

THE INCIDENCE AND PATTERN OF ANOMALOUS CORONARIES IN JORDANIAN POPULATION

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ABSTRACT

Objective:To determine the frequency and pattern of coronary anomalies on angiography in the Jordanian population.**Methods:** This is a retrospective study conducted at Queen Alia Heart Institute in Amman-Jordan during the period 2007 to 2010. A total number of 2950 adult patients who had coronary angiography which were reviewed looking for the presence of anomalous coronary arteries and their pattern of occurrence.**Results:** The total number of angiograms studied was 2950, with 38 cases showed coronary anomalies (1.3%).The commonest anomaly was circumflex from right sinus or right coronary artery (29.0%). Myocardial bridging reported a high incidence of occurrence (23.7%). The distribution of other coronary anomalies was found to be almost the same to what was reported in the literature. The incidence of coronary artery disease in the anomalous arteries was low (28.9%).

Conclusion: The prevalence of coronary anomalies in Jordanian population is lower than the ratios mentioned in the literature but has almost the same pattern,with low risk for developing atherosclerosis in the anomalous vessel.They are usually benign; however, angiographic recognition of these vessels is clinically significant especially in patients undergoing coronary angioplasty or heart surgery.

INTRODUCTION

Congenital coronary artery anomalies (CAA) are present at birth, but relatively few are symptomatic during childhood.⁽¹⁾ In adults; they may be clinically silent, benign, and discovered incidentally; on the other hand, they may cause angina, syncope, myocardial infarction and sudden cardiac death.⁽²⁾

According to the literature, coronary anomalies affect 0.3 – 5.6% of the general population,⁽³⁾ and they are found in about 1% of coronary angiograms⁽⁴⁾ while lower incidence (0.3%) is reported at necropsy.⁽⁵⁾ Although CAA overall frequency is relatively low, they may predispose the patients for myocardial ischemia,⁽⁶⁾ and importantly, it was documented⁽⁷⁾ to cause death, for example 11.8% of deaths in American high school and college athletes, and more over it was considered as the commonest cause of sudden cardiac death in young athletes.⁽⁸⁾ Among these anomalies, the most fatal variants are caused by

vessels that pass between the aortic root and the right ventricular out flow tract or pulmonary artery.^(9,10)

Diagnosis of CAA is important specially when considering the severity of coronary artery stenosis during treatment options like angioplasty or bypass surgery.

METHODS

This retrospective study was conducted to Queen Alia Heart Institute in Amman – Jordan, during the period January 2007 to January 2010.

The sample size involved 2950 adult patients (>18 years) who underwent coronary angiography for mainly chest pain in that period of time.

Patients known to have congenital structural heart disease were excluded from the study. Pediatric age group was not involved as well.

Review of all cases was done looking for the presence of coronary anomalies in each case.

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The study was designed to determine the incidence of coronary artery anomalies, its pattern and the presence of atherosclerotic plaques in the anomalous vessels.

Patients were categorized as having significant coronary artery disease, if they had more than 40 – 50% stenosis. Patients with high "take off" of coronary arteries, separate origin of the conus artery from the right aortic sinus, coronary ectasia and separate ostia left main were excluded from the study.

Results:

As can be seen in table 1, CAAs were found in 38 cases in a ratio of 1.3% of the total number of the studied angiograms. Table 2 shows the relative frequency of CAA, with the commonest one is circumflex artery from right sinus or right coronary artery in 29.0% of cases, followed by myocardial bridges which constituted 23.7% of CAAs, followed then by coronary fistulae (18.5%).

Left main from aorta, absent circumflex and left anterior descending artery from right sinus reported the lowest frequency in this study with 2.6% for each.

As can be observed in table 3, the incidence of associated coronary artery disease in CAA was 28.9%, which is lower than the overall incidence of coronary artery disease in all angiograms (80.0%) as can be shown in table 4.

DISCUSSION

The prevalence of coronary anomalies in our study is 1.3%, which is lower than the ratio in other pioneer studies^(4,11) of patients referred for coronary angiography. CAA appear to be more common in males than in females in our review, which is similar to other reports.^(12,13) This may reflect the selective basis of referral for cardiac catheterization and coronary angiography.

