A Comparative Histological Study of the Soft Palate between Rabbits and Guinea Pigs

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Abstract

Objectives: The purpose of this research was to identify the normal histological features of the soft palate in guinea pigs and rabbits. Also, make information available for surgical procedures as well as pathological conditions. Method/: Eight healthy rabbits and guinea pigs were bring from Iraq animal's house market. From the animal house market, eight healthy rabbits and Guiana pigs were brought. Both experimental species were killed with xylazine [0.5 cc] and ketamine [0.5 cc] intramuscular injections, and tissues were identified with H&E. Results: The soft palate had two surface; oropharyngeal surface was coated by stratified squamous keratinized epithelia and nasopharyngeal surface was bordered by psuedostratified columnar epithelial ciliated. The palatine glands variety in distributed in soft palate, in rabbit's located closing to oropharyngeal surface while in guinea pigs were closing to nasopharyngeal surface.

Keyword: Soft palate, Rabbits and Guinea pig.

1. Introduction

The musculomembranous component of the partition between the proximal parts of the respiratory and digestive systems is known as the soft palate. It extends caudally at a transverse level from the hard palate, covering the epiglottis to varying degrees. Because the two organs are involved in both swallowing and breathing, their coordinated operation is critical. In fact, soft palate dysfunction has been linked to the development of well-known respiratory disorders including obstructive sleep apnea in humans and occasional dorsal displacement of the soft palate in exercising horses [1, 2]. The soft palate is frequently quite lengthy in dogs, especially in brachycephalic breeds, whose skull bone shrinkage is not accompanied by a decrease in soft tissue growth. In mesaticephalic heads, the boundary between hard and soft palate is just caudal to the final upper molar teeth, while in brachycephalic heads, it might be beyond 1 cm caudal [3]. The morphology of the palatine musculature in mesaticephalic dogs is similar to something like the functional soft palate muscles in humans [4] and horses [5], with shorter fiber diameters in the palatinus comparable to the other soft palate muscles. According to Stål et al. [4], this might be owing to unique functional needs of the uvula (equivalent of the canine palatinus muscle) that could be connected to the structure of similar muscles in the human soft palate. At one end, there are no skeletal insertions. In addition, a certain amount of size fluctuation in soft palate muscles other than the palatines was regarded typical in both human and horse [5, 6] healthy soft palates. The soft palate is a musculo-membranous structure in the mouth cavity which really separates the digestive tract from the respiratory system. It reaches the hard caudally. Because both swallowing and breathing are required, the proper operation of the two systems is criticalIn reality, well-known respiratory disorders, such as obstructive sleep apnea illness in humans and intermittent soft palate displacement in farm animals, include soft palate problem in their etiology [7]. Despite the fact that this animal has been used in several experimental experiments, no description to the basic histology of the soft palate could be located in the research. The present findings of the typical histology of the soft palate in the Guaina pig and rabbits are presented in this publication [8].

The goal of this study was to gather information on the normal structure of the soft palate in lab animals in order to help other disciplines such as histology, surgical research, and clinical evaluation.

2. Materials and Method

Soft palate examples from a guinea pig and (8) adult rabbits. The rabbits weighed (1100) g, whereas the guinea pigs weighed (450) g. An IM injection of ketamine (0.5 cc) and xylazine (0.5 cc) had been used to anesthetize. The weight was measured in grams (g) using a sensitive electronic balance [9]. For histological dedications, the samples were fixed in formalin 10% and serially sectioned at 5 µm. Hematoxylin and eosin stain were using a means of (4) microscopic sections to every histological tissue measuring 1.13 mm2 below 10X, with a total of (8) histological sections being used. Then, in all fields, take the arithmetic mean and transform the 1 mm2 rhythmically [10].

