Short reports

REVIEW OF "WHAT BUGGED THE DINOSAURS? INSECTS, DISEASE AND DEATH IN THE CRETACEOUS" BY POINAR G. JR. AND POINAR R.

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Book details

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Review

Have you ever wondered whatever happened to the dinosaurs? George and Roberta Poinar have put forward some evidence that maybe it was not just cataclysmic events, such as meteorites falling on the earth. They surmise that perhaps insects transmitted diseases that contributed to the extinction of the dinosaurs. By studying the arthropods trapped in amber during the Cretaceous (65.5 –145.5 million years ago) period, they have revealed some extraordinary microorganisms concomitant with the ensnared invertebrates.

The period is well described in the opening chapters, showing that fossil evidence and especially amber tells us a great deal about the animal and plant kingdoms during those millions of years. Some chapters start with a speculative scene, painting a picture of life in the Cretaceous, the dinosaurs, the plants they feed from and the insects that breed around them, while others discuss in detail the known scientific facts. Herbivory, both by the dinosaurs and the insects is described in detail and the possibility that insects introduced plant viruses and fungi into the food supply, which may have led to the depletion in resources for the large animals. The dinosaurs did benefit from insects, like the dung beetles that removed the vastwaste voided by 55–100 ton dinosaurs, and arthropods were part of the diet of the omnivores.

The authors describe how they believe that arthropods were able to acquire blood meals from the dinosaurs in antiquity. By studying the mouth parts of the insects trapped in amber, they have shown that regardless of the outer skin, whether cold or warm blooded, the micro-predators had found a way to obtain the necessary food for survival. Chapters 12 – 18 describe those blood-sucking arthropods that were extant during the Cretaceous, including, important Nematocera and Tabanids, fleas, lice, ticks and mites. For each group the method of haematophagy is discussed and which organisms could have been transmitted with a few examples of ancient parasites observed in amber. There are separate chapters on the worms, cretaceous diseases, and another on the evolution of pathogens, (erroneously Rickettsia are given as the cause of human plague). The numerous color plates illustrate the diversity of arthropods in the Cretaceous, while the original line drawings embellish the theory. This is an assiduously written book for entomologists and parasitologists who would like to lean more on the time-encapsulated data from the Cretaceous, and perhaps stimulate the search for more "paleoparasites".

MUSCULO-ELASTIC COMPLEX IN THE VALVES OF HUMAN FEMORAL VEIN

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Condition of the problem

Venous valves are often becom an object of researches in normal conditions, in experiments and in pathology [2, 3, 5]. The absence of myocytes in cusps of the venous valves is accepted as correct until now. Therefore they are openning and closing only passively. Solitary muscular elements may occur in thickened subendothelial layer of cusp during the intima proliferation [1]. However, last years the data that valvar cusps contain the smooth myocytes were observed [4].

Material and methods

The work was carried out on both sexes human cadaveres of 20-78 years old. Valves were choosed from the walls of human femoral vein isolately or with the adjacent part of venous wall. Serial histologic sections of 5-7 mkm in thickness in sagittal (from base to tip of the valve) and transverse planes (in plane of the stretched cusp). Sections were stained by picrofuxine, azane, hematoxilin-Fe, orseinum, impregnated by Argentum. The stained by hallocianinum and hematoxilin-Fe total preparations were made from the part of material.

Results

The femoral vein contains 1-5 valves, constant valve situates under the entry of deep femoral vein. Valves constitute the circular folds of inner layers of the venous wall. Internal elastic membrane from the distal segment of vein continuates to the axial sector of valvar cusp where it gives branches of different thickness to the parietal sector of cusp. Internal elastic membrane from the proximal segment of vein are loosenning in the base of valve, its fragments are determined in the parietal sector of cusp. Thransverse muscular bundles and folded bundels of thick collagen fibers prevale here as in the whole cusp. The bulge of the external coat pushes the circular muscular layer of middle coat inside. It confluences with the longitudinal muscular layer of intima. The compact accumulation of myocytes arises in the base of valve – multilayer circular muscle of valvar cuff. It has the configuration as a parabole, its branches (lateral segments of valvar cuff) separate and grow together by their ends with the same branches of other valvar cuff – comissures of valvar cusps. The longitudinal muscular bundles plating into muscular coat of the proximal (postvalvar) segment of the vein originate from them. Muscular bundles with longitudinal orientation from intima of its distal segment reach the base of valve and divide into branches, which enter usually into one of the cusps, into lateral segments of valvar cusp and into a cusp, usually in axial sector. Circular muscular bundles cross both cuff and cusp, suspending the valve to middle coat of the venous wall. In passage from cuff to cusp the number and sizes of myocytes as and connective tissue fibers greatly decrease. The continous multilayer muscular stratum transforms to unilayer muscular network which loosens in direction to the free border of cusp with thinning of muscular bundles. They become straight and parallel to the free border of cusp. There are much oblique muscular bundles in the middle part of a cusp passing along lateral segment of valvar cuff and crossing near it's central segment. They form muscular "cupola" above the thin marginal part of cusp, the similar is formed by bundles of collagen and elastic fibres.

