Anatomy of Oropharyngeal Cavity of Fowl (*Gallus domesticus*)

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ABSTRACT

The study was conducted on the mouth cavity of 9 birds aged between 2-6 months. The beak was formed by dense horny tissue lying over the incisive bone and mandible. The lower beak (3.61±0.08 cm) was overlaid by the upper beak (3.34±0.04 cm). In the mid line of hard palate was a longitudinal fissure (choanal cleft), characterized by a narrow rostral portion and an enlarged caudal portion. A 0.61±0.02 cm long infundibular cleft represented the common opening of two auditory tubes. The hard palate had a median swelling and two lateral palatine ridges. Caudally directed papillae were arranged in 5±0.17 transverse rows. The floor of the oropharynx was formed by the interramal region, the tongue and the laryngeal mound (1.09±0.03 cm in length). The triangular shaped tongue was 1.94±0.06 cm in length and 1.17±0.03 cm in width. The laryngeal mound lay caudal to the tongue, in which the glottis (laryngeal cleft 0.56±0.02 cm) was present. The length of the upper and lower parts of the pharynx was 1.57±0.04 cm and 2.29±0.08 cm, respectively. The posterior limit of pharynx on upper part had single row of papillae, while the lower part had two rows of papillae.

Key words: Anatomy, Fowl, Oropharyngeal cavity

Materials and Methods

Nine heads of young, healthy fowl aged between 2 to 6 months were procured from the local slaughter house irrespective of sex. After thorough washing these were fixed in 10% formalin. After fixation the heads were washed in running tap water to remove excess of formalin and incised along the commissure of mouth to expose the oropharyngeal cavity. The posterior limit of the mouth cavity was taken at the last row of papillae on the hard palate in upper jaw and at the prominent row of papillae on the lower jaw (Sisson and Grossman, 1955). Gross anatomy of various structures present in the mouth and pharyngeal cavity were recorded in detail. Biometrical parameters were recorded with the help of non-stretchable thread, meter scale and digital Vernier callipers. The data was statistically analysed.

Results and Discussion

The mouth cavity of fowl was guarded by upper and lower beaks. The osseous basis of the upper and lower beaks were formed by the incisive bone and the rostral part of the mandible, respectively as described in birds (Nickel et al., 1977), fowl (Sisson and Grossman, 1975) and ostrich (Tadjalli et al., 2008). The length of upper beak was 3.61±0.08 cm and the lower beak 3.34±0.04 cm. In ostrich it was 6.3±0.4 cm and 2.5±0.3 cm, respectively (Tadjalli et al., 2008). The size and shape of the beak were related not only to the type of food the birds eat but also to their means of food prehension. The size of beak seems to be an important factor in the regulation of ingestion. Both the beaks were pointed and covered by a hard horny sheath which was relatively flexible (Figs. 1, 2). The horny sheath of upper beak extended beyond the lower beak forming a small hook as reported by Nickel et al. (1977) in fowl and pigeon. A clear cut demarcation between oral and pharyngeal cavity was lacking, thereby constituted a common cavity known as the oropharyngeal cavity (Figs. 1, 2) as reported in African pied crow (Igwebuike and Eze, 2010), rhea (Rodrigues et al., 2012) and ostrich (Tadjalli et al., 2008). The roof of the...
oropharyngeal cavity was formed by a cartilaginous hard palate and pharynx. The choanal cleft (1.66±0.05 cm) was present as a longitudinal fissure in the mid line of the hard palate. It was narrow rostrally and enlarged caudally. It continued into a narrow closely placed groove in the pharyngeal region (Fig. 1). The oral and nasal cavities communicated through this opening as reported by Igwebuike and Eze (2010) in African pied crow. Behind the median septum there was an infundibular cleft (0.61±0.02 cm long), which divided the roof of the pharynx into two equal parts (Fig. 1). The infundibular cleft was a common opening of the two auditory tubes that lay against the base of skull, limited by the pharyngeal folds. Based on differences in the colour of the mucosa Rodrigues et al. (2012) reported that the roof of the cavity demonstrated two regions of approximately equal area in rhea. The soft palate was absent as described by Nickel et al. (1977) in birds.

