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Original Article

A Cadaveric Study of the Thebesian Valve

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ABSTRACT

Coronary sinus ostium is guarded by a valve called Thebesian valve. The Coronary sinus is defined as a venous trunk 2-3cm long that extends from the Vieussens valve to the coronary sinus ostium in the right atrium. The Thebesian valve is an embryological remnant of the sinoatrial valve. It is a fold of endocardial tissue that guards the coronary sinus ostium and is variable in shape [1]. About 50 adult human hearts from the cadavers of institute of Anatomy, Madurai Medical college, Madurai were dissected for the study of the dimensions of the coronary sinus ostium. The presence or absence of Thebesian valve and the shape of the Thebesian valve were noted. The Thebesian valve was present in about 96% of the specimens and absent in 4%. The shape of the Thebesian valve also showed various forms like semicircular, bands, strands. A thorough knowledge of the coronary sinus ostium and the valvular system is important with the advent of invasive cardiological procedures like cardiac catheterisation.

Key Words: Coronary sinus (CS), Thebesian valve, Coronary sinus ostium (CSo).

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INTRODUCTION

The coronary sinus is a wide venous trunk that occupies the posterior part of atrioventricular groove. It is about 2-3cm in length and extends between the Vieussens valve to the opening of the coronary sinus into the interior right atrium[1]. The sinus is actually the continuation of the great cardiac vein distal to its junction with the oblique vein which is guarded by a valve called Vieussens valve.The coronary ostium is situated in the posterior aspect of the inter atrial septum which is in front of the Eustachian valve and behind the tricuspid annulus. The coronary sinus ostium is guarded by a semilunar valve called as "Thebesian valve" that normally covers the posterior and superior surface of the ostium. Sometimes it covers the ostium with fenestrations [2,3].

The valve is absent in some cases and the shape of the valve is variable. Most commonly it is semilunar or cresentric in shape, but it may be in the form of band, strands or remnants [4]. Coronary veins are not given its due importance unlike the arteries. It is being increasingly used in cardiothoracic surgeries and electro physiologicalstudies [5].

MATERIALS AND METHODS

A study was conducted on 50 formalin fixed human cadaveric hearts that were collected in the Institute of Anatomy, Madurai Medical college, Madurai,over a period of three years. The Morphometry of the coronary sinusostiumwith the help of vernier caliper, the presence or absence of Thebesian valve and the shape of the Thebesian valve were all noted in all the 50 specimens.

RESULT

The Morphometry of the Thebesian valves were then taken. All the 50 specimens were examined for the presence or absence of Thebesian valve. The following findings were noted.

Table:1 Presence or Absence of Thebesian valve

Thebesian valve	No. of specimens	Frequency
Present	48	96%
Absent	2	4%

When the Thebesian valve was present the craniocaudal and transvense dimensions were less, when the valve was absent these dimensions were more.

Table:2 Comparison of craniocaudal dimension of CS ostium in relation to presence or absence of Thebesian valve

Study	Craniocaudal dimension (mm)	
	Thebesian valve-present	Thebesian valve-absent
Present study	10.83± 2.16	14.50± 2.12

TRANSVERE DIMENSIONS (mm)

Table:3Comparison of Transverse dimension of CS ostium in relation to presence or absence of Thebesian valve.

Study	Transverse dimension(mm)	
	Thebesian valve-Present	Thebesian valve-Absent
Present study	9.98±2.23	13.50±0.71

