Gross Morphological Studies on the Trachea of Adult Emu

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SUMMARY

This study was conducted to elucidate the gross morphology of the trachea of emu. The trachea was a cartilaginous, compressible tube of considerable length with tracheal pouch and was elastic in nature. The trachea was formed by the total of 89.5±1.23 tracheal rings, 56.5±0.82 rings were above the tracheal opening, 6.5±0.95 rings correspond to the tracheal pouch (open portion) of the tube and 26.4±0.72 rings were noticed below the open portion to the bifurcation of right and left bronchi. Proximal to the pouch, the rings were complete and broad whereas, distal to the pouch they were complete and narrow. At the bifurcation of left and right bronchi, the rings were incomplete and they were membranous at their continuation into the lungs. The diameter of the tracheal rings gradually increased and at the pouch it was very large and started to decrease distally. The peculiar organization of tracheal pouch in emu was connected with the different vocal powers of this bird.

Key words: Emu, Trachea, Tracheal pouch

Respiratory organs of birds differ from those of mammals in many features, which are associated partly with the requirements of flight and partly with the voice production. Air inspired during respiration passes from the nasal cavity to the larynx and continues via the trachea and enters the syrinx and bronchi to the alveoli. In birds, the number of cartilage rings in the trachea varies due to the length of the neck. Literature available on gross anatomical studies on the trachea of emu is limited and to overcome this lacuna, the present study was undertaken.

The present study was conducted on 12 apparently healthy adult emu birds. The trachea has removed, washed with normal saline to remove the blood and tissue debris, mobbed with blotting paper and fixed in 10% formalin. The biometrical parameters were recorded proximal to pouch and distal to pouch.

The trachea was a long flexible tube, made up of cartilaginous rings starting at the caudal margin of the larynx with tracheal pouch in its distal third and it was located at the ventro-medial aspect of the neck (Fig. 1). It was attached to the esophagus by connective tissue as reported by Onuk et al. (2010) in goose. The trachea was of considerable length, rings were elastic, compressible and the average total number of rings, length and diameter was 89.5±1.23, 57.0±1.37 cm and 10.91±1.74 cm, respectively.

The length and diameter of trachea at proximal to pouch were 37.0±1.00 cm, 7.9±0.75 cm and distal to pouch were 14.7±0.98 cm, 10.7±0.70 cm, respectively. The number of 56.5±0.82 rings were noticed proximal to the tracheal pouch and 26.4±0.72 rings were correspond to the region distal to the pouch. But total number of tracheal rings were 137-140 in goose (Onuk et al., 2010), 110-116 (Rajathi et al., 2009) in Japanese quail and 100-130 (Nickel et al., 1977) in domestic fowl. The average length of the trachea was 4.05±0.08 cm in Japanese quail (Rajathi et al., 2009) and in chicken, the length ranged from 17.0 to 18.0 cm in males and 15.5 to 16.5 cm in females (McLelland, 1975). Rajathi et al. (2009) reported maximum mean diameter of 4.01±0.05 mm at cranial third and 1.95±0.008 mm at caudal third in Japanese quail.

The tracheal cartilages showed some differences in size and form in different parts of the tube. The tracheal rings were complete and broad in the proximal to the pouch region whereas, they were complete and narrow in distal to the pouch. The diameter of trachea gradually increased from caudal margin of larynx and it was maintained for some distance, very large at the level of pouch and then slightly narrowed distally. Onuk et al. (2010) also mentioned that the diameter of the trachea was large at the beginning up to 90-95th ring, very wide up to 117-118th ring and narrowed afterwards.
Tracheal rings were connected by tracheal annular ligament and covered by trachealis muscle. Distally it was divided into right and left bronchi where the rings were incomplete, smaller in diameter, then it abruptly became membranous (tympanum of syrinx) and continued into the lungs (Rajathi et al., 2009).

The cervical air bag called tracheal pouch occupied a deep depression on the fore part of neck immediately above the sternum. This pouch was located at the distal third of the trachea (Fig. 2). In live birds, this tracheal pouch was covered by thin mucous membrane and in turn covered with loose skin which distends at the depression when a bird vocalizes. The entire trachea was freely movable to either side and the region of tracheal pouch was flaccid. Thin and minimal plumage was noticed over the tracheal pouch region. During respiration, tracheal pouch will be distended with air and it may be reason for peculiar sound production by the emu bird. The tracheal rings at the pouch was broad, incomplete at the ventral aspect and the number of rings, length and diameter of the tracheal pouch was 6.5±0.95, 5.2±0.87 and 14.0±0.92, respectively.

**REFERENCES**


