

ORIGINAL ARTICLE

STUDY OF INCIDENCE OF AN ABNORMAL TRICUSPID VALVE IN THE HUMAN CADAVERIC HEART

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ABSTRACT

Introduction: Rapid progress in the field of interventional cardiology has caused research in the field of morphology of the heart to be in constant demand. The tricuspid valve is of great importance because of the progress made in operative techniques and invasive cardiology accidents.

Methodology: In this study, performed on a 100 human cadaveric hearts to assess the incidence of abnormal tricuspid valve and the number of main and accessory cusps. The hearts were non-macerated and preserved by immersion in 4% neutral formalin solution. Dissection was performed according to standard techniques.

Results: Present study indicates the incidence of 4 cuspidal tricuspid valve is 10%(10/100hearts) and bicuspidal valve is 1%(1/100hearts) and the incidence of normal tricuspidal valve is 89%.the average height of accessory cusp is 15.60mm.

Conclusion: From the above result it will be concluded that this study is helpful to cardiac surgeons in this modern era of technology.

Key words: tricuspid valve, circumference of tricuspid valve, cusp, chordae tendonae, human heart.

INTRODUCTION

Despite intense interest in cardio-anatomy, there are many issues to be examined with great care. The problem of the morphology of the atrioventricular ostia is still an open question. One of the first who paid attention to the presence of accessory cusps was Tandler in 1913¹. Accessory cusps were also described by Testut and Latarjet in 1923 and Jastrzębski in 1926¹, but their descriptions are based on a limited number of cases. Descriptions of the chordae tendineae and the localisation of the papillary muscles differ from one study to another. The dynamic progress of therapeutic and diagnostic cardio-invasive procedures implies a marked rise in interest in studies of cardiac anatomy and it is reasonable, therefore, to resume research on the tricuspid valve. The tricuspid valve is of great importance because of the progress made in operative techniques and invasive cardiology accidents. The normal data of the tricuspid valve complex is of great clinical importance in the light of progress in cardiosurgery and the development of novel operating techniques. The anatomy of the tricuspid valvar complex is highly sophisticated but understanding of it may be helpful in the practice of cardiac surgery, especially in the partial transfer of leaflets of the tricuspid valve for mitral valve repairs. The right atrioventricular valve region may be involved in severe cardiac malformations. Surgical techniques of tricuspid valve repair have been devel-

oped that are equally effective in correcting purely functional and organic valvular incompetence. The tricuspid valve is often called the "forgotten valve" or "lost valve,"² because it is relatively understudied relative to the other cardiac valves; however, a few variations have been noted. The tricuspid valve has been described as having as few as 2 and as many as 6 leaflets, whereas the papillary muscles have been reported to number from 2 to 9¹. The main objective of the study is to find out the incidence of abnormal tricuspid valve and to measure the dimensions of that valve which will be helpful during replacement of heart valves to cardiac surgeons.

METHODS

The examinations were carried out on 100 human hearts of adults who had died because of non-vascular disease and who did not display congenital malformations or pathological changes. This study is conducted in different medical colleges of Gujarat during the period of Aug-2011 to oct-2013. The hearts were formalin-fixed. The hearts were non-macerated and preserved by immersion in 4% neutral formalin solution. Dissection was performed according to standard techniques: from the superior vena cava and along the sharp margin of the right ventricle. Afterwards, using an ordinary metric ruler & cotton thread, the following

measurements were made: the attachment length of the accessory leaflets and number of chordae tendonae at the accessory valve leaflets.

RESULTS

Using as the criterion for division the number of cusps of the tricuspid valve, we established 2 types. The most common was a 4-cuspidal structure consisting of 3 main cusps and one accessory cusp which appears to be the most common form of accessory tricuspid valve. This form appeared in 10% of cases in the group of hearts studied .total number of heart studied in this group is 100.

Table 1 shows that the measurement analysis of several cusps led us to arrive at the conclusion that the height of anterior cusp is greater than that of the others. CP was usually lower than CA, but the lowest was CS. Accessory cusps were always lower than the main ones. The mean height of the accessory cusps was 15.60 mm. In this study, the number of leaflets varied from 2-4 in deaths of non cardiac origins. In 01 heart, we found 2 leaflets (1%), in 10 hearts there were 4 leaflets (10%) in deaths of non cardiac origin which has been shown in table-2 which shows the frequency of particular types of tricuspid valve.

Table 1: shows the dimensions of accessory valve cusp of tricuspid valve.

Parameters	In this study
Max. Length of cusps Accessory	15.60mm
No. of chordae tendonae At accessory cusp	9
No. of accessory cusps 4 cuspid valve 2 cuspid valve	10%(10/100) 1% (1/100)

DISCUSSION

This study is conducted in 100 formaline fixed human cadaveric heart to study the incidence of abnormal tricuspid valve. From the result of study it indicates the presence of accessory cusps is most common anomaly. In this study, the incidence of 4 cuspidal tricuspid valve is 10%(10/100) and bicuspidal valve is 1%(1/100). Thus 4 cuspidal valve is most common anomaly of accessory tricuspid valve cusps the frequency of particular types of tricuspid valve has been shown in table-2, which shows the characteristic tricuspidal valve form has been found in 89% of cases, 4 cuspidal form in 10% of cases and bicuspidal form in only 1% of cases in this study while in Aytackocak study, characteristic tricuspidal form found in 70% cases, 4 cuspidal form in 10% cases and bicuspidal form found in 20% of cases and in M. Grzybiak study, 4 cuspidal form found in 36.15% of cases.

Table2: Frequency of particular types of tricuspid valve.

Type	Number of cusps	Occurrence in studied group (%)	Aytac Kocak Study(2004) ⁶	Skwarek M study(2004) ¹
1	3	89%	70%	-
2	4	10%	10%	36.15%
3	2	1%	20%	-

TABLE-3 Comparison of different dimensions of accessory cusp of tricuspid valve with other study. the mean height of accessory cusp in this study is 15.60mm, in M .Grzybiak study-14.88mm and this shows that the height of anterior cusp is greater than that of the others. Posterior cusp is usually lower than anterior, but the lowest is septal cusp. Accessory cusps were always lower than the main ones. the characteristic tricuspidal valve form has been found in 89%(89/100) of cases, 4 cuspidal form in 10%(10/100) of cases and bicuspidal

form in only 1% (1/100) of cases in this study while in Aytackocak study, characteristic tricuspidal form found in 70% cases, 4 cuspidal form in 10%(20/400) cases and bicuspidal form found in 20%(40/400) of cases and in M. Grzybiak study, 4 cuspidal form found in 36.15% of cases. The number of chordae tendonae is studied at the level of their attachment on free margin of valve cusps and also at their attachment on papillary muscles. The number of chordae tendonae at the accessory cusp in this study is 9.

Table3: Comparison of different dimensions of accessory cusp of tricuspid valve with other study

Parameters	In this study	Aytackocak study (2004) ⁶	Skwarek M study (2004) ¹
Max. Length Of Cusps Accessory	15.60mm	-	14.88mm
No. of Chordae Tendonae At Accessory Cusp	9	-	-
No. of Accessory Cusps 4 Cuspid Valve 2 Cuspid Valve	10%(10/100) 1% (1/100)	10%(20/400) 20% (40/400)	36.15%

CONCLUSION

From the above results it's concluded that this study will be helpful to the cardiovascular surgeons as there is little data available on morphometry of tricuspid valve and this valve leaflets can also be transplanted in diseased valve in this modern era due to advancement of technology.

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