Journal of Population Therapeutics & Clinical Pharmacology

RESEARCH ARTICLE
DOI: 10.53555/jptcp.v30i16.4386

ANATOMICAL STUDY OF THE ANNULAR CIRCUMFERENCE OF ATRIOVENTRICULAR VALVE WITH ITS CLINICAL CORRELATION.

Dr. Pavan Kumar Mahato[1], Shailendra Singh[2]*

[1]Professor, Department of Anatomy, Index Medical College Indore, Madhya Pradesh
[2]*Ph. D Scholar, Department of Anatomy, Index Medical College Indore, Madhya Pradesh

***Corresponding author;** Shailendra Singh
*Ph. D Scholar, Department of Anatomy, Index Medical College Indore, Madhya Pradesh
Mail id; shailendra9044301005@gmail.com

Abstract

Introduction: - The human heart comprises four chambers with openings to facilitate blood inflow and outflow. These openings are safeguarded by valves that ensure planned and controlled blood flow. The annulus, the periphery where the valves are attached, plays a crucial role in this process. Two atrioventricular valves, tricuspid and mitral (bicuspid), are named after the number of cusps they possess and are located between the atria and chambers on both sides. The pulmonary valve regulates blood flow in the pulmonary trunk while the aortic valve regulates the flow through the aorta. **Materials and Methods: -** The study took place in the anatomy department of Index Medical College Indore, Madhya Pradesh , where 45 formalin-fixed heart specimens were examined. The hearts were dissected, allowing for visual examination of the interior to identify the tricuspid and bicuspid valves. **Results:-** Our current study observed that the annular Circumference of the Tricuspid valve ranges from 46.09 to 131.92 mm, with a mean of 90.28±17.86. While annular Circumference of the bicuspid Valve ranges from 64.18-128.15 mm with a mean of 84.11 ±14.25 **Conclusion:-** A thorough understanding of the anatomical features of the atrioventricular valve can enhance our comprehension of its structure and function. This knowledge can play a key role in improving the outcomes of conservative treatments and facilitating a return to normal anatomical and functional states.

Keywords: Bicuspid Valve, Tricuspid, Mitral, atrioventricular valve, Prostheses

Introduction

The human heart contains four chambers equipped with openings designed for the inflow and outflow of blood. Valves protect these openings for planned and controlled blood flow. The periphery to which the valves are attached is called the annulus. Atrioventricular valves are two in number: tricuspid and mitral (bicuspid), named for the number of cusps and located between the atria and chambers on both sides. The other Valve, the pulmonary Valve, regulates blood flow in the pulmonary trunk, and the aortic Valve regulates flow through the aorta. Valves generally act as closures chambers, thereby controlling the inflow and outflow mechanism. An increase in the incidence of a sedentary lifestyle leads to heart disease, which causes an increase in mortality and morbidity in humans.Moreover, hearty valves are also affected by various diseases and disorders such as stenosis, regurgitation, valve prolapse, infectious endocarditis & rheumatic fever and fibrocalcific degeneration or dilatation of the valve annulus[1].Knowledge of the normal anatomy of cardiac valves

and the anatomic abnormalities caused by specific diseases is essential in the clinical detection of abnormalities of cardiac valves and in developinga particular therapeutic intervention that proves helpful in patient care. The cardiac valves are collagenous structures covered by the continuous endothelium layers that line the cardiovascular system. The valves that guard the exit from the ventricle are the pulmonary and aortic valves (semilunar valves), and those at the atrioventricular junction are tricuspid and mitral valvesThe cardiac disease may also involve more than one Valve. Severe damage to the heart valves can be corrected with prosthetics valves[2].
The present study was undertaken to construct a normal range for the different dimensions of the tricuspid valve orifice, which may be helpful for cardio surgeons and invasive cardiologists whouse direct measurements of this region.

Material
The present study was conducted in the anatomy department of Index medical college Indore, Madhya Pradesh. Forty-five formalin-fixed heart specimens were taken for the study.

Inclusion criteria
1. Hearts in good condition after removing from cadavers.
2. Hearts specimensretain their morphological features.

Exclusion criteria
1. Hearts in lousy condition after removing from cadavers.
2. Hearts specimens did not retain their morphological features.

Method
The heart dissection was done, and the heart's interior was seen for the tricuspid valve and bicuspid Valve. Morphological parameters of the structure mentioned above were measured as follows:

Tricuspid valve
- Annular Circumference: With the help of cotton thread length of the attached margin of the Valve was measured, and it was considered an annular circumference.

Bicuspid Valve
- Annular Circumference: With the help of cotton thread length of the attached margin of the Valve was measured, and it was considered an annular circumference.