3. Results and Discussion

In rabbits, the soft palate had two surfaces nasopharyngeal and oropharyngeal, both surface different from each other in their structure. The oropharyngeal surface lined by thicker stratified squamous epithelial keratinized, folded in shape, thickness of oropharyngeal part was (40) µm, recognized by thin layer of collagen fibers. On the other hand, the nasopharyngeal lined by psuedostratified columnar ciliated epithelia without goblet cells rested in thick layer of collagen fibers. These finding disagree with [11] who

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describe the soft palate in cat had a stratified squamous epithelial non – keratinized rested on thick layer of collagen fibers (Fig1).

The submucosa in rabbits toward oropharyngeal part had a crowded mass of branch mucous glands don't form lobulated structures, the diameter of these glands was (25) µm, also poorly of connective tissue septa in this region, while these glands absent toward nasopharyngeal part and this region rich by connective tissue. These results disagree with [8] who stated that the soft palate of albino rat had a dense collagen layer. In addition these results disagreement with 13 who describe that the thick glandular layer gradually becomes thinner towards the posterior part of the soft palate (Fig,2).

In guinea pigs, the soft palate also had two surfaces (oropharyngeal and nasopharyngeal) seam as rabbits in epithelial lining but present some of varieties in shape. The oropharyngeal epithelial layer was sharp in shape and thinner, the measuring was (30) µm. In addition the oropharyngeal layer had more keratinized layer in surface. These results agree with Kuehn et al. [12] Whoever finding the oropharyngeal surface as being heavy for mucosal coat lubrication is necessary to prevent injury during consumption of food (Fig,3).

The contrast from Rabbits the sub-mucosal glands in guinea pigs scattered as lobulated groups located closing to nasopharyngeal part. These mucous acini separated from each other by thick layer of connective tissue septa, the diameter of this type was µm. The current study akin partially with [11] that mention that the palatine salivary glands in nasopharyngeal side less in numbers, located close to mucosal layer and disagree with Arrighi et al. [13] who stated that the soft palate in dogs have two side; oral and nasopharyngeal, the later side no glands underneath mucosa (Fig, 4,5).

In both species, the epithelial lining of the interlober glandular ducts lined by simple squamous epithelia while main duct located near to the basement membrane and lined by stratified cuboidal epithelia. These finding variance partially with Samuelson [14] who stated that the glandular epithelial of main duct lined by stratified cuboidal while the interlober duct lined by simple cuboidal epithelia (Fig, 6).

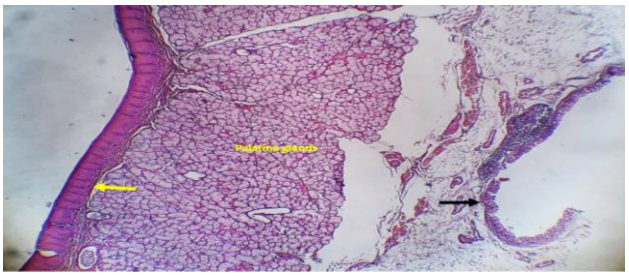

Figure 1: Soft palate in rabbits showing nasopharyngeal part (black arrow) and oropharyngeal part (yellow arrow). H&E stain.40X.

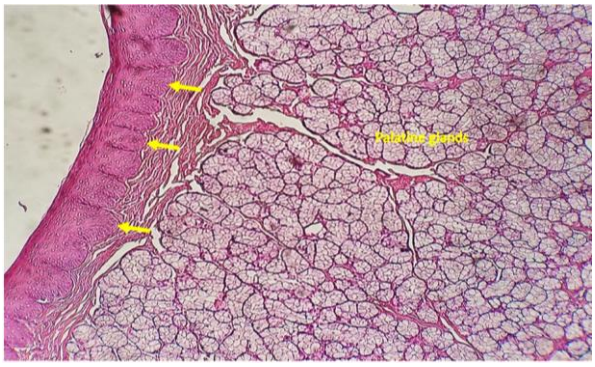

Figure 2: Soft palate of rabbit showing oropharyngeal part lined by folded stratified squamous epithelial keratinized (yellow arrow) rested on heavy layer of Palatine glands .H&E stain.100X.

