Liyanage L.H.

TOPOGRAPHICAL FEATURES OF THE CORONARY ARTERY ORIFICES IN THE AORTIC SINUSES IN CONNECTION WITH THE FENESTRAE PRESENCE IN THE SEMILUNAR LEAFLETS

Tutor: PhD, associate professor Pasiuk H.A.
Department of Normal Anatomy
Belarusian State Medical University, Minsk

Relevance. Coronary arteries originate from the aortic bulb from the right and left aortic sinuses and bring oxygenated blood to the heart muscle. Topography of the coronary ostium can influence to the coronary blood flow. Fenestrae are the small perforations in the semilunar leaflets which may influence the valves function and also alters the local blood flow patterns into the coronary ostia. Both factors - ostial position and fenestrae presence may cause changes in their hemodynamics and coronary outflow and perfusion efficiency.

Aim: to investigate the anatomical variability of coronary ostia localization and quantify the frequency and spatial distribution of valvular fenestrae in the aortic valve.

Materials and methods. Morphological and morphometric methods were used on 20 post mortem human hearts. The presence and distribution of fenestrae in the aortic valve were recorded. To evaluate coronary ostial topography, the following parameters were measured: the distance from the nadir of the semilunar leaflet to the ostium, the distance from the ostium to the sinutubular junction (supravalvular ridge), and distances between the ostium and the respective left and right commissures. Data were compiled and analysed using Microsoft Excel and Statistica 10.0.

Results and their discussion. The study revealed the following median [IQR] values: Distance of the left coronary ostium to the nadir leaflet (12.00 [11.00; 15.00]mm), Distance of the left coronary ostium to the sinutubular junction (2.00 [2.00; 3,00]mm, Distance of the left coronary ostium to the Left-Posterior commissure (4.50 [4.00; 7.00]mm), Distance of the left coronary ostium to the left-right commissure (9.00 [7.00; 12.00]mm). Distance of the right coronary ostium to the nadir leaflet (13.00 [10.00; 18.00]mm), Distance of the right coronary ostium to the sinutubular junction (2.00 [1.00; 3.00]mm), Distance of the Right coronary ostium to the left-right commissure (10.00 [10.00; 18.00]mm), Distance of the right coronary ostium to the right-posterior commissure (4.50 [4.00; 5.00]mm). With the above details it was recognized that the right and left coronary origins are situated just below the supravalvular ridge and the ostium of the left coronary artery shifts more towards the left-posterior commissure while the right coronary ostium shifts more towards the right-posterior commissure.

Spearman's correlation analysis revealed a significant negative correlation ($r = -0.628$, $p \leq 0.05$) for the left coronary ostium, indicating that as the distance to the left-right commissure decreases, the vertical deviation between the cusp and the sinutubular junction increases. So as the left coronary ostium moves horizontally closer to the commissure, its vertical position relative to the leaflet and sinutubular junction shifts down. The positive correlation ($r = 0.347$, $p \leq 0.05$) was observed for the right coronary ostium between the cusp-to-ostium distance and the deviation between the right-posterior and right-left commissures. So as the right coronary ostium moves vertically closer to the nadir of the semilunar leaflet, its vertical position shifts closer to posterior commissure.

The study found a high incidence of valvular fenestrae: in the left aortic leaflet: 22.2%, in the aortic right leaflet: 22.2%, in the aortic posterior leaflet: 16.7%.

Conclusions. The study demonstrates a significant asymmetrical topography of the coronary ostia: the ostium of the left coronary artery shifts more towards the left-posterior commissure while the right coronary ostium shifts more towards the right-posterior commissure. These variations may influence coronary blood flow dynamics and should be considered in clinical and surgical contexts involving aortic valve and coronary arteries.