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Shot reports

SMOOTH MYOCYTES IN THE THORACIC DUCT VALVES

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Condition of the problem**.** The opinion, that valves are not contain the myocytes in their cusps and are moving passively by the gradient of vacillating lymph flow is prevail in the literature [2]. Isolated messages testify to inverse. Y. Kajawa [1] have found that longotudinal muscular bundles jut out deep to the central plate of the thoracic duct valves. Used the histological and electron microscopic method of unvestigation, H. Ohemke [3] have described the smooth myocytes in the valvar cusps of human foot lymphatic vessels. Smooth myocytes form accumulations in the base of a lymphatic valve – its muscle which become thin in the cusp [4].

Take into consideration a key role of valves in the organization of lymph outflow from organs, it was decided to fulfil the investigation with the aim to identify the smooth myocytes in cuspes of the thoracic duct valves.

Material and methods. The work was carried out on both sexes human cadavers of 17-40 years old, who have died from casual reasons without pathology of cardiovascular system (30) and bothe sexes white rats of 5-12 months old (30). Thoracic duct was allocated without a preliminary injection, it is longitudinal dissected and choosed cusps of its valves. Material was fixed in 10% solution of neutral formalin, stained in paraffin with following production of serial longitudinal and transverse sections of 5-10 mkm in thickness. Sections were stained by picrofuxine, azane, orseinum. For specific identification of smooth myocytes in human thoracic duct the material was processed by Human Alpha Muscle Actin (monoclonal antibodies RTU-SMA, Novocastra Laboratories), contained the antibodies to α-actine of vascular smooth myocytes, and diaminobenzydinum, then poststained by hematoxilin. Smooth myocytes in thoracic duct valves were discovered by histochemical method (staining by benzydinum on myoglobinperoxidase witn poststaining by hematoxilin-Fe and without it) and with electron microscope.

Figure 1. Thoracic duct of a man, longitudinal section: 1 – longitudinal muscular bundle in intima; 2 – radial muscular bundle enters into cusp of a valve. Picrofuxine. x 400.

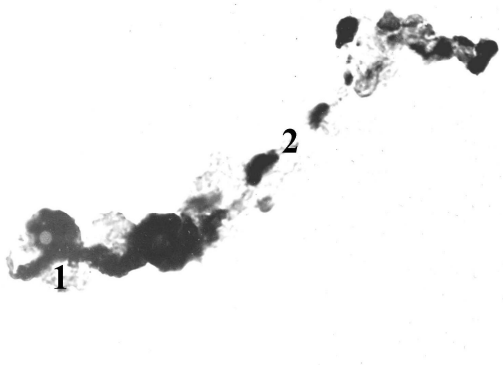

Figure 2. Cusp of a human thoracic duct valve, longitudinal section: 1, 2 – longitudinal & transverse orientated smooth myocytes. Immunohistochemical method. x 600.

Results. The heterogenous construction of valves is discovered on the histological sections. Their parietal surface is covered by thickened endothelium, nuclei of its cells are orientated oblique-transverse, situated frequently; on the axial surface – infrequently, longitudinal, by the direction of lymph flow. The plate of loose connective tissue of different thickness is situated between two thin layers of endothelium. Fold-

ing bundles of the collagen fibers locate in its more wide parietal part. They are straightening during widening of the valvar sinus under the indirect lymph flow pressure. The connective tissue fibers are more thin in an axial part of the cusp, here there are more elastic fibres. Myocytes of the vale have, more often, transverse and oblique-transverse orientation. Longotudinal and oblique-longitudinal myocytes are determined mostly in the axial parts of valves. Middle (muscular) coat become more thick and forms a protuberance in the base of valve towards its cusp. Longitudinal muscular bundles from intima of usually distal, prevalvar segment of the thoracic duct turn and enter the axial sector of cusp (Figures 1, 3), where internal elastic membrane is saved. It is loosend and disappears in the parietal sector of cusp.

The compactness of myocytes allocation in the valvar cusp 3-4 times less than in valvar roller (parietal bulge), where more large myocytes and their bundles form the muscular sheet in 2-4 layers. In cusp the myocytes are more or less dispersed and form the network of different density. It is nice shown after staining on myoglobinperoxidase: grains of benzydinum are dissipated in the cusp and form compact accumulations in the base of valve. Myocytes are completely colored in brown after immunohictocemical processing, in other cells – only nuclei in pale blue by hematoxilin (Figure 2).

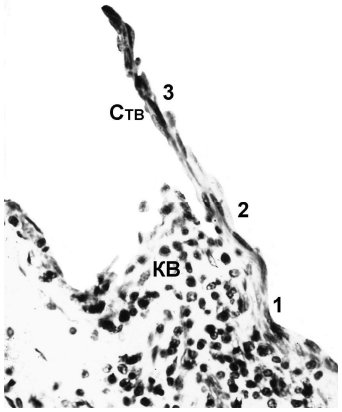

Figure 3. Thoracic duct of a rat, longitudinal section: КВ – valvar roller; Ств – cusp; smooth muscular bundle from intima (1) enters into a valvar roller (2) and a cusp (3). Picrofuxine. X 600.

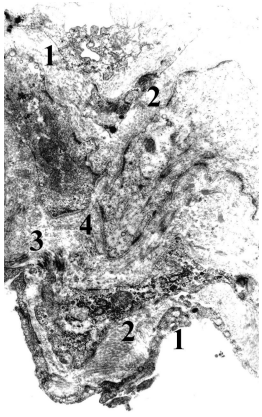

Figure 4. Cusp of valve of a rat thoracic duct, electron microscopic picture: 1 – endothelium; 2– connective tissue cells; 3 – collagen fibers; 4 – smooth myocytes. x 7500.

On electron microscopic figures the connective tissue cells and fibers are revealed under two layers of endothelium of the rat thoracic duct valvar cusps and deeper – myocytes (Figure 4). They have a basal membrane, their cytolemmas are hardly deformated by caveolas.

Conclusion. Thus, muscular bundles are discovered in the human and white rat thoracic duct valves. Proper smooth myocytes of valvar cuspes increase their viscoelastic properties, stability to alternating pressure of lymph flow, determine the capacity to the shape and location autoregulation. Myocytes are heterogenous distributed in valves. Their lesser numbers and sizes in cusp correspond to its more high mobility; increasing of longitudinal myocytes and elastic fibers content in axial sector – to shocks of direct lymph flow. Muscular bundles from valves continue into adjacent parts of the thoracic duct walls. It is possible to assume the active, coordinating movements of the valves and muscular cuffs of lymphangions, including the procesees of openung an closing of valves.

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