Angiographic anatomical variation of origin of left circumflex coronary artery in Basrah

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ABSTRACT

Background: **The left circumflex coronary artery normally originated from left coronary artery , however, this artery may change its origin either from left aortic sinus or from right aortic sinus. This knowledgement may help in understanding some of ischemic heart diseases and its consequences on cardiac surgery.**

Objective: **To know the incidence of anatomical variations of left circumflex coronary artery origin among people in Basrah.**

Patients and Method: **Prospective study of the coronary angiography carried out in cardiac catheterization center at Al-Sader Teaching Hospital during period from 5th of October 2012 to end of June 2013. A sample of 315 patients was recruited with normal coronary angiography.**

Results: In the present study the left circumflex artery was variable in its origin, the left circumflex artery originated from the left coronary artery in 97.1%, originated from the left aortic sinus in 1.9% and in 1% of the sample it originated from right aortic sinus.

Conclusions: **Recognition of the origin of left circumflex coronary artery and its anatomical variations before cardiac surgery is important to prevent myocardial infarction and death. Special surgical consideration must perform in valvular replacement in patient with variation of origin of left circumflex coronary artery.**

Keywords: angiography, anatomical variation.

التصوير الوعائي للتباين التشريحي لمنشأ الشريان التاجي المنعطف الأيسر في البصرة

الخلفية: **الشريان التاجي المنعطف الأيسر ينشا عادة من الشريان التاجي الأيسر، ومع ذلك، هذا الشريان قد يتغير منشأه أما من الجيب الابهري الأيسر أو من الجيب الابهري الأيمن وان هذه المعرفة قد تساعد على فهم بعض من أمراض القلب الاقفاري وعواقبه في جراحة القلب.**

الهدف: **الهدف من هذه الدراسة معرفة حدوث اختلافات تشريحية من منشأ الشريان التاجي المنعطف الأيسر بين سكان البصرة.**

طريقة أجراء البحث والمرضى: **أجريت دراسة استطلاعية لتصوير الشرايين التاجية في مركز قسطرة القلب في مستشفى الصدر التعليمي خلال الفترة من الخامس من تشرين الأول ٢٠١٢ و حتى نهاية حزيران ٢٠١٣ وقد أجريت على ٣١٥ مريض ذوي شرايين تاجية سليمة.**

النتائج: **في هذه الدراسة كان الشريان المنعطف الأيسر متغير المنشأ، حيث ينشا الشريان المنعطف الأيسر من الشريان التاجي الأيسر في ٩٧.١٪ و ينشا من الجيب الابهري الأيسر في١٩% و في ١% ينشا من الجيب الابهري الأيمن.**

الاستنتاجات: **أن من الأجدر أدراك الاختلافات في منشأ الشريان التاجي المنعطف الأيسر وذلك للوقاية من احتشاء عضلة القلب والموت و خصوصا في عمليات القلب المفتوح. ويجب الأخذ بالاعتبار إجراء دراسة جراحية خاصة في استبدال صمامات القلب لهولاء المرضى.**

الكلمات الرئيسية: **التصوير الوعائي، التباين التشريحي.**

INTRODUCTION

Coronary arteries carry blood to the heart, these run on the surface of heart called "epicardial coronary arteries". It originated from the root of aorta one centimeter above the aortic valve as pocket-like sinuses called "aortic sinus or sinus of Valsalva": the right, left and posterior aortic sinuses. The anterior right aortic sinus gives origin to the right

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coronary artery, the left posterior sinus gives origin to the left coronary artery and the posterior aortic sinus referred as the non coronary sinus.[1-7] The left aortic sinus has left coronary artery orifice but the most frequent variation is absence of left coronary artery that's mean the left anterior descending artery and left circumflex artery have existence of two separate orifices in left aortic sinus known as "shotgun orifice". [8] Otherwise if the left coronary artery presents it bifurcates into left anterior descending artery and left circumflex artery.[1,.2] Most patients with left circumflex artery anomalies are asymptomatic until sudden death or complications after performing valve replacement therapy. The knowledgement of these variations taken with regard to invasive catheterization or bypass surgery. [8, 12]

PATIENTS AND METHODS

This angiographical prospective study was carried out in the cardiac catheterization center at Al Sadder Teaching Hospital ,Basrah governorate during the period extended from 5th of October 2012 to the end of June 2013. The sample included patients who lived in Basrah and attended the center during the study period. The patients with history of congenital heart diseases and angiographical findings as ischemic arterial changes were excluded from the study. The sample size was three handered fifteen cases (315), the cases selected randomly in age and sex (male cases were 212 while female cases 103). A structural questionnaires formula was developed and designed for the purpose of the study after being discussed with experts. All 315 cases were interviewed, the interview and data collection was carried out after taken a verbal permission from the patient to participate in this study. The patient should be stable at time of conventional angiographical study, each patient should have done the following tests: the baseline ECG, electrolytes, renal function tests, complete blood cell count and coagulation test should be reviewed before coronary angiography. Drugs used during coronary angiography: sedation as diazepam 5-10 mg intramuscularly, anticoagulants as heparinized saline is still required during routine coronary arteriography, contrast dye Ominipaque contrast media 350 mg / 1cc, the vial contain 100 cc given according to body weight and other drugs used according to the patient conditions these drugs included: intravenous fluid, adrenaline, atropine, hydrocortisone. The coronary angiographies were performed by the Judkin technique through femoral approach by using 6 French femoral sheath and diagnostic catheters.