The hard palate had a median ridge (1.42±0.03 cm long), two lateral palatine ridges (2.36±0.05 cm long) and several transverse rows (5±0.17) of caudally pointing papillae (Fig. 1) as reported by Nickel et al. (1977) and Sisson and Grossman (1955) in fowls. Internally the upper jaw was 3.71±0.05 cm long. The width of upper beak at the commissure of mouth cavity and at the level of last transverse row of papilla was 2.53±0.04 cm and 1.51±0.02 cm, respectively. In the median plane, the length of lower beak was 2.88±0.08 cm (upto the transverse row of papillae) while on lateral side (commissure of mouth cavity) it was 3.17±0.08 cm long. The floor of the oropharynx was formed by the interramal region, the tongue and the laryngeal mound (Fig. 2). The triangular interramal region was accommodated between the two rami of mandible and formed the floor of the oral cavity as reported by Rodrigues et al. (2012) in rhea and Nickel et al. (1977) in other domestic birds.

The tongue was present on the floor of mouth cavity and was well demarcated from the pharynx by a transverse row of caudally directed papillae as reported in ostrich (Tadjalli et al., 2008). The tongue was wide and triangular in shape. The dorsal surface was marked by a faded median groove and several transverse grooves. Ventrally the tongue was strongly convex and marked by a median ridge (Fig. 2) as reported by Kadhim et al. (2011) in Red jungle fowl. In pigeon, the tongue was narrow (Nickel et al., 1977) and in fowl it was broad, lancet shaped and did not extend to the full limit of the lower beak. The length and width of tongue was 1.94±0.06 cm and 1.17±0.03 cm, respectively. Ventrally, the anterior part (1.49±0.04 cm) of the tongue was free. In ostrich, the tongue was semicircular, short and broad with 1.92±0.15 cm length and 2.92±0.29 cm width. Its base was attached to the rostral floor of pharynx by a short stalk like mucosal fold but the papillae were not visualized (Tadjalli et al., 2008). Jackowiak and Godynicki (2005) reported that the tongue of the white tailed eagle was 6 cm long. It was elongated with a sharp-ended apex. There was a deep median sulcus on the surface of the body of tongue, giving the tongue the shape of a drain pipe. The tongue of the cormorant was a small (1.4 cm long) fixed structure situated in the middle part of the elongated lower lip (Jackowiak et al., 2006). The tongue in partridge was characterized by its triangular shape with sharp extremity and its mean length was of 1 cm (Rossi et al., 2005).

There were well developed caudally directed papillae on the tongue, mucous membrane of hard palate and laryngeal mound (Figs. 1, 2), the same was also reported in bustards (Bailey et al., 1977) and African pied crow (Igwebuike and Eze, 2010). These papillae might serve principally as mechanical obstacles to the involuntary return of food that has passed over them. In addition, the papillae may assist in swallowing by ensuring

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Fig. 1. Roof of oropharyngeal cavity showing upper beak (A), median ridge (B), lateral palatine ridge (C), last row of papillae on the palate (D), pharynx (E), row of pharyngeal papillae (F), palatine cleft (choanal cleft) (G), infundibular cleft (H), esophagus (I).

Fig. 2. Floor of oropharyngeal cavity showing lower beak (A), tongue (B), row of lingual papillae (C), pharynx (D), laryngeal mound (E), laryngeal cleft (F), row of pharyngeal papillae on laryngeal mound (G).
that the bolus of food is moved in only one direction, towards the esophagus and prevent regurgitation (McLelland, 1979). The caudal part of the oropharyngeal cavity was pharynx (Fig. 2). The length of the upper and lower parts of the pharynx was 1.57±0.04 cm and 2.29±0.08 cm, respectively. The width of anterior and posterior regions of upper part of the pharynx was 1.51±0.02 cm and 0.69±0.05 cm, respectively, while these parameters for lower part were 1.17±0.03 cm and 1.46±0.05 cm, respectively. The posterior limit of pharynx on upper part had single row of papillae, while the lower part had two rows of papillae. In contrast to present finding there was a single row of pharyngeal papillae behind the laryngeal cleft in red jungle fowl (Kadhim et al. 2011)

The laryngeal mound, a mucosal elevation, was located on the midline caudal to the tongue of fowl as reported by Igwebuike and Eze (2010) in African pied crow. The laryngeal mound was 1.09±0.03 cm in length; having a 0.56±0.02 cm long laryngeal cleft (glottis) on the rostral surface of it. The two rows of the caudally directed papillae were evident on the mucous membrane of the laryngeal mound.

REFERENCES


