



A Macroanatomic Study on Larynx Cranialis of Turkeys in Thrace Region, Turkey

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Abstract

This study was conducted to determine the differences and similarities between larynx cranialis of turkey and other species of poultry. For this purpose, 8 female and 8 male adult turkeys were used for the anatomical measurements. Furthermore, histological examinations were performed on larynx cranialis of 2 turkeys. Cartilago thyroidea and epiglottis were not observed in the larynx cranialis, in our study. Besides, larynx cranialis were found to constitute from paired cartilago arytenoidea and unpaired cartilago cricoidea and cartilago procricoidea. Crista ventralis was detected on larynx cranialis of turkeys. According to our results, it has been determined that in turkey; the width of glottis in female turkeys were larger than males. Cartilago procricoidea were observed bigger than cartilago arytenoidea and crista ventralis were found to be more prominent than in other birds.

Introduction

In poultry species, unlike mammals, larynx is divided into two sections such as larynx cranialis and larynx caudalis. Larynx cranialis is only related with respiration and it is not a voice organ. In birds, voice organ is only formed by larynx caudalis (Baumel et al., 1993; Getty, 1975).

Larynx cranialis is located in pharyngeal pathway (Nickel et al., 1977), and it is formed by 3 different cartilages. These cartilages are named as cartilago cricoidea, cartilago procricoidea and cartilago arytenoidea. Cartilago arytenoidea is formed by pair cartilages while others are unpaired. The split which situated between the two cartilago arytenoidea is called glottis and its sulcus to caudalis is called sulcus laryngealis (Baumel et al., 1993; Getty, 1975).

Mons laryngealis is a protuberance that is located in larynx cranialis. Papillae rows, which are facing backwards and prevent nutrients coming back to mouth, are situated in this zone (Getty, 1975; Taşbaş et al., 1994). In goose these papillae do not show a systematic row but are located randomly and their numbers are approximately around 25-28 (Onuk et al., 2010).

In this study, we aimed to investigate the macroanatomical features of total of larynx cranialis of turkey, determine the differences and similarities from

other species of avian and shed light on the structure of larynx cranialis of turkey for further studies on this subject in veterinary anatomy.

Materials and Methods

In this study, 18 larynx cranialis from 9 female and 9 male turkeys, taken during the slaughter process from a private turkey slaughterhouse, were examined. Larynx cranialis were taken by using dissection methods. To make cartilages more evident, 16 of them were left in 70% alcohol for 2 hours. Furthermore, cartilages were stained with 0.1% methylene blue. The stained larynx was left in 70% and 50% of alcohol for one hour, respectively. Photographs were taken with Canon Eos 650D. Two larynx cranialis were left in formol solution for one day. Larynx which were going to be used for the histological examination were embedded in paraffin after routine histological processing (Demir et al., 2001). Cross sections of 5µm thickness were taken and stained with Masson Trichrome method to obtain better vision (Crossman, 1937). Tissue sections were evaluated under light microscope (Demir et al., 2001).

Results

Mons laryngealis is located behind the oral cavity and at the base of pharynx. At this part 2 lines of papillae; rostrotransversal and caudotransversal were observed (Figure 1). The number of these papillae in cranial line was determined as 20.37 ± 1.92 mm in

females and 21 ± 2.72 mm in males, the number of the papillae in caudal line was determined as 15 ± 2.61 mm in females and 15.37 ± 1.68 mm in males. The preliminary papillae located left and right side of the end of the sulcus laryngealis were found to be more developed than other papillae.

Paired cartilago arytenoidea and single cartilago cricoidea and cartilago procricoidea were found to constitute laryngeal cartilages. Cartilago thyroidea and epiglottis were not observed. It was determined that cartilago arytenoidea is composed of two cartilages located on the right and left of glottis (Figure 2). The lengths of glottis were determined to be 10.62 ± 1.15 mm in males and 8.42 ± 0.60 mm in females, widths were determined as 2.62 ± 0.23 mm in males and 3.14 ± 0.24 mm in females.

Cartilago arytenoidea was found to be composed of a double cartilage. These cartilages, located in both sides, were composed of three sections; processus rostralis, corpus and processus caudalis. The corpus of the cartilago arytenoidea forms an articulation with cartilago procricoidea (Figure 2).

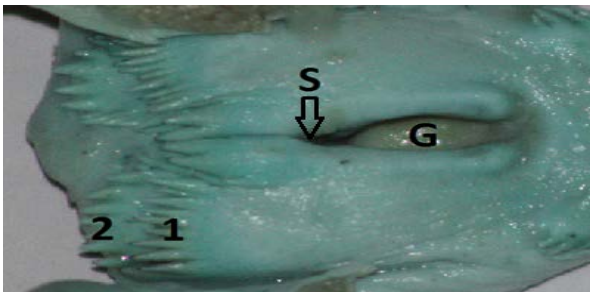


Figure 1. Appearance of the mons laryngealis; 1: Rostrotransversal direction papillae row, 2: Caudotransversal direction papillae row, S: Sulcus laryngealis, G: Glottis.



Figure 2. Lateral appearance of cartilago arytenoidea and cartilago procricoidea (Cartilago cricoidea is removed); PC: Cartilago arytenoidea processus caudalis, C: Corpus of arytenoid cartilage PR: Cartilago arytenoidea processus rostralis, CP: Cartilago procricoidea.

