European Journal of Interdisciplinary Research and Development
Volume- 43 September- 2025
Website: www.ejird.journalspark.org ISSN (E): 2720-5746

TECHNIQUE OF SURGERY ON THE THORACIC LYMPHATIC DUCT AND THE CELLULAR COMPOSITION OF THE CENTRAL LYMPH OF GOATS

Narziev Nurmuhammad Bakhtiyorovich
PhD Student; Samarkand State University of Veterinary Medicine,
livestock and Biotechnology

Abstract
The article presents the results of a study concerning the topographic anatomy of the thoracic lymphatic duct in goats. The thoracic duct (ductus throracicus) is the main lymphatic collector, collecting lymph from most of the animal's body. More than ¾ of all lymph passes through it. To fill the thoracic lymphatic duct of goats, an intra-addular injection was used through the popliteal lymph node. At the level of the first rib, the thoracic lymphatic duct in this goat flows into the external jugular vein with one sleeve (mono trunk type) and several sleeves (deltoid type). The morphological composition of the central lymph in goats has been studied.

Keywords: Thoracic duct, topography, surgery, lymph, cannula, jugular vein, cell.

Introduction

Relevance of the topic. Thoracic duct (ductus throracicus) is the main lymphatic collector, collecting lymph from most of the animal body. More than ¾ of all lymph passes through it. Only lymph flowing from the right half of the chest, head, neck and right thoracic limb bypasses the thoracic duct - it flows into the right lymphatic duct. The thoracic duct is formed in the retroperitoneal tissue by the fusion of large lymphatic trunks. The initial part of the duct is the lactiferous cistern. The thoracic duct runs along the caudal vena cava, passes through the aortic opening of the diaphragm into the posterior mediastinum, where it is located between the descending aorta and the azygos vein. Then the thoracic duct deviates to the left and exits above the aortic arch from under the left edge of the esophagus. It curves in an arc and flows into the venous bed at the confluence of the left and right jugular veins or at the confluence of the jugular and subclavian veins Panchenkov R.T. et al. (1982); Chumakova V.Yu. et al. (2003). In animals, the thoracic duct usually consists of several collateral branches. The rate of lymph flow in the thoracic duct of a cat is 2 ml/kg/hour. It can increase 10-fold after eating fatty food [7]. The thoracic duct with one trunk flows into the veins of the neck in 59% (Zhdanov D.A.), 65% (Tsyb A.F. et al.), 74% (Bronnikov S.M.) or 91.8% of people (Lisitsyn M.S.), in this case more often into the internal jugular vein (51.3%) and the left venous angle of the neck (40.5%) (D.A. Zhdanov) or into the venous angle (46.7%) and the brachiocephalic vein (24.4%) (M.S. Lisitsyn). When the venous angle is expanded from acute to obtuse, the entry points of the thoracic duct are displaced from the veins towards the venous angle. The thoracic duct opens directly into the right venous angle in 60% of cases, less often (27%) into the wider internal jugular vein, and even less often (13%) into the subclavian vein. (cited by Petrenko V.M., 2010) According to Petrenko V.M. (2010), the simplest and most convenient access to the thoracic duct in humans and animals is the isolation of the interazigoaortic segment of the thoracic duct,

which is the least variable in structure and topography. The azygos vein passes to the right, and the thoracic aorta to the left of the thoracic duct. The inconstant and usually incomplete left thoracic duct passes along the semi-zygos vein, on the medial side. In rats, the azygos vein passes to the left of the midline, and its place is taken by the semi-zygos vein. In humans, the azygos vein is formed by the fusion of the right subcostal and ascending lumbar veins. At the level of the 17th thoracic vertebra, the azygos vein receives a large left tributary of the semi-zygos vein. Often it joins into one trunk with the accessory semi-zygos vein. In dogs, the third, left root is well expressed. It unites the left ascending and subcostal veins, and can receive 12 caudal intercostal veins. According to Chumakov V.Yu. and others (2003), the following are structurally distinguished on the valve of the thoracic duct of sheep: a base (valvular ridge) - the place of its attachment to the vascular wall; a free edge (cusp); an internal convex (axial) surface facing the lumen of the vessel; and an external (concave) surface. The parietal surface of the valve with the underlying section of the vascular wall forms a valvular sinus. In lymphangions, the valves are a fold of vascular endothelium with a connective tissue plate lying in its center. On the axial surface of the valve, the endothelial cells are extended in the longitudinal direction, and on the parietal surface of the valve, they occupy a position transverse to the vessel axis. Bundles of collagen fibers penetrate the valve from the vascular wall and are located transversely in it; single fibrocytes are located between the bundles of collagen fibers in the valve cusp. Elastic fibers in the valves form a finely looped network with loops oriented along the course of collagen fibers. The latter have small spare folds, which give the valve a certain elasticity necessary for complete closure of the cusps. It was noted that the base of the valves contains much more connective tissue elements than its cusp, as well as single myocytes oriented along the course of attachment of the valve to the vascular wall. According to Panchenkov R.T. et al. (1982); Petrenko V.M. (2010); the thoracic duct is formed in the abdominal cavity at the level of the 1st - 2nd lumbar vertebrae as a result of the fusion of three lymphatic vessels of the left and right lumbar trunks and the intestinal trunk. At the junction there is often an expansion of the thoracic duct, which is called the thoracic duct cistern. It is located on the anterior surface of the 2nd lumbar to 11th thoracic vertebrae and ends between the crura of the diaphragm. Kuznetsov G.S. et al. made a great contribution to the study of the thoracic duct in animals with their research. (1961) cattle; Itkin B.Z., horses (1966); Rakhimov Ya.K., mammals (1966); Petrakov K.A., cattle with pathologies (1973, 1983); Petrenko V.M., rats, dogs (2010) and others. For a deep study of the lymphatic system and its influence on the body, the development of operative access to the thoracic lymphatic duct for cannulation is of great importance, in order to obtain lymph and study its morphological composition, biophysics-chemical properties in the norm and in various pathological conditions. As can be seen from the above review of the literature, there are no works concerning the study of the anatomy and surgery of the thoracic lymphatic duct of goats and the morphological composition of lymph.

