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Research Article

ANATOMICAL FEATURES OF THE NOSE AND NASAL CAVITY

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ABSTRACT

In this article we will review the anatomy and histology of the nasal cavity - its sections, structure and vascular and nerve supply. For experimental rhinology, the choice of a laboratory animal is very important. The scattered information on the morphology of the nose and paranasal sinuses forces the researcher to study the literature from various branches of biology (zoology, embryology, veterinary medicine, etc.) for a long time. Having analysed works describing the anatomy and morphology of the nose and paranasal sinuses in various laboratory animals.

KEYWORDS

Nose, nasal cavity anatomy.

INTRODUCTION

An innocuous runny nose can develop into an inflammation of the sinuses, or sinusitis. [...] If secretions due to swelling of the nasal passages cannot be drained, they become trapped. Mucus accumulates in the paranasal sinuses, where it can easily lead to inflammation. Studying the anatomical features of the

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nose and nasal cavity is one of the important studies to prevent inflammatory diseases of the nose and nasal cavity

OBJECTIVE OF THE STUDY

To study the anatomical features of the nose and paranasal sinuses of rabbits

MATERIAL AND METHODS

We macroscopically examined the nasal cavity of 25 adult rabbits. The animals were removed from the experiment with ethominal-sodium anaesthesia, the solution of which was injected intraperitoneally at a dose of 50 mg/kg body weight.

RESULTS AND DISCUSSION

The study of macroscopic preparations showed that laboratory rodents belong to the mammalian macrosomatids, the nose of which is characterized by the fact that, firstly, the nasal cavity is separated from the oropharynx; secondly, only a rudiment of the primary choana remains in the form of a narrow stenson canal in the palate; thirdly, the nasal cavity receives access to the nasopharynx through secondary choanas, bypassing the mouth; fourthly, the system of shell and paranasal cavities is well developed [2].

Anatomy of the rabbit nose. The outer nose of the rabbit is covered with wool and overhangs the bifurcated upper lip, to which it is connected by a frenulum. It is separated from the lip by two oblique nostrils that lead to the nasal cavity. The skin at the nostrils gradually changes to a mucous membrane. There is no nasal cavity. The nostrils are supported in an extended state by a special cartilaginous skeleton embedded in the wings of the nose. The skeleton is represented by nasal cartilage attached to the front of the nasal septum. The passage through the nostrils into the nasal cavity in the rabbit is severely narrowed. The nasal cavity is relatively small and elongated in length. It is divided into 2 symmetrical halves by a thin cartilaginous septum, the posterior part of which also ossifies into 2 symmetrical halves [3].

The nasal septum is low and thick in the front, but becomes thinner and higher towards the back and divides the nasal cavity into right and left halves [2]. The base of the nasal septum is formed by hyaline cartilage, which is an extension of the perpendicular lamina of the dentate bone.

Each half of the nasal cavity is filled with 3 strongly developed nasal shells consisting of the thinnest bony or cartilaginous plates covered by a mucous membrane. The nasal shells, which form complete curls, create a system of labyrinth-like passages for the air passing through the nasal cavity; passing through them, the cold air is warmed before entering the pharynx and larynx, and the polluted air leaves its dust behind. In addition, the air in the nasal cavity humidifies. This is the respiratory part of the nasal cavity. The largest and shortest of the nasal crusts is the inferior crust, originating from below the maxillary bone and occupying almost the entire front half of the nasal cavity. The longest and narrowest and the upper one, arises above the nasal bone and extends upwards along the entire nasal cavity. The middle shell is short and wide, arises at the back of the nasal cavity from the cuspid bone and extends inward to the lower shell. Between the shells and the adjacent walls of the nasal cavity, passages are formed, of which the width of the lower one - respiratory, leading to the choroid, and the upper one - olfactory, leading to the olfactory part. In the rabbit, most of the nasal cavity is occupied by the shells, while the lower nasopharyngeal passage and the choana leading to the pharynx are poorly developed. The nasal cavity of the rabbit is therefore

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underdeveloped due to its lifestyle. The nasal shells divide each half of the nasal cavity into 4 nasal passages: dorsal, middle, ventral and common.

The dorsal nasal passage (meatus nasi dorsalis) is olfactory, located between the vault of the nasal cavity and the long, narrow dorsal nasal concha, leading to the back into the labyrinth of the dentate bone.

The middle nasal passage (meatus nasi medius) is a mixed, olfactory and respiratory passage located between the dorsal and ventral shells. It leads to the choana, the slits of the olfactory labyrinth and communicates with the paranasal sinuses. The ventral nasal concha is wide, divided by a longitudinal septum into dorsal and ventral parts. The dorsal part communicates with the middle nasal passage and the ventral part with the ventral passage. The ventral nasal passage (meatus nasi ventrilis) is respiratory, located between the ventral shell and the floor of the nasal cavity and leads to the choana.

The common nasal passage (meatus nasi communis) is mixed and occupies the space between the nasal septum and the medial surface of the nasal shells and the olfactory labyrinth. It communicates with the 3 described passages, passes to the back of the exopharyngeal passage, which opens into the nasopharynx via the choana.