We believe, the incidence of CAA should be higher than the ratio obtained in this trial, because the included coronary arteriograms were only for symptomatic patients

mostly chest pain, while there are many asymptomatic people with CAA were not subjected to arteriography, so they were missed and still undiagnosed.

This low incidence of CAA in our study can be also explained on the basis of geographical or racial differences of this topic which was reported^(22,23) in other trials.

Besides, pediatric population were excluded from our study which included only adults and elderly people, so certain major and severe coronary anomalies were not documented, which are associated with a high death rate in infants and children.^(24,25)

Patients with congenital structural heart disease were not involved in the study, as CAA are frequently seen among these people.⁽²⁶⁾

However, we believe that our study sample size is relatively small and we did not attempt to examine a large number of cases which might affect the end ratios we obtained.

The distribution of CAA and their relative frequency in our trial was almost similar to the findings in other reported studies,⁽⁴⁾ except for myocardial bridging that constituted 23.7% of CAA in our study, which is relatively higher than ratios in other

reports.⁽¹⁴⁾ Although it is a benign condition with an excellent long term survival,⁽¹⁵⁾ its presence has been associated with myocardial infarction^(16,17) and sudden death in

left anterior descending artery myocardial bridging.⁽¹⁸⁾

Atherosclerotic anomalous coronaries were found in 28.9% of patients in our study. Whereas the overall incidence of atherosclerosis in the study was 80%.

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Although this is against what was reported⁽¹⁹⁾ that anomalous coronaries are more

susceptible to atherosclerosis, our result goes in agreement with some other reports.⁽²⁰⁾

Dispite atherosclerosis is less in anomalous coronaries, they are associated with myocardial ischemia, which could be due to compression from the aorta and pulmonary artery. Furthermore, ischemia was also reported⁽²¹⁾ even when the anomalous artery does not run between the great vessels.

Currently, attention should be shifted to other proven modalities in the diagnosis of CAA before going to the invasive coronary arteriography.

For example, computed tomography⁽²⁷⁾ and magnetic resonance⁽²⁸⁾ angiography which proved its usefulness in demonstrating the origin, the exact course of the anomalous coronaries and its relation to the surrounding structures, in addition to allow a great

accuracy in the diagnosis of atherosclerosis and stenosis in those vessels.

Recognition of coronary anomalies at angiography is essential in order to prescribe proper follow up and appropriate medical or surgical therapy as we realize their exact clinical consequences, we should plan for the precise timing of application of therapeutic measures.

Table 1: Overall incidence of CAA *

Total No. Of angiograms	No. of cases with CAA	%
2950	38	1.3

*CAA: coronary artery anomaly

Table 2: Relative frequency of CAA

Anomaly	No.	%
Cx. from right sinus or RCA	11	29.0%
Myocardial bridges	9	23.7%
Coronary artery fistulae	7	18.5%
RCA from aorta	4	10.5%
RCA from left sinus	4	10.5%
LAD from right sinus	1	2.6%
LM from aorta	1	2.6%
Absent Cx.	1	2.6%
Total	38	100%

Cx ; circumflex, RCA :right coronary artery

LAD: left anterior descending, LM: left main

Table 3: Distribution of CAA * according to sex and presence of associated CAD **

Sex	CAA with CAD	CAA free of CAD	Total
Male	9 (32.1%)	19 (67.9%)	28 (73.7%)
Female	2 (20.0%)	8 (80.0%)	10 (26.3%)
Total	11 (28.9%)	27 (71.1%)	38 (100%)

*CAA: coronary artery anomaly

**CAD: coronary artery disease

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Table 4: The overall incidence of CAD* in total No. of angiograms in this study and in respect to sex distribution.

Sex	No. of cases with CAD (%)	No. of cases with normal coronaries (%)	Total (%)
Male	1774 (83.4%)	353 (16.6%)	2127 (100%)
Female	585 (71.1%)	238 (28.9%)	823 (100%)
Total	2359 (80.0%)	591 (20.0%)	2950 (100%)

*CAD: coronary artery disease

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