

BLOOD SUPPLY OF THE DEEP AND SUPERFICIAL FASCIAE OF THE MUSCLES OF THE ANTERIOR COMPARTMENT OF THE FOREARM

Suleymanov Remzi Ibraimovich, Assistant

Department of Human Anatomy

Samarkand State Medical University

Samarkand, Uzbekistan

Abstract. The present study investigates the angioarchitecture of the organ-specific blood vessels of the superficial and deep fasciae covering the muscles of the anterior compartment of the forearm. The study material consisted of fascial specimens obtained from the anterior forearm compartment of 18 human cadavers of different ages and both sexes. The vascular system was examined using the silver nitrate impregnation technique developed by E. I. Rasskazova and modified by V. V. Kupriyanov, as well as by vascular injection with an aqueous India ink suspension followed by dehydration in pyridine and clearing in methyl salicylate. The angioarchitecture of the deep fascia demonstrates distinct regional features in different functional zones, manifested by variations in the degree of development, shape, and size of vascular loops.

Keywords. human cadavers; forearm fasciae; anterior forearm compartment; angioarchitecture; arterial vessels; silver nitrate impregnation according to E. I. Rasskazova modified by V. V. Kupriyanov; India ink vascular injection; methyl salicylate.

КРОВΟΣНАБЖЕНИЕ СОБСТВЕННОЙ И ПОВЕРХНОСТНОЙ ФАСЦИЙ МЫШЦ ПЕРЕДНЕГО ЛОЖА ПРЕДПЛЕЧЬЯ.

Сулейманов Ремзи Ибраимович, Ассистент

кафедры Анатомия человека

Самаркандский государственный медицинский университет

Резюме: В статье изучены архитектонику органных кровеносных сосудов фасций над мышцами переднего ложа предплечья. Материалом исследования

послужили фасции над мышцами переднего ложа предплечья от 18 трупов людей различного возраста и пола. Сосудистая система изучалась методом импрегнации азотнокислым серебром по Е. И. Рассказовой в модификации В. В. Куприянова, а также методом наливки водной взвесью туши с последующим обезвоживанием в пиридине и просветлением в метилсалициловом эфире. Ангиоархитектоника собственной фасции в различных функциональных зонах имеет свои особенности, проявляющиеся в степени выраженности сосудистых петель, их формы и размеров.

Ключевые слова: трупов людей, фасций предплечья, методом импрегнации азотнокислым серебром по Е. И. Рассказовой, артериальные сосуды.

Introduction. In recent years, researchers have renewed their interest in the architecture of organ-specific blood vessels, particularly in relation to tissue structure and the terminal portions of the vascular system. These terminal vascular segments are referred to by some authors as terminal vascular branches [1,2] and by others as the microcirculatory system [3,4]. Regardless of the terminology, both concepts describe the five principal components of the microvascular bed that determine the specific angioarchitecture of an organ: arterioles, precapillaries, capillaries, postcapillaries, and venules [5,6].

A review of the available literature revealed no studies specifically devoted to the blood supply of the forearm fasciae, which determined the objective of the present investigation.

Objective. To investigate the angioarchitecture of the organ-specific blood vessels of the fasciae covering the muscles of the anterior compartment of the forearm.

Materials and Methods. The study was performed on fascial specimens covering the muscles of the anterior compartment of the forearm obtained from 18 human cadavers of different ages and both sexes. The vascular system was examined using the silver nitrate impregnation method developed by E. I. Rasskazova and modified by V. V. Kupriyanov, as well as by vascular injection with an aqueous India ink suspension followed by dehydration in pyridine and clarification in

methyl salicylate. These complementary techniques provided a comprehensive and clearly defined visualization of the fascial vascular system.

Results. The deep fascia covering the muscles of the anterior compartment of the forearm demonstrates structural characteristics that vary according to functional region, which are reflected in its organ-specific angioarchitecture.