Cartilago procricoidea was bigger than cartilago arytenoidea (Figure 2) and located under and inside of the ala of cartilago cricoidea at the corpus.

Cartilago cricoidea was found to constitute the ventral and caudo-dorsal of larynx cranialis (Figure 3). Triangle shaped processus rostralis was found to form the most of the ventral section. It was determined that the section at the back of the processus rostralis was formed by corpus and the sections reaching out to the back and up in both sides was formed by ala (cartilago cricoidea dorsalis) (Figure 3). A crista ventralis was determined in the median of the corpus of cartilago cricoidea in histological section (Figure 4). An indentation was found at the caudal facing surface of this crista.

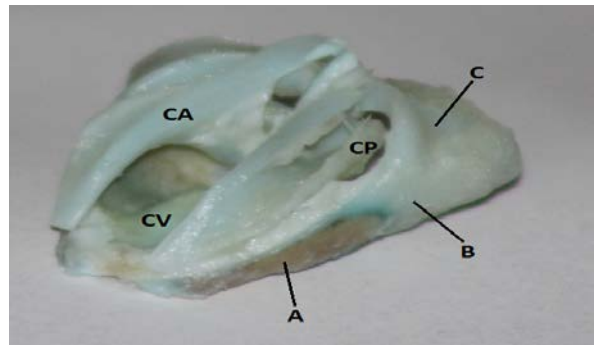


Figure 3. Craniolateral appearance of cartilago arytenoidea, cartilago procricoidea and cartilago cricoidea; CV: Crista ventralis, CA: Cartilago arytenoidea, CP: Cartilago procricoidea, A: Cartilago cricoidea processus rostralis, B: Corpus of cartilago cricoidea, C: Ala (cartilago cricoidea dorsalis) of cartilago cricoidea.

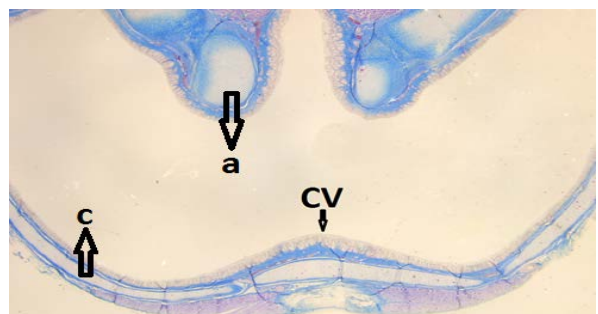


Figure 4. Appearance of the crista ventralis; CV: Crista ventralis, a: Ala of cricoid cartilage, c: Corpus of cartilago cricoidea.

Discussion

Many studies were conducted on the laryngeal cartilages of some domestic birds. To our knowledge,

there is no detailed study on the laryngeal cartilages in turkey and in the present study we aimed to investigate the anatomy of the larynx cranialis of turkeys.

The papillae (papillae pharyngis caudo-ventrales) located in the caudal part of the mons laryngealis, which helps food to transfer to oesophagus, are located in the same area in seagulls as a single line (Gezer İnce and Pazvant, 2010); as two lines in quail (Çevik Demirkan et al., 2007), Denizli Rooster (Taşbaşı et al., 1994), long-legged buzzard (Kabak et al., 2007), and chicken (Getty, 1975). In goose 2 lines of papille facing caudal was reported to show no organization (Onuk et al., 2010). In the presented study, two transversal papillae (papilla pharyngealis caudoventralis) were observed in the turkey.

In our study, 20-21 papillae in the rostral line and 15-16 papillae in the caudal were observed over mons laryngealis while 1-3 papillae in stork (Onuk et al., 2013), 17-20 papillae in seagulls (Gezer İnce and Pazvant, 2010) and partridge (Sağsöz et al., 2012), 33-56 papillae in Denizli rooster (Taşbaşı et al., 1994) were reported in the literature.

The papillae around glottis were previously reported in Gerze Rooster (Onuk et al., 2015), partridge (Sağsöz et al., 2012), Japanese quail (Çevik Demirkan et al., 2007) and goose (Onuk et al., 2010), but as in long-legged buzzard (Kabak et al., 2007) and seagulls (Gezer İnce and Pazvant, 2010) papilla around glottis were not determined in turkeys.

In turkey, larynx cranialis was composed of a single cartilago cricoidea, a cartilago procricoidea and a paired cartilago arytenoidea similar to seagulls (Gezer İnce and Pazvant, 2010), stork (Onuk et al., 2013) and Denizli rooster (Taşbaşı et al., 1994).

Cartilago cricoidea was determined to be the biggest laryngeal cartilage as in other species (Baumel et al., 1993; Getty, 1975; Gezer İnce and Pazvant, 2010; Onuk et al., 2010; Onuk et al., 2013; Taşbaşı et al., 1994). Cartilago procricoidea was not the smallest cartilage like in seagull (Gezer İnce and Pazvant, 2010) and Gerze rooster (Onuk et al., 2015), it was determined to be bigger than cartilago arytenoidea in the presented study.

In conclusion, it has been determined that the width of glottis in female were larger than males, cartilago procricoidea were bigger than cartilago arytenoidea and crista ventralis were bigger than other birds with caudal indentation (Baumel et al., 1993; Getty, 1975; Gezer İnce and Pazvant, 2010; Onuk et al., 2010). Although the absence of cartilago procricoidea in turkeys was mentioned in a previous study (Cover, 1953), the

presence of cartilago procricoidea in our study supports the idea of anatomic variations in subspecies.

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