Observation
Our current study observed that the annular Circumference of the Tricuspid valve ranges from 46.09 to 131.92 mm, with a mean of 90.28$\pm$17.86. While aannularCircumference of the bicuspid Valve ranges from 64.18-128.15 mm with a mean of 84.11 $\pm$14.25, as shown in Table No 1

Table no 1 shows the mean value of the Annular Circumference of the Valve

Parameter	**Mean (mm)**	**Standard Deviation**	**Minimum (mm)**	**Maximum (mm)**
Tricuspid ValveAnnular Circumference of Valve	90.28	17.86	46.09	131.92
Bicuspid ValveAnnular Circumference of Valve	83.98	13.29	64.18	128.15

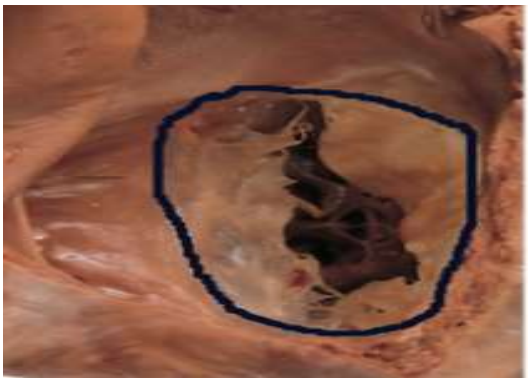

Fig No 1 Showing Tricuspid Valve

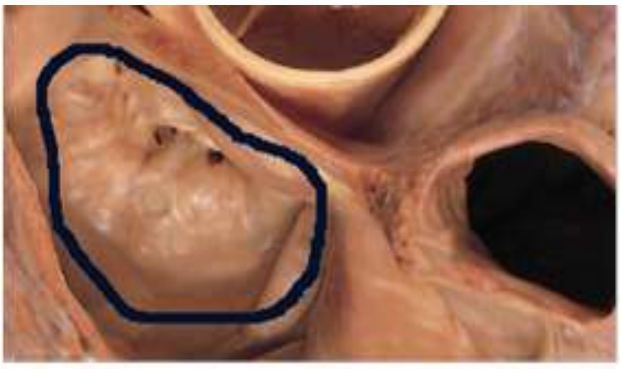

Fig No 2 Showing Bicuspid Valve

Discussion

In our study, we observed that the annular Circumference of the Tricuspid valve has a mean of 90.28±17.86. While annular Circumference of the bicuspid Valve with a mean of 83.98±13.29. While comparing our study with Dr S. Ilankathir[3,] the annular Circumference of the Tricuspid valve was a mean of 10.37 cm annular Circumference of the bicuspid Valve with a mean of 8.28 cm,which is similar to our study, another study byKouji Chida et al.[4], annular Circumference of the Tricuspid valve has a mean of 9.9 ± 1.0 cm. While annular Circumference of the bicuspid Valve with a mean of 8.3 ± 1.0. another study of Geethanjali. B.S et al. [5], the Circumference of bicuspid Valve was 8.19±1.01cm in males, 7.76±0.99 cms in females, another survey by Brock RC et al. [6] study on 50 hearts and observed Circumference of bicuspid Valve was 9.9 cm, Nagarathnamma B et al. [7] observed that the Circumference of Tricuspid valve was 95.25±11.48 mm, another study of Skwarek, et al.[8] observed circumference Tricuspid valve was 105.67±16.76mm,

Conclusion

Disorders affecting the heart valves impair the pumping efficiency of the heart. They cause either stenosis or regurgitation. Detailed knowledge of the anatomical characteristics of the atrioventricular valve should improve the understanding of its anatomy and significantly contribute to better results in conservative procedures and thus promote a return to anatomical and functional normality. This precise knowledge also defines some of the details of the mitral valve architecture that are necessary for the development and manufacture of the prosthesis. This will be useful for anatomists and cardiac surgeons in surgical procedures such as balloon replacement aortic valvotomy.

Reference

1. Vanhanian A, Baumgartner H, Bax J, Butchart E, Dion R, Filippatos G et al. Guidelines on managing valvular heartdisease. The task force on managing valvular heart disease of the European Society of Cardiology. Europ Heart J 2007;28:230–68.
2. Suman Bhandari, K Subramanyam, N Trehan. Valvular Heart Disease: Diagnosis and Management. JAPI • vol. 55 • August 2007.
3. Dr. S. Ilankathir A Cadaveric Study On Adult Human Heart Valve Annular Circumference And Its Clinical Significance IOSR Journal of Dental and Medical Sciences (IOSR-JDMS) e-ISSN: 2279-0853, p-ISSN: 2279-0861. Volume 14, Issue 12 Ver. I (Dec. 2015), PP 60-64 www.iosrjournals.org.
4. Kouji Chida et al. A morphological study of normally ageing heart. Cardiovasc Pathol 1994 Jan-Mar; 3(1):1-7
5. Geethanjali. B.S *1 , Jayanthi V 2 , Kavimani 3 , Varsha Mokhasi 4 , Rajini. T 5 , Mohan kumar. H The Anatomical Study Of Mitral Valve Annulus In The Human Cadaveric Hearts For Bioprosthesis International Journal of Anatomy and Research, Int J Anat Res 2019, Vol 7(2.2):6575-80. ISSN 2321-4287 DOI: https://dx.doi.org/10.16965/ijar.2019.173.
6. Rusted IE, Schiefley CH, Edwards JH, Studies of the mitral Valve 1. Anatomic features of the normal mitral Valve and associated structures. Circulation 1952;6:825-31.

7. Nagarathnamma B[1]* , Manjunath Ashok Koganoli[2] Tricuspid valve morphometry - In cadaveric study y - In cadaveric study. IAIM, 2018; 5(12): 66- 71.
8. Skwarek M, Hreczecha J, Dudziak M, Jerzemowski J, Szpinda M, et al. Morphometric features of the right atrioventricular orifice in adulthuman hearts. Folia Morphol (Warsz), 2008; 67: 53-57.