Rabbit Respiratory System: Clinical Anatomy, Physiology and Disease

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KEYWORDS

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• Pasteurellosis • Staphylococcosis • Neoplasia

The nostrils of rabbits contain sensory pads at the entrance, making the nose very sensitive to touch. For this reason, when inspecting the nostrils and the oral cavity, put fingers lateral to the nasal area. The nostrils are still when totally relaxed, but can twitch at up to 150 twitches per minute. Rabbits have an acute sense of smell due to turbinate bones with a vomeronasal organ and olfactory sensory epithelium.[1]

Rabbits are obligate nose breathers due to their epiglottis positioned rostrally to the soft palate. Any obstruction within the nasal cavity will produce a respiratory wheeze with increased respiratory effort (**Fig. 1**).

Air moves through the nostrils across the alar folds into the nasal cavity. The nasal cavity is divided by the cartilaginous septum into a right side and a left side. Ventrally, the long nasal cavity is separated from the oral cavity by the hard palate cranially and the soft palate caudally. Each portion of the nasal cavity has dorsal and ventral nasal conchae that extend into the cavity from its lateral wall. The nasal conchae are scrolls of cartilaginous tissue covered by mucosa. Additionally, there are openings between the conchae that extend into the maxillary and ethmoid paranasal sinuses.

The epiglottis sits over the caudal portion of the soft palate.[1] This allows for an unobstructed conduit for air to move from the nostrils through the nasal cavity into the rima glottis. When looking into the oral cavity, a wall of tissue covering the opening of the glottis will be observed. To see into the tracheal opening, the soft palate will need to be elevated to drop the epiglottis into view. The mucosa is very sensitive to trauma related to intubation.

The authors have nothing to disclose.

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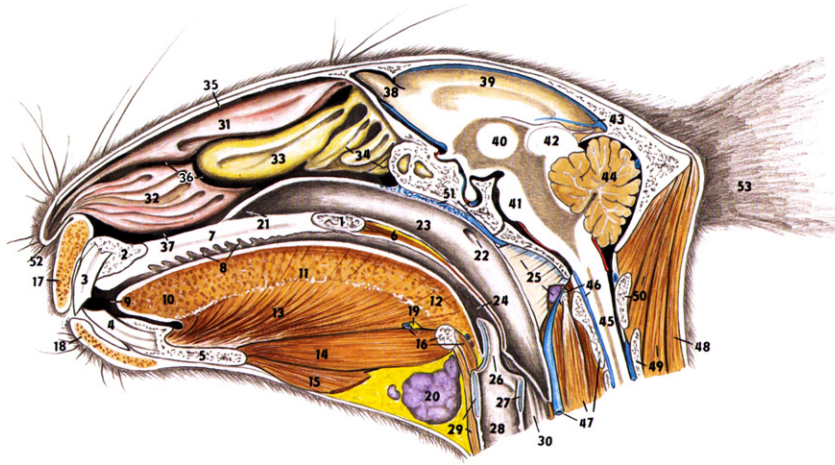

Fig. 1. Paramedian section through the head. Anatomic features with respiratory effect include the soft palate (6), hard palate (7), epiglottis (26), cartilaginous cricoid plate (27), trachea (28), dorsal nasal concha (31), and the ventral nasal concha (32). The epiglottis is positioned rostrally to the soft palate, thus requiring rabbits to be obligate nose breathers. (*Reprinted from* Popesko P, Rajtova V, Horak J. A colour atlas of anatomy of small laboratory animals, vol. 1. Rabbit, guinea pig. London (UK): Elsevier; 1992; with permission.)

The thorax is small in contrast to the size of the abdomen. The thymus persists in the adult and lies ventral to the heart, extending forward into the thoracic inlet (**Fig. 2**).

Both the left and right lungs have cranial, middle, and caudal lobes (**Fig. 3**).[1] However, the right lung has an accessory lobe. The left cranial lobe is smaller than the right due to the presence of the heart. The pleura is thin. There are no septa dividing the lungs into lobules. This accounts for pneumonia being generalized rather than localized. The normal respiratory rate at rest is 30 to 60 breaths per minute. At rest, the diaphragm is used for muscular contractions rather than the intercostal muscles. Open-mouth breathing is not normal and is an indicator of severe respiratory disease or agonal breathing.

DISEASES

Respiratory diseases are a major cause of morbidity and mortality in rabbits.[1–4] Pasteurellosis is the primary respiratory disease, but many other pathogens can play a role in the disease complex. The term snuffles can refer to any upper respiratory disease (URD). Comprehensive studies have shown that rabbits can resist infection even if housed with infected rabbits, spontaneously eliminate *Pasteurella multocida*, become chronic carriers, develop acute disease, develop bacteremia and pneumonia, or develop chronic disease. The pathogenesis depends on host resistance and virulence of the *P multocida* strain. Many rabbits carry *Bordetella bronchiseptica* and *Moraxella catarrhalis* in the nares. The prevalence of *P multocida* infection varies between rabbitries. It increases with the age of rabbits in facilities where the disease is endemic. There is an inverse relationship between *P multocida* and *B bronchiseptica* infections in rabbits. Weanlings have higher infection rates with *B bronchiseptica,* whereas *P multocida* predominates in adults.