Comparative Gross Anatomical Studies on the Sternum of Emu, Turkey and Duck

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Received: 14 October 2014; Accepted: 8 December 2014

SUMMARY

A study was undertaken to provide a reference for the gross anatomy of the sternum of emu as one of the ratite species and also to compare the structural differences with sternum of duck and turkey. The sternum was bowl-shaped in emu and rectangular in duck. It consisted of deeply concave dorsal surface, more convex ventral surface without keel in emu, with prominent keel in turkey and duck. An upward and antero-laterally directed flat antero-lateral process was observed and was long in turkey, short and curved in emu and very small in duck. The posterior extremity or metasternum was triangular and flattened in emu. It had very long posterior process and carried ventrally a thin plate of bone called keel in duck and turkey. Single and divided postero-lateral process was noticed in duck and turkey, respectively but was absent in emu.

Key words: Anatomy, Emu, Duck, Sternum, Turkey

Plenty of information is available on gross anatomy of sternum of domestic fowl but it is lacking on comparative aspects of sternum of poor fliers such as duck and turkey with large flightless ratite species, emu. Therefore, the study was undertaken.

The study was conducted on four adult emu, turkey and duck. The sternum with pectoral muscles were collected from the local slaughter houses in and around Namakkal and were macerated by wet method of maceration. The disarticulated sternum was cleaned and utilized to study the gross anatomical features.

The sternum of emu was a large unsegmented bowl shaped bone located on the antero-ventral aspect of the body cavity and gave attachment to the coracoid and sternal ribs (Kumar and Singh, 2014). Fowler (1991) also described soup plate like sternum in emu. The sternum consisted of two surfaces, two extremities and two borders. The dorsal surface was deeply concave and the ventral surface was more convex which gave broad area for attachment to the breast muscles. The sternum was rectangular with very shallow dorsal surface in duck. The dorsal surface of the body was pierced by numerous small foramina in turkey and duck whereas, these foramina were absent in emu. In duck and turkey the ventral surface was encroached by keel (Nickel et al., 1977)

In emu, the anterior extremity was broad and its anterior border bore two short blunt processes with a notch inbetween them. Below the notch, there was a blunt ventral process and on either side of it, flat facets for articulation with coracoid bone was noticed. In duck and turkey, the anterior process or rostrum or manubrium sternum was short, on either side of the root of the rostrum, a deep concave groove or elongated facet was observed for articulation with the coracoid. Nickel et al. (1977) reported that the dorsal and ventral process noticed on either side of the groove fused with each other into a median vertical bony plate leaving an opening between them in turkey. But in duck only the ventral process was present.

An upward and caudally directed antero-lateral process (Fig. 1) was noticed on either side of the lateral aspect of the anterior extremity as mentioned by Jagapathi Ramayya et al. (2007). In duck and turkey, lateral to the articular surface for the coracoid, antero-laterally directed flat anterolateral process was observed which was long in turkey and very small in duck.

The posterior extremity or metasternum was triangular and flattened in emu. The posterior extremity had very long posterior process and carried ventrally a thin plate of bone called keel or sternal crest in duck and turkey. The keel and posterior process was absent in emu as

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observed by Jagapathi Ramayya et al. (2007) and it was prominent in turkey and moderately developed in duck although they were poor fliers. In turkey, the keel was broad anteriorly as triangular plate and faded out posteriorly (Fig. 1) whereas, in duck the anterior end was thin and straight.

The postero-lateral process (Fig. 1) was absent in emu as reported by Jagapathi Ramayya et al. (2007). The sternum of duck had thin rod like postero-lateral process on either side behind the lateral border of the body and a deep oval notch was formed between this process and body of the sternum. In turkey, the postero-lateral process on the lateral border was divided into medial and lateral processes. The lateral division was broad and plate like. The medial division was long and narrow and formed the oval incisures between it and lateral border of the body and also between it and lateral division (Nickel et al., 1977).

In all the species, the lateral border of the sternum caudal to the antero-lateral process presented articular areas corresponded to the number of sternal ribs on either side. The articular facets were 4 pairs in emu and turkey and 7 pairs in duck as recorded by Brett and Hopkins (1991) and (Nickel et al., 1977). Between these articular areas, small air holes (pneumatic foramina) which led into the sternum were noticed (Jagapathi Ramayya et al., 2007).

REFERENCES


Fig. 1. Photograph of the sternum of emu, turkey and duck showing anterior process (AP), posterior process (PP), antero-lateral process (ALP), Postero-lateral Process (PLP), medial division (MD), lateral division (LD), ventral process (VP) and keel (K).