Photo – 1→Thebesian Valve – Present Photo –

2→Thebesian Valve - Absent

Photo – 3→Thebesian Valve – Semicircular

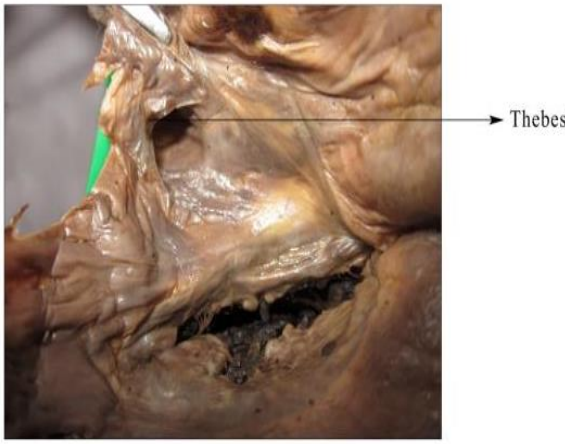


Photo – 4 Thebesian Valve - Band

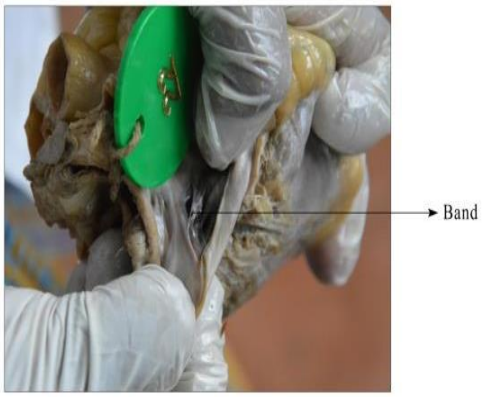
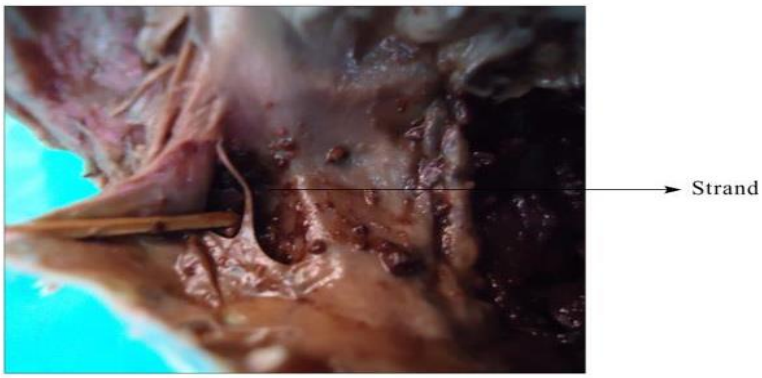


Photo – 5→Thebesian Valve - Strand



The transverse dimensions of CS ostium in specimen with Thebesian valves were 9.98 ± 2.23mm and with absent Thebesian valves were 13.50 ± 0.17mm. The P valve < 0.032 was considered significant. Shape of thebesian valves were also condidered into study. Normally the Thebesian valve is semicircular or cresentic in shape. But many other forms like bands, strands were also noticed. In the present study, no remnant type was obtained.

Table:-4 various Shapes of Thebesian valve

Shape of Thebesian valve	No of specimens	Frequency
Semicircular	41	85.4%
Strands	6	12.5%
Bands	1	2%
Remnants	-	-

DISCUSSION

An extensive inter-communicating network of veins provides venous drainage of the coronary circulation. The three venous drainage system that are normally considered are the coronary sinus and its tributaries,the anterior right ventricular veins and the Thebesian veins.Thebesian valve is located at a distance of about 9cm from the bifurcation of left coronary artery[6].

In the present study, the cranio caudal and transverse dimensions correlated with the study of Mak et al. Hellerstein H.K and Orbison J.C [4] studied 150 hearts and found Thebesian valve in 85.3% and it was absent in 14.7% of cases. GS mak et al[3] studied 75 hearts and found the valve in 73% of cases and it was absent in 27%. R. Manorajitham [7] studied 30 hearts and found valves in 93.33% and was absent in 6.66%. Lalit Mehra[8] studied 40 hearts and found valves in 92.5% of cases and were absent in 7.5% cases. In the present, parameters for the presence or absence of Thebesian valve correlated with the study of R. Manoranjitham and Lalit Mehra's study.The absence might be congenital or might be the force exerted by blood flow across a thin flimsy endocardial valve. When absent, the entry of the catheter through the coronary sinus ostium would be uneventful especially as the diameter of the coronary sinus ostium was more in hearts without Thebesian valves, compared to hearts with valve [9]. G.S Mak et al observed thebesian valves in 4 shapes namely semicircular, strands, bands and remnants. In the present study, three types of valves were noted, but the remnant type was not

observed. M.Mazur [10], stated that band form of valve posess conduction tissue,so it may cause arrthythmia during catheterization.

CONCLUSION

The complete knowledge of coronary sinus its Morphometery and its variations and presence or absence Thebesian valve and its types are important in interventional cardiology. In indirect Annuloplasty for mitral valve annulus repair for mitral regurgitation, the mitral valve annulus approached through the coronary sinus because the sinus cover about 50% of the mitral valve annulus perimeter[9].

Coronary sinus defect is an uncommon type of Atrial septal defect consist of the absence of coronary sinus and entry of left superior vena cava directly in to the left atrium[6]. It is to note that in studies involving catheterization of coronary sinus often requires placing the tip of the catheter in the coronary sinus beyond the enhance of posterior inter-ventricular vein[6].

The type of Thebesian valve observed in this study may be useful for the success of invasive procedures since it can complicate the cannulation of Coronary sinus by obstructing its access, or it may complicate invasive cardiac procedures when band like valve with a potentiality to induce arrhythmia. It is concluded that the information obtained from this study regarding the morphology of coronary sinus valve will help to identify and to avoid potential complications during cardiac interventions.

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