



A Comparative Study Of Distance Of The Right And Left Coronary Ostia From The Bottom Of Their Respective Aortic Sinuses.

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ABSTRACT

With the aim of comparing the distance of right and left coronary ostia from the bottom of their respective aortic sinuses 43 human hearts were collected irrespective of age, sex, socioeconomic status, religion, educational status. The specimens were collected from the Department Of Forensic Medicine and Department Of Anatomy, Gauhati Medical College, Guwahati. In the present study it is seen that the mean distance of the right coronary ostia (13.34 ± 2.06 mm) was found to be greater than the mean distance of the left coronary ostia (12.80 ± 2.55 mm) from the bottom of their respective aortic sinuses.

KEYWORDS

coronary ostia, aortic sinus.

Introduction:

The heart is the first functioning organ in the human body and much of its development including remodeling and septation occurs while the heart is pumping blood. The walls of the heart are supplied by the coronary arteries which are characterized by two major vessels, the right and left coronary arteries. The coronary arteries are the first vessels that branch from the aorta, normally originating below the junction between the bulbous and the ascending aorta, that is, at the sinotubular junction. These arteries arise from the corresponding sinuses of the aortic valve apparatus. Their position within sinus of valsalva or at the sinotubular junction allows maximum coronary filling during ventricular diastole. This position is however variable.^[1-5]

Coronary arterial orifice in the aorta are present at 37 days of gestation. Coronary arteries originate from capillary ring that encircles aorta and pulmonary outflow tracts and penetrate the aorta. Thereby, coronary arteries do not grow out of the aorta but grow into the aorta from the peritruncal vasculature.^[6-8]

Ever since Werner Frossman performed self-catheterization in 1929, there has been dramatic and innovative advances in both methods and materials of catheterization and now it has become a standard medical procedure. In the last decade cardiac catheterization has evolved further from a diagnostic modality to one of a treatment. This has motivated several studies on the anatomical position of the coronary ostia as it is well known that the changes in the coronary flow maybe caused by modifications in the position, diameter and anatomic relations of the coronary ostia.^[9-11]

Materials and Method:

The present study was carried out in the Department of Anatomy, Gauhati Medical College, Guwahati. Specimens (heart with proximal part of aorta) were collected from unclaimed or donated human cadavers taken from the following two sources -

- 1) Department of Anatomy, Gauhati Medical College
- 2) Department of Forensic Medicine, Gauhati Medical College.

In the present study, a total of forty three hearts had been studied. The specimens were collected irrespective of age, sex, socio-economic status, religion, educational status. The hearts with the proximal part of aorta were collected after fulfilling all medico legal formalities within six hours of death and with no obvious pathological changes and decomposition. Hearts with mechanical damage and gross deformity were excluded.

The collected specimens were washed with free flowing tap water. All the blood and clots were removed from the chambers of the

heart by gently squeezing the heart. Coronary arteries and their branches were particularly squeezed out in the direction from the apex towards the ostia, so that the clots pass through the ostia. The specimens were then preserved in 10% formalin.

The preserved specimens were dissected for gross anatomical examination. The visceral pericardium was first removed to expose the coronary arteries. Subepicardial fats were also removed carefully. With the help of scalpel and fine forceps, the coronary arteries were dissected out and traced. Then the ascending aorta was sectioned transversely approximately one cm above the commissure of aortic leaflets. Next the aorta was longitudinally opened at the level of non coronary sinus to enable visualization and analysis of right and left aortic leaflets and their respective coronary ostia. Measurements of the distance from the bottom of the aortic sinus was taken using Vernier Callipers

Statistical Analysis:

The statistical analysis had been done using statistical software SAS 9.3 to find out the appropriate results from the collected data by applying the appropriate tests.

Results:

The position of the coronary ostia had been studied by measuring the distance of each ostia from the bottom of the aortic sinus where they were present.



Fig 1: Photograph showing the coronary ostia and aortic sinuses

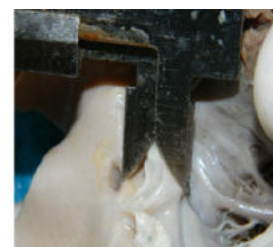


Fig 2: Photograph showing measurement of distance of coronary ostium from the bottom of the aortic sinus

Table 1: Mean distance of coronary ostia from bottom of Aortic Sinus

CORONARY OSTIA	NO. OF SPECIMEN	MEAN (in mm)	SD (in mm)	SE (in mm)	P VALUE
RIGHT	43	13.34	2.06	0.31	0.2793 ^{NS}
LEFT	43	12.80	2.55	0.39	

NS= Non Significant P>0.05

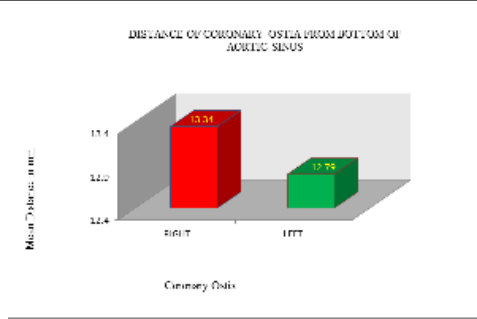


Fig 3: Bar diagram showing the mean distance of right and left coronary ostia from the bottom of their respective aortic sinuses.

Table 1 and fig 3 shows the mean distance of the right and left coronary ostia from the bottom of their respective aortic sinuses. The mean distance of the right coronary ostia (13.34 ± 2.06 mm) was found to be greater than the mean distance of the left coronary ostia (12.80 ± 2.55 mm), which was not statistically significant (P value > 0.05).

Discussion:

The mean distance of the right coronary ostia (13.34 ± 2.06 mm) was found to be greater than the mean distance of the left coronary ostia (12.80 ± 2.55 mm) from the bottom of their respective aortic sinuses. Cavalcanti et al. (2003), Joshi et al. (2010) and Govsa et al. (2010) found a similar result in their studies but Sirikonda and Sreelatha (2012) found that the distance was almost equal from the right and left ostia with the right coronary ostia being situated marginally higher than the left coronary ostia.^[12-14]

Table 2: Comparison of mean distance of coronary ostia from the bottom of the aortic sinus with other studies.

Studies	Mean distance of coronary ostia from bottom of Aortic Sinus (in mm)	
	Right	Left
Cavalcanti et al. (2003)	13.2	12.6
Joshi et al. (2010)	14.08	13.3
Govsa et al. (2010)	13.1	11.8
Sirikonda and Sreelatha (2012)	14.46	14.3
Present study	13.34	12.80

Conclusion:

It is seen in this study, the mean distance of right coronary ostium from the bottom of aortic sinus was greater than left coronary ostium which was not found to be statistically significant. The knowledge of anomalies in origin in the coronary arteries is important to many disciplines of medical sciences including forensic medicine. Some variations in the origin of coronary arteries may cause heart disease in patients and increase the risk of sudden death during exertion and normal activities. Knowledge about the position of the coronary ostium and their possible variations is also important for coronary angiography. High and Low coronary orifices represent added difficulty during coronary angiography, a point that most haemodynamists agree with.^[15,4]

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