Comparative Gross Anatomical Studies on the Atlas of Chiru (Pantholops hodgsoni) and Sheep (Ovis aries)

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ABSTRACT

A comparative gross anatomical study was conducted on the atlas of Chiru and sheep. A prominent prism shaped dorsal tubercle was present in chiru whereas it was ill-developed in the sheep. Wings of the bone terminated into a rough thin, less convex edge in chiru but it was thicker and more convex in the sheep. Fossa atlantis of chiru was shallower than that of sheep. Anterior border of dorsal arch was wider in chiru but angular in the sheep. In the present study, the biometrical parameters revealed that the values were generally higher in chiru as compared to the sheep.

Key words: Atlas, Chiru, Gross anatomy, Sheep

The present study was undertaken to compare the atlas (first cervical vertebra) of chiru with that of the sheep. The findings of the present study shall be of use to identify the carcasses produced for identification by Wild Life Department.

MATERIALS AND METHODS

For the present study, cervical region of an adult chiru was supplied by the Division of Animal Breeding and Genetics, Sher-e-Kashmir University of Agricultural Sciences and Technology of Kashmir. The sample was processed by standard techniques and the atlas was removed from the specimen. Atlas vertebra of 5 adult sheep were also utilized for the present study. The data collected from different parts and regions of the atlas vertebra of the sheep was processed for mean and standard error (Snedecor and Cochran, 1994).

RESULTS AND DISCUSSION

The atlas of chiru was an atypical vertebra. Maximum length of atlas of chiru from the postero-lateral end of the right wing up to the cranio-lateral end of the anterior articular cavity of the same side and from the postero-lateral end of the left wing up to the cranio-lateral end of the anterior articular cavity of the same side was 6.10 and 6.15 cms, respectively.

The atlas of chiru presented a ring from which two wings projected laterally. The anterior articular surface (Fig. 1) of the atlas was deep and cup shaped both in chiru as well as in the sheep as reported in ruminants (Nickel et al., 1986; Sisson, 1975). This surface had very deep two articular cavities separated above by a wide non-articular area and below by a central ridge which was connected with an eminence (Fig. 1) both in chiru and sheep. Maximum width at the anterior and posterior articular cavities was 5.7 and 5.3 cm in chiru, whereas, in case of sheep it was 4.77±0.32 and 4.25±0.20 cm, respectively. Maximum width at anterior and posterior ends and middle point of the wings in chiru was 6.5, 7.3, 7.55 cm, respectively whereas, similar observations for the sheep remained 5.36±0.14, 4.97±0.22 and 6.01±0.32 cm. It was evident that the width at the posterior end of the wing was higher than the anterior end in chiru while it was found to be reverse in case of sheep.

Dorso-ventral diameters of neural canal at the anterior and posterior ends were 1.9 and 2.2 cm in chiru whereas, 1.36±0.10 and 2.17±0.05 cm in sheep. Transverse diameter for the anterior and posterior ends in chiru remained 2.6 and 2.25 cm, respectively whereas, 2.28±0.04 and 2.11±0.07 cm in sheep. The neural ring possessed two lateral masses connected by dorsal and ventral arches. The lateral masses presented two deep oval anterior articular cavities which receive the occipital condyles and they were separated by a wide non-articular area above and narrow one below. The lateral margin
was also notched and a triangular non-articular depression cuts into medial part of each cavity in case of chiru as well as in sheep. The posterior articular surfaces (right and left) were flattened behind and continued into the vertebral canal forming an extensive area for the dens of the axis in chiru and sheep.

Dorsal arch of atlas was dome shaped in chiru and sheep. Anterior border of the dorsal arch was wider in chiru while it was angular in sheep (Figs. 1 and 2). A ntero-posterior length of the dorsal surface of the dorsal arch at the middle axis was 3.0 cm in chiru and 2.21±0.07 cm in sheep. The arch presented a prominent roughly triangular prism shaped dorsal tubercle in chiru (Fig. 1) whose apex was placed cranially and base caudally. Whereas in case of sheep, it was ill developed (Sisson, 1975). Height of the dorsal tubercle increased antero-posteriorly. The maximum height, width and length of the dorsal tubercle were 1.0, 1.4 and 2.1 cm, respectively. Posterior border of the dorsal arch of chiru was sharp and did not possess notch whereas, sheep possessed one central notch (Sisson, 1975).

Ventral wall of the ventral arch was thicker and curved than dorsal arch in both the species. Length of the ventral surface of the ventral arch at the middle axis of chiru was 3.2 cm and 2.45±0.16 cm in sheep. In chiru, the ventral arch presented a prominent ventral tubercle (Fig. 2) that possessed two spine like projections having a concave area between them. However, it was in the form of a small nodule devoid of spine like projections in the sheep.

The height of the ventral tubercle increased posteriorly in case of chiru. The maximum height, width and length of ventral tubercle of chiru were 0.3, 0.85 and 1.4 cm, respectively and 0.48±0.06 cm, 0.73±0.06 cm and 1.36±0.22 cm in sheep. The neural surface of the ventral arch had a transverse concave articular surface posteriorly, the fovea dentis, on which the dens or odontoid process of the axis rests in chiru as well as in sheep (Nickel et al., 1986). Wings or alae were modified transverse processes. The outer border of the wing was comparatively thinner, less convex and irregular in chiru whereas, thicker, more convex and almost regular in the sheep.

In both the species, the dorsal surface of the wing was flat and presented antero-medially a short small groove, the alar groove (Fig. 1) which remained connected with intervertebral and alar foramina. From the anterior aspect of alar groove, a triangular area was present in chiru was either absent or less developed in sheep. In chiru, the diameters for the right and left intervertebral foramina were 0.35 and 0.5 cm, right and left alar foramina were 0.4 and 0.55 cms, respectively. Similar observations in case of sheep remained 0.29±0.02 and 0.30±0.02 and 0.36±0.02 and 0.36±0.03 cms, respectively. The alar foramen of chiru was divided into two; one caudally and another on its external surface as in goat (Nickel et al., 1986) while it was not divided in sheep. Ventral surface of the wing was concave bearing a fossa atlantis (Fig. 1) which was communicated by alar foramen in chiru and sheep (Sisson, 1975 and Nickel et al., 1986). However, fossa atlantis was shallower in chiru.

REFERENCES


Choudhury et al.