In the distal third of the forearm, where the principal layer of the deep fascia consists of densely packed transversely oriented collagen bundles, the arterial vessels divide into straight precapillary and capillary branches measuring 18–20 μm in diameter. These vessels run parallel to the collagen bundles and form elongated rectangular vascular loops measuring approximately $750 \times 4000 \mu\text{m}$.

In the middle third of the forearm, the collagen bundles also have a transverse orientation but are arranged more loosely, leaving interbundle spaces. The vessels likewise follow the direction of the collagen bundles; however, unlike those in the distal third, they do not form elongated rectangular loops. Instead, polygonal loops—including trapezoidal, pentagonal, and triangular configurations—predominate. These loops are smaller, measuring approximately $750 \times 2500 \mu\text{m}$.

In the proximal third of the forearm, where the principal fascial layer is composed of interlacing collagen bundles, the terminal vascular branching pattern differs considerably. The vascular network consists of loops of various configurations, although rhomboid loops are the most characteristic. As in other regions, the vessels follow the orientation of the collagen bundles. Venous vessels accompany the arterial vessels down to their finest branches. Within the superficial accessory layer of the deep fascia, vascular loops delineate microvascular fields. The arterial vessels surrounding these fields are enveloped by venous vessels, forming delicate lace-like networks. Similar structures have been described in the literature as ribbon-like reticular structures. These formations contain very small meshes measuring $50 \times 50 \mu\text{m}$ and $100 \times 100 \mu\text{m}$, formed by capillaries with diameters of 7–10 μm . A characteristic feature of these structures is the predominance of the

venous component, with relatively few precapillaries and numerous large postcapillaries.

The superficial fascia contains two to four vascular networks. In its deepest layer, the vessels are predominantly oriented longitudinally. In the remaining vascular layers, the branching pattern is more uniform and exhibits a tree-like arrangement, progressively dividing into smaller branches that ultimately form capillary networks. Arteries are not consistently accompanied by veins. In these layers, no definite relationship exists between the orientation of the vessels and the collagen bundles. The venous component also predominates. Large longitudinal vascular trunks pass between the layers of the superficial fascia and between the superficial and deep fasciae.

Conclusion. The angioarchitecture of the deep fascia varies among different functional regions and is characterized by differences in the degree of development, shape, and dimensions of vascular loops. The vascular bed of the superficial fascia consists of two functionally distinct layers. In the first layer, the vessels are predominantly oriented longitudinally, whereas in the second layer they show no definite relationship to the collagen bundles and exhibit a characteristic tree-like branching pattern.

References

1. Ахмедова, С. М., Коржавов, Ш. О., Маматалиев, А. Р., Миразимова, И. Б., & Рузиева, Н. Д. (2020). Антропометрические показатели физического развития у детей до 5 лет в самаркандской области. In *SCIENTIFIC RESEARCH IN XXI CENTURY* (pp. 250-258).
2. Блинова С. А., Орипов Ф. С., Дехканов Т. Д. Морфофункциональные особенности нейроэпителиальных телец в респираторном отделе легких // Вестник науки и образования. – 2020. – №. 10-3 (88). – С. 82-84.
3. Mamataliyev A. R. HISTOTOPOGRAPHY OF THE PROSTATE GLAND IN THE RABBIT // Экономика и социум. – 2025. – №. 2-1 (129). – С. 319-321.

4. Mamataliyev A. R., Sh R. S., Zohidova S. H. EKSPERIMENTAL JIGAR SIRROZI SHAROITIDA PASTKI PORTO KAVAL VENOZ TIZIMI MORFOLOGIYASINING ORGANILGANLIK DARAJASI //Экономика и социум. – 2024. – №. 4-1 (119). – С. 1346-1350.
5. MAMATALIYEV A. R. AGE-RELATED MORPHOLOGICAL CHANGES IN THE NERVE STRUCTURES OF THE APPENDIX IN RABBITS //ЭКОНОМИКА. – С. 199-201.
6. Маматалиев А. Р. НАРУШЕНИЕ ИННЕРВАЦИИ И МУТАЦИОННЫЙ ПРОЦЕСС В ТКАНИ //Экономика и социум. – 2025. – №. 4-2 (131). – С. 876-880.