

ABSTRACT

It is axiomatic that knowledge of cardiac anatomy is important for the interpretation of echocardiographic anatomy and for the surgical reconstruction of the valves. However, norms of dimensions have not been reported for Sri Lanka. The study leads to determine pattern of cardiac valve dimensions.

320 normal necropsy hearts were studied to determine the basic variations of the Morphology and Morphometry of the mitral and aortic valve, the coronary ostia and the main trunk of left coronary artery in Sri Lankan adults. The findings were compared with previous studies in the Caucasians.

The study purpose includes natives of Sri Lanka (both males and females), ranging from 18 – 78 years, who died of noncardiovascular causes. The fresh heart specimens were from cadavers received at the Judicial Medical Office, Colombo. The study was carried out at the Department of Anatomy, Faculty of Medicine, University of Colombo during a period of 18 months from June 2004 to collect adequate data on the norms of measurements of the components of heart valves in the adult Sri Lankans. The method adopted for dissection and study of each of these valves, preserved the integrity of the valves till the study was completed.

RESULTS :

The heart weight ranged from 180 – 412 g with a mean of $274.42 \text{ g} \pm 41.9 \text{ SD}$.

Mitral valve

Mitral annular circumference ranged from 58 – 110 mm with a mean of $93.24 \text{ mm} \pm 7.3 \text{ SD}$. Mitral valve area ranged from $230.79 - 595.82 \text{ mm}^2$ with a mean of $412.52 \text{ mm}^2 \pm 89.73 \text{ SD}$. The contribution of the posterior mitral valve leaflet to the annulus was larger (52 %) than that of anterior leaflet (34 %) and commissural zones (14 %). The anterior leaflet is shorter in breadth, longer in length than that of the posterior leaflet, and was semicircular (55 %) or triangular (40 %). **In 5 % of hearts, notches were seen in its free border supported by cleft like chordae, a new finding not reported earlier.** The posterior leaflet was not consistently triple scalloped, but had one, two, four or five scallops in 110 (34 %) hearts. **Compared with Caucasians, the mitral valve annulus was smaller and the commissures occupied smaller areas of the annulus, and may facilitate the rapid fusion of valve tissue in rheumatic valvulitis.**

The chordae were uniformly spread out in the leaflet. Chordae insertion was oblique in relation to the anterior leaflet and perpendicular to the posterior leaflet. All types of chordae reported earlier in mitral valves were present (zone chordae, cleft chordae of anterior leaflet and rough zone chordae, cleft chordae, basal chordae of posterior leaflet and commissural chordae), **In addition there were free edge chordae and cleft chordae in the anterior leaflet. The mean lengths of chordae were shorter than in Caucasians.**

Papillary muscle was not symmetrical in all subjects. Four types were distinguished with increasing complexity, single belly was the commonest type in anterolateral papillary muscle (73 %) and two bellies were the commonest type in the posteromedial group (40 %).

Aortic valve

The mean aortic annular circumference at the Sinutubular junction in Sri Lankan adults was $59.86 \text{ mm} \pm 7.7 \text{ SD}$. The corresponding value at the basal ring was $64.7 \text{ mm} \pm 7 \text{ SD}$. There were three cusps in all aortic valves and overall, the right coronary leaflet was the largest and the left was the smallest.

Coronary ostia

The coronary ostia were in the right and left coronary sinus position and were located below the commissural plane in the majority (Right - 92 % and Left - 68 %). On average the left ostia were central in location and the right ostia deviated to the right half of the sinus. The occurrence of separate ostia (additional ostia) for the conus artery was observed in the right coronary sinus in 30 % of hearts. In 2 % of the hearts, separate orifice for the anterior descending artery and the circumflex artery were found in the left coronary sinus.

The average width of the right and left coronary ostia were $2.76 \text{ mm} \pm 0.9 \text{ SD}$ and $3.67 \text{ mm} \pm 0.7 \text{ SD}$ respectively. The mean height was $2.08 \text{ mm} \pm 0.7 \text{ SD}$ for the right and $2.65 \text{ mm} \pm 0.6 \text{ SD}$ for the left.

Main trunk of left coronary artery

The main trunk of left coronary artery had a mean length of $8.33 \text{ mm} \pm 3.7 \text{ SD}$ and **mean diameter of $3.14 \text{ mm} \pm 0.4 \text{ SD}$ (range 2.6 – 4.1 mm), smaller than that reported in the Caucasians.** The variations in the branching pattern of the main trunk of the left coronary artery, presented as bifurcations in the majority (75 %) with trifurcation and quadrifurcation in the rest.

This study highlights the measurements of valve parameters being smaller in Sri Lankans than reported for the Caucasians, with minor morphological variations. These would be of significance in echocardiographic analysis and surgical management of valvular disease in Sri Lankans.