

Morphological And Morphometric Analysis Of Mitral Valve Leaflets In A Sri Lankan Population Fresh Autopsy Study

Sivananthini Udhayakumar¹

²Department of Anatomy, Faculty of Medicine
University of Jaffna
Jaffna, Sri Lanka
sivananthini3@yahoo.com

S. G. Yasawardene²

²Department of Anatomy,
Faculty of Medical Sciences
University of Sri Jayewardenepura, Sri Lanka
surangiy@hotmail.com

ABSTRACT

A fundamental knowledge of cardiac anatomy forms the cornerstone of clinical cardiology and many publications have appeared dealing with its detailed anatomy in Caucasians and in some other racial groups. We present data of morphology and dimensions of the mitral valve and its relationship with demographic data in a Sri Lankan population. This will be helpful for the anatomists, surgeons and radiologists. Three hundred and twenty (320) fresh adult hearts obtained from natives of Sri Lanka who had died of noncardiovascular causes were studied to determine the basic variations of the morphology and morphometry of mitral valvular apparatus. The findings were compared with previous studies in other racial groups. Mitral annular circumference (MAC) ranged from 58–110 mm with a mean of 93.24 mm \pm 7.3SD. The mean size of the MAC was 94.41 mm \pm 5.9 SD in males and 84.62 mm \pm 8 SD in females and the difference was statistically significant ($p < 0.001$). Our results of circumference are comparable with those reported from India and are lower than that of Caucasians. A significant positive relationship exists between the mitral annular circumference with age, height and body surface area of the person ($p < 0.05$). The contribution of posterior mitral valve leaflet to the annulus was larger (52%) than that of anterior leaflet (34%) and commissural zones (14%). The anterior leaflet is longer in length (20.24 mm \pm 2.1SD) than that of the posterior leaflet (13.25 mm \pm 2.2SD), and was semicircular (55%) or triangular (4%). In 5% of the hearts, notches were seen in its free border of anterior leaflet supported by cleft chordae. The posterior leaflet was not consistently triple scalloped, but had one, two, four or five scallops in 110 (34%) hearts. This study highlights the measurements of valve parameters being smaller in Sri Lankans than reported for the Caucasians, with minor morphological variations. Compared with Caucasians, the commissures occupied smaller areas of the annulus, and may facilitate the rapid fusion of valve tissue in rheumatic valvulitis. These would be of significance in echocardiographic analysis and surgical management of valvular disease in Sri Lankans.

Key words: *Mitral valve, Annular circumference, Fresh autopsy, Leaflet, Sri Lankan*

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I. INTRODUCTION

Excellent knowledge of cardiac anatomy is mandatory to perform surgical procedures and interventions safely and efficiently. Further this information is useful for any advances or custom designing cardiac prosthetic valves and repair of abnormalities in the valves. Currently the norms of measurements utilized for echocardiogram in Sri Lanka, are based on reported studies in Caucasians. There appears to be a geographical variation on the norms of measurements for heart valves [1,2,3,4,5,6,7]. Anatomical norms of measurements for cardiac valve and associated structures have so far not been reported in Sri Lankans. Therefore the present study was undertaken for detailed anatomy of mitral valve. This would be of clinical importance, in assessing the degree and progress of valve stenosis and the valve incompetence in diseased hearts. Further the morphological analysis of the valves will enable us to appreciate/ or confirm the varied anatomy of the components of the valves. The variations in morphology may be significant, in the profile of varying pathological types in heart diseases in Sri Lankans. This knowledge of morphology would assist in the valve replacement with homograft, and also in the application of conservative surgical techniques [8,9].

Anatomy of mitral valve : Mitral valve complex as per text consists of orifice and its associated annulus, the leaflets, the supporting chordae tendineae and papillary muscles. The roots of the valve leaflets are attached to the fibrous skeleton of the atrioventricular opening (annulus). Chordae supports entire free edge of valvular cusps with varying degrees of their ventricular aspect, which prevent the valve from bowing into the atria during ventricular systole. The chordae tendinae are inserted to the papillary muscles, two in number, anterolateral and posteromedial arising from the ventricular wall, hold the valve in situ. The chordae tendinae complex with its papillary muscle is termed 'subvalvular apparatus'. The anatomic regulation of the blood flow across the orifice depends on a complex interaction between these five elements [10].

