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THE MORPHOLOGY AND DEVELOPMENT OF THE SHEEP'S TRACHEO-BRONCHAL CRANIAL LYMPHONODES IN PRENATAL PERIOD

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ABSTRACT

The investigation was made on 37 sheep's fetuses (21 males and 16 females) between 3rd–5th month of gestation. The work describes the morphometry of tracheo-bronchal cranial lymphnodes in 3rd, 4th and 5th month of gestation, as well as the location of these lymphnodes and their development connected with the development of tracheal bronchus.

The work includes schematic diagrams and photographs.

Key words: sheep, prenatal period, tracheo-bronchal cranial lymphnodes, tracheal bronchus

INTRODUCTION

The lymphatic system plays an important part in morphological and physiological sciences and among other things, in the pathogenesis of particular diseases. In accessible literature lacks of wider studies on this theme in domestic animals, including sheeps. The investigated lymphnodes belong to bronchial lymphatic center (lymphocentrum bronchale) collecting lymphatic vessels among other things from lungs, heart, mediastinum [1,2,3,5].

The tracheo-bronchial cranial lymphnodes are of great consequence in morphology, physiology and pathology. This lymphnode was former called the eparterial lymphnode (lymphnodus eparterialis). The tracheo-bronchial lymphnode plays an important part in veterinary diagnostics. This lymphnode belongs to so-called police lymphnodes, it means, to the lymphnodes always investigated in veterinary meat investigation. The tracheo-bronchial cranial lymphnode exists in Artiodactyla, in which exists the tracheal bronchus (bronchus trachealis). The development of this bronchus in sheep's prenatal period introduced Noden [4]. Tanudimadia and Ghoshal [7] describe these lymphnodes in adult goat. The lymphnode and tracheal bronchus in prenatal life introduce Pospieszny [6]. The present literature lacks of wider informations about the development of sheep's tracheo-bronchial cranial lymphnode in prenatal period.

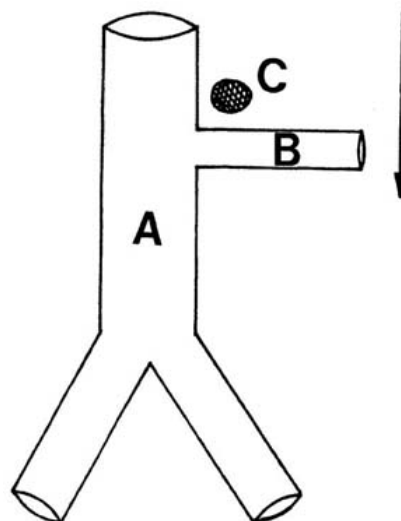
MATERIAL AND METHODS

The morphological observations were made on 37 sheep's fetuses (21 males and 16 females), which age was stated by Zietzchmann and Krolling method [8]. Based on the length measurements (from 175mm – 425mm), the age of investigated fetuses was assigned between 3rd – 5th month of gestation and the fetuses had got normal fully developed thoracic organs. Whole material was fixed in 5% formalin solution with the addition of 3% acetic acid. During preparation, the acetic acid was used to make the all object more visible. The investigation was made using the stereoscopic microscope with enlargement 2.5x – 100x. The great number of photography and schemes was made on prepared in this way material. The author of this work used NAV in the descriptive part of his own investigations and in the results of the work.

RESULTS

The morphology and the development of all objects taking part in bronchial lymphatic center, in this case the tracheo-bronchial cranial lymphnodes is strongly connected with developing tracheal bronchus (Fig. 1). This bronchus, in fetuses from 3rd month of gestation, branches from trachea on the level of second thoracic vertebra (Th₂) at an angle of 80 – 90 degrees (skeletotopy). In the next weeks of prenatal life, the thoracic cave and its organs develop distinctly, both the lungs and bronchial tree. In the 4th month of gestation, the tracheal bronchus branches from trachea on the level of third thoracic vertebra (Th₃), and on the level of fourth - fifth thoracic vertebra (Th₄₋₅) in perinatal period. In this time the investigated tracheal bronchus branches from trachea at an angle of 50 – 60 degrees. During the dynamic development of bronchial tree, both the tracheal bronchus, develops the whole bronchial lymphatic center. The investigated lymphnode is strongly connected with the developmental movements of bronchial tree.

Fig. 1. The schematic morphology of the tracheo-bronchial cranial lymphnode and the tracheal bronchus in sheep. The length of fetus 425mm. The arrow shows the direction of developmental movements. A – trachea, B – tracheal bronchus, C – tracheo-bronchial cranial lymphnode.

