

Morphological characteristics of the human pulmonary valve structures

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Introduction

The relevance of studying the structure of the heart valves is due to the fact that diseases of the cardiovascular system take one of the first places among the causes of death according to the World Health Organization. According to the latest published data, the mortality from valvular disease of the heart is about 20,000 people in the United States annually. Despite the fact that the aortic and mitral valves are affected more often, however, pulmonary valve dysfunction can also lead to severe consequences. The present literature does not give sufficient information about the features of the structure and topography of the semilunar cusps of the pulmonary valve.

Aim of the study

To identify the morphological features of the pulmonary valve in man; to explore the variant anatomy of the semilunar cusp of the pulmonary valve and to analyze the received data.

Materials and methods

19 human hearts of both men and women were the material for the research. The features of the structure and position of the semilunar cusp of the pulmonary trunk valve were studied using morphological method. Using the morphometric method we measured height, length of the free and fixed margins of the semilunar cusp; the distance between the upper margin of the semilunar cusp and the proximal point of its attachment; width and length of the commissures; the distance between commissures of the semilunar cusp; pulmonary trunk sinus length; the distance from the pulmonary trunk wall to the nodule as well as the length, height and position of the nodule. Statistical processing of the results was carried out using the spreadsheet program "Microsoft Excel 2007" and the dialog system "Statistika 10.0". Methods of descriptive statistics, which also were applied, included the assessment of the arithmetic average (M), the errors of the average value (m). To assess the intergroup differences, Student's t-criterion was used. Differences were considered statistically significant for $p \leq 0.05$. Coefficient (K) was also calculated showing the ratio of intercommisural distance to the distance from the wall of the pulmonary trunk to the nodule of semilunar cusp.

Results

As a result of the research it was established that the diameter of the pulmonary trunk was 21.50 ± 0.56 mm. When studying the length of the free margin, the height and the length of the fixed margin of the semilunar cusp, it was established that the length of the margins of all semilunar cusps was approximately equal; the height of the right semilunar cusp exceeded the left one. The length of the fixed margin of the left semilunar cusp was the smallest.

Conclusion

As a result of the research, it was established that the semilunar cusps of the pulmonary trunk valve is asymmetrical and differ in shape, size and position. The right semilunar cusp occupies the highest position, while the left and the front cusps are located lower. In this regard, in some cases, the nodule of the right semilunar cusp may be absent. The plane through the commissures of the valve of the pulmonary trunk is located at an angle to the pulmonary trunk in the horizontal plane. The hole of the open pulmonary trunk valve is a little displaced from the center to the left.