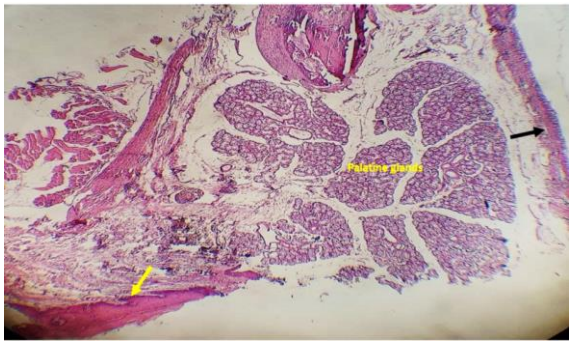

Figure 3: Soft palate in Guiana pig showing nasopharyngeal part (black arrow) and oropharyngeal part (yellow arrow). H&E stain.40X.

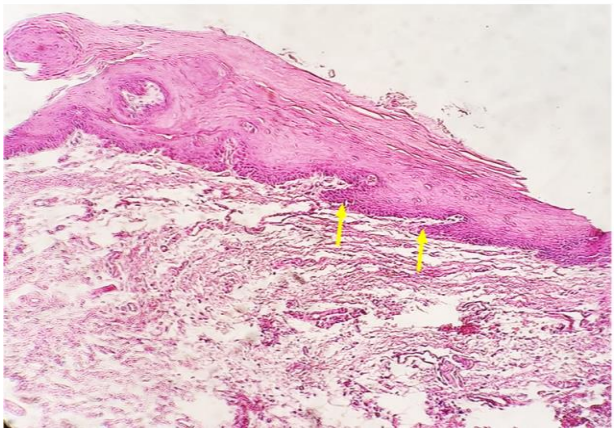

Figure 4: Soft palate of Guiana pig showing oropharyngeal part lined by sharp layer of stratified squamous epithelial keratinized (yellow arrow) rested on heavy layer of connective tissue .H&E stain.100X.

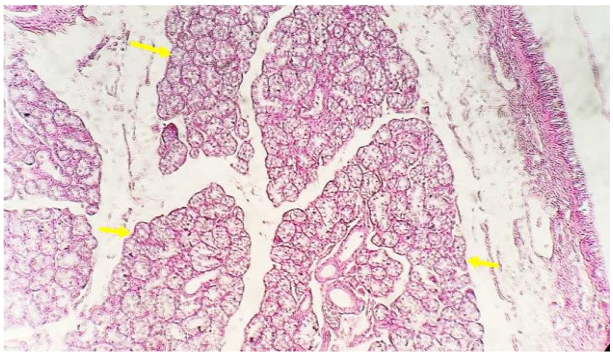

Figure 5: Soft palate of Guiana pig showing Palatine glands found as lobulated and closing to nasopharyngeal part. H&E stain.100X.

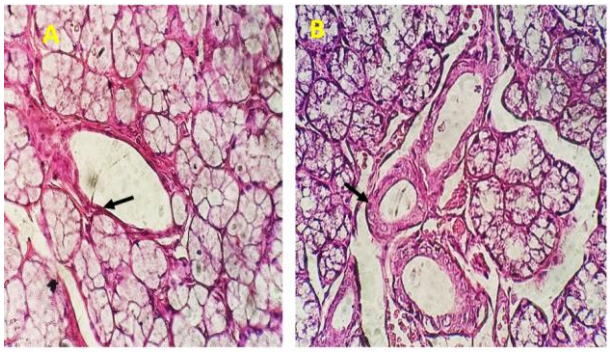

Figure 6: Soft palate in Guiana pig and rabbits showing systemic Ductus (A) interlobular duct lined by stratified gummous epithelia whereas (B) main duct lined by simple cuboidal epithelia. H&E stain.400X.

4. Conclusions

The soft palates of both species differ in epithelial thickness and connective tissue, as well as the form and location of glands.

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