Materials and methods of the study. The scientific research was conducted at the Department of Veterinary Surgery and Obstetrics of the Samarkand State University of Veterinary Medicine, Animal Husbandry and Biotechnology. The material for the study was the corpses of 3 goats that died from internal non-communicable diseases or were killed for the purpose of

conducting scientific research. The technique of the operation to obtain lymph was worked out on 5 heads of local goats. In the course of the scientific research, we used the following methods: detection of the thoracic duct with contrast masses, layer-by-layer dissection with anatomical and topographic description, visiography , photography, smear microscopy, surgical intervention on the thoracic duct.

Results of the study. The efferent lymphatic vessels coming out of the popliteal lymph node in the amount of 2-3 or more are directed proximally towards the sacrolumbar region on the left and right sides. At the level of the 1 sacral and last lumbar vertebra, the main lymphatic vessels coming from the right and left pelvic limbs join into 2-3 large collecting vessels. In the abdominal cavity at the level of the 4-3 lumbar vertebrae, they join to give rise to the abdominal part of the thoracic lymphatic duct. Here it is located as part of the left azygos vein and aorta and is directed caudo-cranially . There were cases when lymphatic vessels coming from the sacral-sciatic region flowed into the lumbar lymph nodes and upon exiting the node 1-2 main vessels at the level of the 2 lumbar vertebra independently flow into the thoracic duct or at the level of the 1 lumbar vertebra into the lumbar cistern. At the level of the 1 lumbar vertebra at the entrance to the thoracic cavity, the thoracic duct expands, forming in this place the cistern of the thoracic duct, the intestinal trunk and main vessels coming from the sacral-lumbar region flow into it, the width of the cistern is 2-3 mm. As a result of the studies, we found that the lumbar cistern in goats has two varieties: narrow fusiform in 3 heads (60%) and wide ampullar in 2 heads (40%). Having penetrated through the crura of the diaphragm into the chest cavity, the thoracic lymphatic duct is located on the dorsal surface of the aorta closer to the body of the thoracic vertebrae. In some photographs in the chest cavity, a splitting of the thoracic lymphatic duct into several sleeves from 2 to 4 is noted , into which the efferent lymphatic vessels coming independently from the pelvic limbs can flow. Three cases (60%) were established when in the chest cavity, vessels separated from the thoracic lymphatic duct independently flowed into the azygos or pulmonary vein.

This indicates that goats have lymphovenous anastomoses on the periphery in addition to the venous angle. The lymphovenous anastomoses we have established are of clinical significance. Then the thoracic duct moves along the inner surface of the aorta and the outer surface of the trachea making an arcuate turn towards the venous angle, this is approximately at the level of the first rib, where the common carotid artery, external and internal jugular vein, and cranial vena cava are located. At the level of the first rib, the thoracic lymphatic duct in a goat with one sleeve (mono trunk type 60%) and 2-3 sleeves (deltoid 40%) flows into the external jugular vein.

After obtaining lymph from the thoracic lymphatic duct in goats, we conducted studies to study the morphological composition of the lymph. For this, the lymph was stabilized with a Heparin solution or special test tubes were used to obtain lymph. Lymph was collected in a test tube in an amount of 1-2 ml, and studies were conducted in the Samarkand Diagnostics laboratory on a special analyzer.

In addition to the substances dissolved in it, the lymph of the thoracic duct of goats contains cellular elements, mainly agranulocytes (lymphocytes and monocytes), as well as granulocytes (neutrophils, eosinophils and basophils) and platelets.

In a normal state, in healthy goats, the lymph of the thoracic duct contains mainly lymphocytes, up to 92%, which indicates that the enrichment of the blood with lymphocytes occurs due to the lymph.