Catheterization Equipments: The catheterization equipments used in cardiac catheterization center at Al Sadder Teaching Hospital were:

***Phillips angiographic equipment: which used in the center since 2008 and manufactured in Holland.**

***General Electrical angiographic equipment: which used in the center since 2012 and manufactured in USA**

RESULTS

This angiographical prospective study was carried out in the cardiac catheterization center for period extended from 5th of October 2012 to the end of June 2013. The sample size was 315 cases; male patients were 212 (67.3%) and the female patients were 103 (32.7%). The age of patients were ranged from 20 to 85 years (56 years ± 5.4 years). This study revealed that the left circumflex artery originated from left main stem in 97.1%, the origin from left coronary sinus in 1.9% and its origin from right coronary sinus was 1% as shown in (**Table-1, Figure-1, Figure-2, Figure-3)**

Table 1. Distribution of cases according to left circumflex artery origin:

Left circumflex artery origin	No. of patients	%
From left main stem originated	306	97.1
From left coronary sinus	6	1.9
From right coronary sinus	3	1
Total	315	100

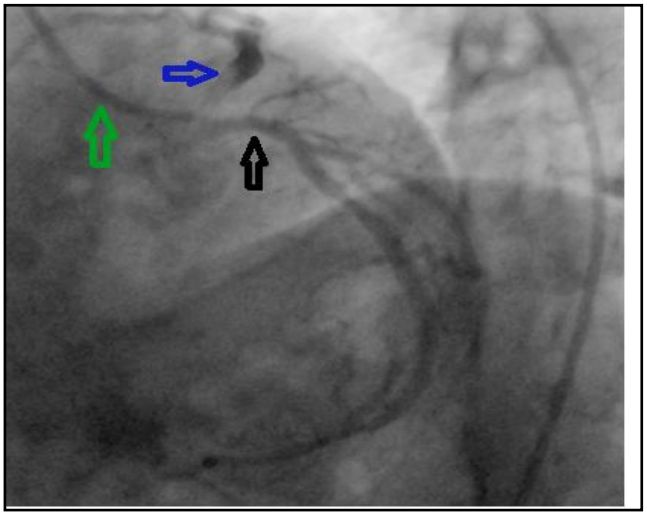

Fig 1. Coronary angiogram showed the catheter (green arrow) in left coronary sinus where the anterior descending artery (blue arrow) and left circumflex artery (black arrow) arised directly from left coronary sinus in two separate Ostia.

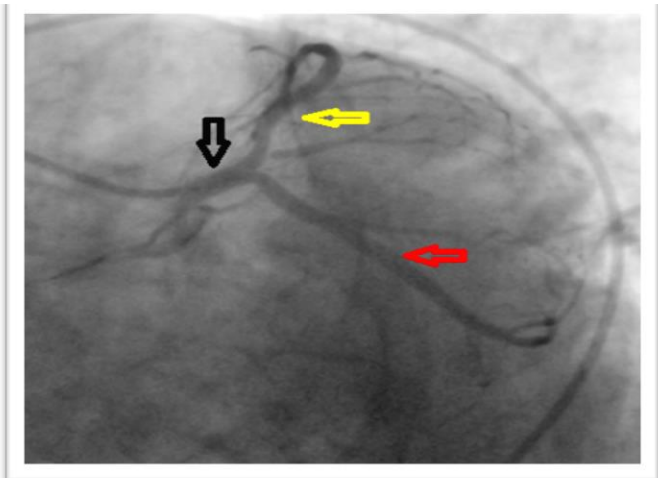

Fig 2. Coronary angiogram showed: left coronary artery(black arrow) branched to anterior descending artery (yellow arrow) and left circumflex artery (red arrow).

Fig 3. Coronary angiogram showed: the left circumflex artery (black arrow) arised from right coronary sinus (blue arrow) same as right coronary artery (red arrow).

DISCUSSION

The present study showed that the left circumflex artery originated from left coronary artery in 97%, the origin from left coronary sinus in 1.9% and from right coronary sinus in 1%. These results were in agreement with Fazliogullari *et al*., 2010; Abdellah *et al*., 2009 and Sohrab *et al*., 2010.[9,10,11] The left circumflex artery originated from left sinus of Valsalva **(left aortic sinus)** or right sinus of Valsalva **(right aortic sinus)** it is consider as benign condition, nevertheless the left circumflex artery anomalies which consider as benign may lead to serious condition when performing valve replacement, left circumflex benign anomalies can be compressed resulting in serious morbidity. [12] Mavi *et al*, 2002 and Rozenman *et al*,1993 reported that if the origin of left circumflex artery from right sinus of Valsalva it will caused myocardial ischemia and infarction at old age. [12,13] Mavi *et al*, 2002 and Rivitz *et al*, 1989 reported that the patient with evidence of persistent inferior wall ischemia after successful percutanous transcoronary angioplasty of a solitary right coronary artery

lesion was due to arising of left circumflex artery from ostium of right coronary artery. A thorough search for such vessels is warranted in a patient with abnormal diagnostic tests and there is no apparent obstructive lesions in the normally positioned arteries. [12,14] Patients with separated orifice of the left anterior descending artery and left circumflex artery within left sinus of Valsalva were not taken in consideration in some studies. [12,15]

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