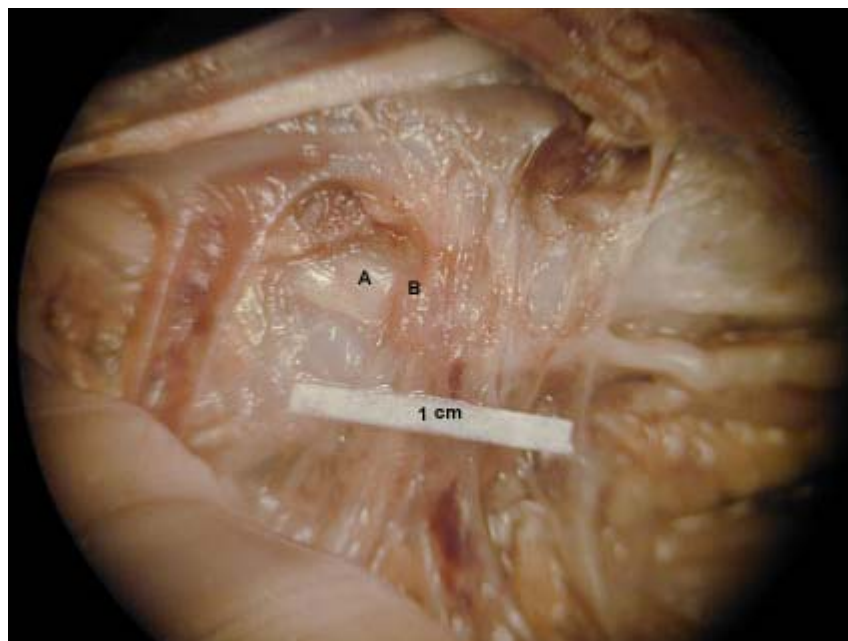


In the 12th week of prenatal life, the lymphnode is located on the level of the second thoracic vertebra (Th₂) and lies closely to the wall of trachea. The tracheo-bronchal cranial lymphnode is the most often not divided, but sometimes it occurs to be secondary divided. On this stage of development, the morphometric measurements occur between 0.2mm – 0.3mm. The lymphnode is surrounded by the perietal mediastinal pleura. The cranial pole of investigated lymphnode lean on the developed vessels; costocervical right trunk and appropriate vein (trunkus et vena costocervicalis dextra).

In the 16th week of gestation, generally the single lymphnode exists, but sometimes it occurs double or triple tiny node. However the single form is dominating, which morphometric measurements equal between 1.8mm – 2.8mm.

In the last week of prenatal life, exactly in perinatal period, tracheo-bronchal cranial lymphnode is located on the right from the trachea wall, closely to tracheal bronchus (Fig. 2). Its morphology is well developed, with strongly marked afferent and efferent lymphatic vessel. The morphometric measurements occur between 1.8mm – 4.6mm.

**Fig. 2. The location of the tracheo-bronchal cranial lymphnode in sheep's male. The length of fetus 425mm.
A - tracheal bronchus, B - Tracheo-bronchal cranial lymphnode.**



The neural supply of the single or multiple tracheo-bronchal cranial lymphnode is secured by the right vagus nerve. It gives the tracheal bronchus branch (ramus bronchi trachealis). Initially (3rd month of gestation) it occurs the simple branch, which closely to the branching tracheal bronchus divide in two or three secondary neural branches. The tracheal bronchus neural branch gives tiny, single branch supplying the tracheo-bronchal cranial lymphnode developing and located cranially to the bronchus. During the subsequent stages of development, the number of neural branches increase supplying the investigated node, so in perinatal period (in the 20th week of prenatal life) the above-mentioned branches are well distinguished.

The investigated lymphnode or its conglomeration (2–3) is supplied by arteries branching from the costocervical right trunk (truncus costocervicalis dexter). Generally the vein supplying the lymphnode going to the costocervical vein (vena costocervicalis). Initially the diameter of these vessels is very small. The above-mentioned vessels have bigger diameter in fetuses from the 5th month of gestation, proofed the important part, they played in whole vessels system.

DISCUSSION

The investigated sheep's tracheo-bronchal cranial lymphnode (lymphonodi tracheobronchales craniales) in prenatal period are strongly connected with the development of tracheal bronchus (bronchus trachealis), existing in Artiodactyla. In this period occurs the enlargement embryonic induction onto the prenatal period induction. The prenatal period, especially its final stage, referring to the development of respiratory and vascular system, is

very “aggressive”. Therefore in our investigations we pay special attention to: first of all the dynamic of tracheal bronchus development, then the development of tracheo-bronchial cranial lymphnode and finally the development of vascular and neural systems. The above-mentioned movements are closely coherent. In present literature lacks of close studies on this subject.

The above-mentioned lymphnode is of great consequence in morphology and, first of all in clinical sciences. In the veterinary sciences it is called “police lymphnode”. This name is well-founded. The lymphnode has got its fixed location. It lies between the wall of trachea and the tracheal bronchus. The morphometric measurements of lymphnode change considerable, the tracheal bronchus changes also his location (from Th₂ – Th₄₋₅) during their development. Initially the tracheo-bronchial cranial lymphnode is supplied by the single branch of vagus nerve, the vessels supplying the lymphnode are also non-multiplied. These vessels are branching from the costocervical right trunk and vein. During subsequent development, the number of neural and vascular branches supplied the lymphnode increase, so the node is better supplied. The similar changes in the tracheo-bronchial cranial lymphnode in pigs observed Pospieszny [6].

CONCLUSIONS

1. The morphology of the sheep’s tracheo-bronchial cranial lymphnodes in prenatal period is strongly connected with the development of trachea and tracheal bronchus.
2. The tracheo-bronchial cranial lymphnode, vessels and nerves supplying it, develop together.
3. The sex of investigated fetuses has not influence on the morphology and the developmental movements of the sheep’s tracheo-bronchial cranial lymphnode in prenatal life.

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