Of the other formed elements found in the lymph of goats, monocytes are cells that are capable of phagocytizing larger particles or even whole cells. The physiological role of these cells also consists of producing immunoglobulins. Monocytes make up to 4% of goat lymph.

Granulocytes (neutrophils, eosinophils and basophils) in the lymph of goats make up to 2%; their role is to move in an amoeba-like manner to infectious foci and, having phagocytic properties, participate in their destruction.

In healthy goats, there are no red blood cells in the lymph. Single red blood cells may enter the lymph from tissues, where they exit through the wall of blood capillaries or during drainage of the thoracic lymphatic duct.

In addition to leukocytes and erythrocytes, thrombocytes are found in the lymph of goats. Their number in the lymph of goats fluctuates within very wide limits from 5 to 25 g/l, which corresponds to (5-25 ×109/l). Their biological role is that they participate in the coagulation of lymph and the spontaneous cessation of lymph flow .

In healthy goats, the formed elements of the lymph are in a certain ratio, which ultimately form a lymphogram . It includes all the formed elements that make up the lymph, their ratios and structural features. The lymphogram has clinical and diagnostic significance and is important for assessing the functional state of the lymphatic system.

Of great importance is the differential count of leukocytes in the lymph of goats. The percentage ratio of leukocytes is called the leukocyte formula of lymph.

As a result of our studies, we established the leukocyte formula of goat lymph, which is expressed in the following figures: lymphocytes - 92%; monocytes - 4%; segmented leukocytes - 1%; eosinophils - 2%; other elements (mainly histiocytes) - 1%.

As can be seen from the presented data, the basis of the cellular composition of goat lymph is lymphocytes, which are divided into 3 types: large, medium and small. Lymphocytes are immunocompetent cells of adaptive immunity that live in the body of animals, including goats, from several months to several years. According to their functions, cells are divided into T-lymphocytes - 80%, and B-lymphocytes - 20%. They provide humoral immunity (antibody production), and cellular immunity that destroy foreign cells and protect the body from their penetration.

Conclusions

1. The thoracic lymphatic duct of goats is divided into two parts, abdominal and thoracic, which originate in the lumbosacral region as part of the aorta and azygos vein.
2. The thoracic lymphatic duct in goats at the level of the 1st lumbar vertebra forms a lumbar cistern; in 60% of cases it is fusiform and in 40% of cases it is ampullar .
3. In the chest cavity, the thoracic lymphatic duct is located on the dorsal surface of the aorta closer to the thoracic vertebrae; vessels separated from the thoracic lymphatic duct can independently flow into the azygos or pulmonary vein.

4. At the level of the first rib, the thoracic lymphatic duct in a goat flows into the external jugular vein with one sleeve (mono trunk type 60%) and 2-3 sleeves (deltoid 40%).
5. As a result of our studies, we established the leukocyte formula of goat lymph , which is expressed in the following figures: lymphocytes - 92%; monocytes - 4%; segmented leukocytes - 1%; eosinophils - 2%; other elements (mainly histiocytes) - 1%.

References

1. Borisov A.V. Anatomy of lymphangioma. Nalchik, Polygraphservice, 2007 – 206 p.
2. Borodin Yu.I. On the functional synergism of the lymphatic, lymphoid systems and the loose connective tissue system // Morphological Gazette – 2010 - No. 3, pp. 7 – 10.
3. Guseinov T.S. Controversial and promising issues of lymphology // Makhachkala. publishing house "Science Plus", 2012 - 136 p.
4. Konenkov V.I. and others. Lymphology. Novosibirsk Publishing House Manuscript – 2012: 1094.
5. Panchenkov R.T., Vyrenkov Yu.E., Yarema I.V., Urtaev B.M. Lymphosorption. Moscow “Medicine” 1982, p. 238.A.Ya. yuSedova T.N. Thoracic duct surgery. Monograph. 2016.
6. Parshin V.D., Samokhin A.Ya., Sedova T.N. Surgery of the thoracic duct. Monograph. 2016.
7. Petrenko V.M. Surgical anatomy of the human thoracic duct. International Journal of Applied Fundamental Research – 2010 - No. 5 – pp. 110 – 114.
8. Sapin M.R. Tissue fluid and the immune system. Proc. int. conf ., Structural transformations of organs and tissues at stages of ontogenesis in norm and under the influence of anthropogenic factors. Astrakhan, 2000, p. 140.
9. Sapin M.R. The lymphatic system and its role in the protective functions of the body. Collection of scientific papers dedicated to the 100th anniversary of the birth of prof. V.N. Nadezhdin. 2004 – pp. 16 – 17.
10. Sapin M.R. The lymphatic system and its role in immune processes // Morphology. 2007, v. 131, no. 1, pp. 18–22.
11. Shvedavchenko A.I., Bocharov V.Ya. On the lymphatic postcapillary // Morphology, 2007, No. 2, pp. 81–83.