Fig. 1. Valve of the human femoral vein, longitudinal section of the vein: 1 – transverse myocytes in valvar cuff; 2 – longitudinal muscular bundle from valvar cuff enters into the cusp (axial sector); 3 – myocytes in parietal sector of cusp. Picrofuxine. x 350.

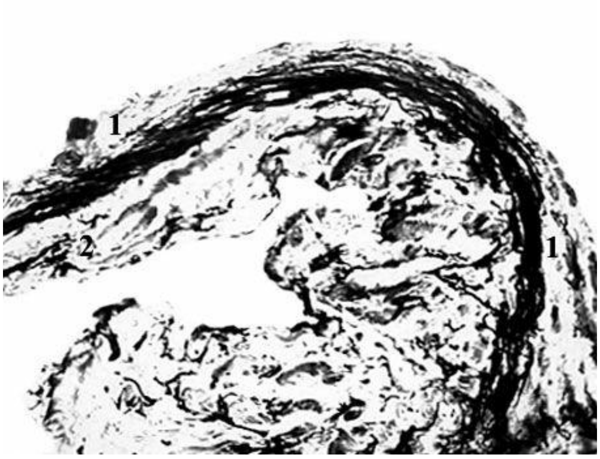

Fig. 2. Valve of the human femoral vein, longitudinal section of the vein: 1 – inner elastic membrane from valvar cuff continuates into cusp (axial sector); 2 – its fragment in parietal sector of cusp. Orseinum. x 350.

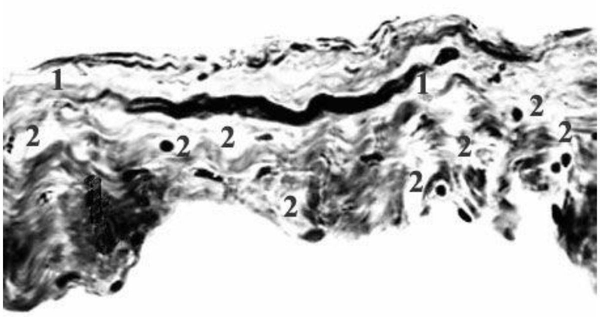

Fig. 3. Cusp of valve of the human femoral vein, longitudinal section: 1 – longitudinal bundle of myocytes in axial sector; 2 – folded bundles of collagen fibres and transverse myocytes in parietal sector. Picrofuxine. x 600.

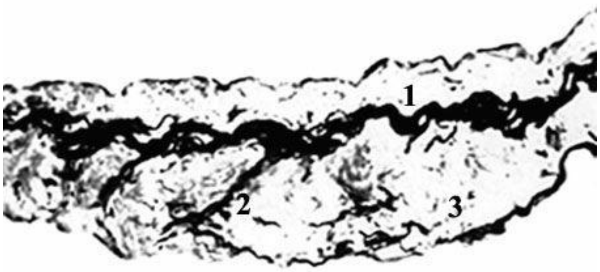

Fig. 4. Cusp of valve of the human femoral vein, longitudinal section: 1 – inner elastic membrane in axial sector; 2 – its branches into thickness of cusp and 3 – fragments in parietal sector.

Conclusion

Valves of femoral vein contain smooth myocytes and elastic fibres. Their fixed parietal part (valvar cuff) counteracts to blood flow by thickening and compacting, concentrating and interlacing of structures. The free luminar part of a valve (valvar cusp) is moveable and can reacts on the blood pressure by displacement and distortion. It is possible to explain the dispersion and reduction of structures, including myocytes, in the direction from base to free border of the valve by the decreasing of the load. Changeable haemodynamic determines the asymmetrical distribution of structures in thickness of a valve: longitudinal shocks of direct blood flow stimulate the development of musculo-elastic complex (amortiser) and longitudinal structures in the axial sector; vortical indirect blood flow extending the valvar sinuses causes the preferred morphogenesis of transverse structures in the parietal sector of cusp including muscular bundles and reserve folds in the bundles of low extensible collagen fibres. The received data allow to suppose that venous valves are able to active counteract to pressure of direct and indirect blood flow due to the complexation of connective tissue fibers with proper muscular structures of valvar cusps. They increase the durability of valvar cusp and determine its ability for blood flow regulation.

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