearance was obtained.

OBSERVATIONS AND RESULTS

Age

In this study, minimum age is 48 and the maximum age is 64, mean is 56 and S.D. is 3.824. According to z test, p value is 0.000 which is less than 0.05. So age values in this study are not normally distributed.

Sex

In this study population, males constitutes about 63 %(63) and females constitutes about 37 %(37).

Presence of Single Coronary Artery

Both RCA and LCA are present in 100% of individuals.

Origin of Right Coronary Artery

In 98% of individual's right coronary artery originates from anterior aortic sinus, which is normal origin. In 1% of individual origin of right coronary artery is from midsegment of left anterior descending artery. Again in 1% of individual origin of right coronary artery is from left coronary sinus, which is an anomalous origin. In this study, almost 98 %(98) have the normal origin of Right Coronary artery. Only 2 %(2) have the anomalous origin.

Origin of Left Coronary Artery

In 99 % of individuals in this study origin of left coronary artery is from left posterior aortic sinus, which is normal origin.

In 1(1%) individual origin of left coronary artery is from right coronary artery, which is an anomalous origin.

Presence of Single Right Coronary Artery

In all the individuals under study both right and left coronary arteries are present.

Table 1. Age (t test)

One-Sample Statistics				
Age	**N**	**Mean**	**Std.Deviation**	**Std.Error Mean**
	100	56.00	3.824	.382

Table 2. Age (Z test)

One-Sample Statistics						
	Test Value=62					
	t	**df**	**Sig.(2-tailed)**	**Mean Difference**	**95% Confidence Interval of the Difference**	
					Lower	**Upper**
Age	-15.689	99	**.000***	-6.000	-6.76	-5.24

Table 3. Association of Sex

S no	Factors	Categories	Fisher test p value(2 sided)
1	Origin of RCA	Anatomical variation	0.529
		Normal	
2	Origin of LCA	Anatomical variation	1.000
		Normal	
3	Independent origin of conus artery	No	0.212
		Yes	

Table 4. Association of Origin of Right Coronary Artery (Chi square test)

S No	Factors	Categories	Chi square p value
1	Origin of SA_{NA}	Both CA	0.644
		CxLCA	
		Proximal portion / trunk of LCA	
		RCA	
2	Origin of AV_{NA}	BOTH CA	0.478
		LCA	
		RCA	
3	Dominance of CA	Co dominance	0.276
		Left	
		Right	

Table 5. Association of Origin of RCA (Fisher's exact test)

S No	Factors	Categories	Fisher test p value(2 sided)
1	Origin of LCA	Anatomical variation	1.000
		Normal	
2	Independent origin of conus artery	No	1.000
		Yes	

Table 6. Association of Origin of Left Coronary Artery (Chi square test)

S No	Factors	Categories	Chi square p value
1	Origin of SA_{NA}	Both CA	0.843
		CxLCA	
		Proximal portion / trunk of LCA	
		RCA	
2	Origin of AV_{NA}	BOTH CA	0.694
		LCA	
		RCA	
3	Dominance of CA	Co dominance	0.837
		Left	
		Right	

Table 7. Association of Origin of LCA (Fisher's exact test)

S No	Factor	Categories	Fisher test p value (2 sided)
1	Independent origin of conus artery	No	1.000
		Yes	

DISCUSSION

In this study, minimum age is 48 and the maximum age is 64, mean is 56 and S.D. is 3.824. Males constitutes about 63 %(63) and females constitutes about 37 %(37). 100% of the individuals don't have the presence of single coronary artery. 99 %(99) have the Normal origin of Left Coronary artery and only 1 %(1) have the anomalous origin. 100% of the people don't have the presence of single Right coronary artery.

Range of Age

In *Fares G Altaii* et al study age range were 7 -85 years [2]. Similar study by *LJA Didio* et al showed minimum age was 7 years & maximum was 80 years [8].

Anjali Sabnis reported that the age range in their study was 20-70 years [5]. *Our findings* are range of age is 48-64 years.

Mean of Age

According to *Fares G Altaii* et al study mean of age was 54.32 years [2]. The results were similar to *Lakshmi Ramanathan* et al study, who reported mean of age was 55 years [6]. *Farhood Saremi* et al reported that mean of age was 57 years [9]. *In this study*, mean of age is 56 years.

Sex

According to *Fares G Altaii* et al study, male were about 45% and female were about 55% [2]. In *Lakshmi Ramanathan* et al study, male constituted about 62%, female constituted about 38% [6]. This results were similar to *Vasudeva Reddy* et al study, were male constituted about 66% and female about 34% [10]. *In present study*, male are 63% and female are 37 %.

Presence of Single Coronary Artery

Study of coronary arteries by angiography had done by *Fares G Altaii* et al in 500 cases. Observations of presence of single coronary was about 10.66% and 89.34% did not have the presence of single coronary artery [2]. According to *Mahilmaran Asha* et al study 0.03% had the presence of single coronary artery and 99.97% did not have the presence of single coronary artery [11]. Similar to this, in *Patel MP* et al study 0.48% had the presence of single coronary artery and 99.52% did not have the presence of single coronary artery [12]. *Our study* shows 100% did not have the presence of single coronary artery.

Origin of Right Coronary Artery

In *Jyoti Kulkarni* et al study, origin of right coronary artery was normal in 99.07% and anomalous in 0.93% [13]. According to *John S Ho's* study, origin of right coronary artery was normal in 99.75% and anomalous in0.25% [14]. *Mohammad Balghith* et al reported that origin of right coronary artery was normal in 99.74% and anomalous in 0.26% [15]. Similar to above study, *we found* that origin of right coronary artery is normal in 98% and anomalous in 2%.

Origin of Left Coronary Artery

In *Cengiz Bolcan* et al study, origin of left coronary artery was normal in 99.98% and anomalous in 0.02% [16]. *Carvalho* et al reported that origin of left coronary artery was normal in 99.9% and anomalous in 0.10% [17]. In another study by *Julie A. Davis* et al, origin of left coronary artery was normal in 98.8% and anomalous in 1.2% [18]. *Present study* reported that origin of left coronary artery is normal in 99% and anomalous in 1%.

Presence of Single Right Coronary Artery

According to *Fares G Altaii* et al study, 1% had the presence of single right coronary artery [2]. *Topaz O* et al studied the origin of left coronary artery and its branches by angiography. They found that in 0.04% cases there was presence of single right coronary artery and 99.96% did not have the presence of single right coronary artery [19]. *In current study*, 100% did not have the presence of single right coronary artery.

CONCLUSIONS

- 100% of the people have the presence of both (right & left) coronary arteries
- 98 % have the normal origin of Right Coronary artery.
- 99% have the Normal origin of Left Coronary artery.
- No statistical association between sex & origin of coronary arteries.
- No statistical association between origin of coronary arteries and SA_{NA} & AV_{NA}.

LIMITATIONS

- This is hospital based study. So we can not apply results to general population. As each unit in the study have not get equal chance of selection to be include in this study.
- Random sampling technique is not used in this study. That's why statistical significant results cannot be generalized to the population.

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