At the bottom of the nasal cavity along the base of the septum there are cartilaginous tubes called nasopharyngeal or Jacobson's organs. They are 15-20 mm long, with a larger diameter of 3.1 mm and a smaller diameter of 1.3 mm and a lumen of 0.45 mm. The organ's orifice is very small and lies slightly anterior to the orifice of the nasolabial canal.

Anatomy of the paranasal sinuses: Of the cranial bones in the rabbit, only the maxillary bones are retained; the frontal and cuneiform bones are reduced.

The maxillary sinuses (sinusmaxillaries) are the most extensive. It combines the air cavity of the maxillary sinus and part of the air cavities present in the cuspid bone. At the front the maxillary sinus reaches the level of the 3rd molar and at the back the bone lacrimal bladder. Medially, at the level of the 5th-6th root tooth, the sinus communicates with the middle nasal passage via a wide nasolacrimal passage, ventrally with the palatine sinus, and dorsocaudally with the lacrimal bone cavity.

The maxillary sinus in the rabbit is divided into 3 widely communicating cavities, one above the other [2]. The maxillary sinus communicates with the nasal cavity via an anterior connection to the lamina (Fig. 1) [17].

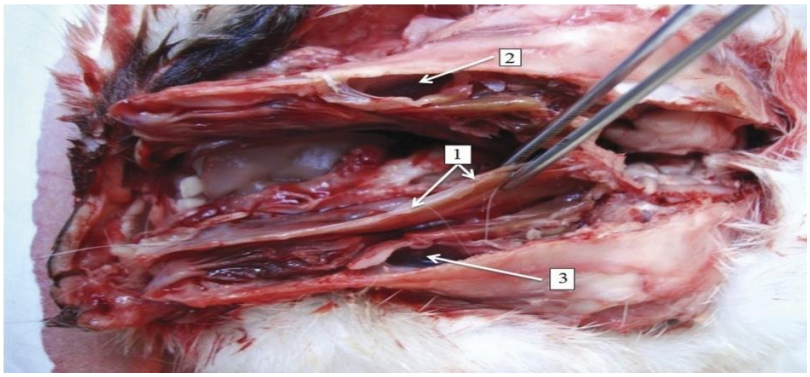

Figure 1. Nasal cavity and maxillary sinuses of an adult rabbit.

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The olfactory analyzer.The anatomy of the rabbit's olfactory analyzer is the least covered, although rabbits have a better developed sense of smell than their eyesight. This is evidenced by the fact that when a rabbit is placed with an alien rabbit, its colour is completely irrelevant, as only by smell the mother can distinguish and destroy it. The rabbit, as it moves forward, sniffs out everything in its path and constantly holds its nose up, picking up the constant change in the atmosphere around it. It is able to sense the faintest traces of the scent around it.

Odourant molecules, which are signals of certain objects or events in the environment, reach the olfactory cells when they are inhaled through the nose (during meals - through the choana). The olfactory organ is located in the upper posterior part of the cavity and consists of 10-12 hairs that respond to aromatic molecules [1].

Anatomy of the olfactory cortex lobe. The nervous system of rabbits is characterized by a number of essential features, many of which are united by primitive features. In structure and development, the nervous system of the rabbit, in particular the central nervous system, is at a low stage of development compared to other placental animals. Particularly striking is the poor development of the cerebral hemisphere cortex and its lack of furrows and gyrus.

The central nervous system consists of the brain, located in the cranial cavity, and the spinal cord in the form of a thick cord running through the spinal canal.

Thus, the most significant features of the rabbit brain are the following:

1) The cerebral hemispheres are small and the longitudinal gap between them is shallow;
2) The cerebral cortex is poorly developed, with little or no gyrus or foramen;
3) The greater cerebrum is strongly narrowed and triangularly pointed anteriorly;
4) The medulla is sharply elongated anteriorly in the form of very large and distinct olfactory bulbs;
5) The pituitary gland is relatively poorly developed;
6) The cerebellum is not compact and flattened anteriorly to the rear, with small hemispheres sharply set aside and containing what are known as wisps on the sides;
7) The variolar bridge is weakly marked [3].

A pair of elongated rounded outgrowths, the olfactory lobes, depart from the lower surface of the anterior part of the hemispheres, pointing forward. They are connected, as can be seen on the fresh brain, by a cord of white nerve fibres with the temporal lobes of their side. In turn, the olfactory nerves branch off from the anterior and inferior surfaces of the olfactory lobes. It is very difficult to see them, as they depart in great numbers in the form of the finest filaments. As they leave the brain, the olfactory nerves pass through the numerous openings of the septum, which separates the cranial box from the nasal cavity. The olfactory nerves are considered to be the first pair of nerves in the brain. When the large hemispheres are spread apart from above, they are connected to each other in the middle third of their length by a white transverse tendon, the so-called corpus callosum.

CONCLUSIONS

Thus, our analysis and data on the anatomy of the nasal cavity will certainly be useful for otorhinolaryngologists who plan to perform experimental studies on rhinology problems

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