Original Research

Comparative Gross Anatomical Studies on the Seventh Cervical Vertebrae of Chiru (*Pantholops hodgsoni*) and Sheep (*Ovis aries*)

Abdur Rezzaque Choudhury, Massarat Khan, Ajaz Quadir, Mushtak Ahmad Baba, Masuood Ahmad John, Firdous Ahmad Dar, Andleeb Rafiq Sheikh

Division of Veterinary Anatomy, FVSc & Animal Husbandry, Shuhama, Ganderbal, SKUAST-K, Jammu & Kashmir, INDIA

***Corresponding author:** quadirajaz@gmail.com

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Abstract

The present study was conducted on the seventh cervical vertebrae of chiru and sheep to arrive at their comparative gross anatomical differences. The morphometrical features of seventh cervical vertebra of chiru were studied, and compared with the same characteristics and parameters of the same vertebrae of sheep. The body was longest (4.3cm) and widest of all the cervical vertebrae of chiru and as compared to the vertebrae of sheep (3.2±0.06cm). Posterior concavity of the body of both chiru and sheep presented on either side a demi facet, a characteristic feature of this vertebra for articulation with 1st rib. Concavity of the posterior end of body was shallower than that of sheep. Morphmetric analysis of these vertebrae revealed that the values of different biometrical parameters were generally higher in chiru as compared to sheep which could act as a forensic tool to identify species.

Key words: Chiru, Morphometry, Sheep, Seventh Cervical Vertebrae

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Introduction

The Tibetan antelopes alias chiru still follow their traditional routes to Aksai-Chin area in small numbers in the eastern Ladakh (Fox *et al.*, 1990) and (Hilaluddin, 1997) but are vulnerable to hunting specifically by the para military forces present in the region (Chundawat & Rawat 1994). The chiru is listed threatened with extinction in the IUCN Red Data List (IUCN Red List of Threatened Species, 2004). The species inhabits an area of approximately 1,600 km across the Tibetan Plateau with its eastern limit near Ngoring Hu (China) and the western limit in Ladakh, India (Prater, 1980). The endangered chiru a small ruminant of the family bovidae, whose fine wool is used to weave the prized Shahtoosh shawl (Schaller, 1998), is

protected by Wild Life Act of Jammu and Kashmir, India, under schedule I of the act (Wright and Kumar, 1997) . Further chiru being a highly priced animal, poachers do hunt this animal. This morphometrical study was conducted to compare the seventh cervical vertebra of chiru with that of sheep, which could prove a basic tool to arrive at the identification of carcasses in various vetrolegal cases as presented to wild life department.

Materials and Methods

The study was conducted in the Division of Veterinary Anatomy and Histology of Faculty of Veterinary Sciences and Animal Husbandry, Shuhama, Ganderbal SKUAST-K, India. A cervical region of adult chiru was provided by the Division of Animal Breeding and Genetics, Shere Kashmir University of Agricultural Sciences and Technology of Kashmir. The cervical vertebrae were macerated by wet maceration, disarticulated, cleaned and arranged in order for various vertebral regions and the seventh cervical vertebra was removed from the specimen. Six cervical vertebrae (seventh) of adult sheep were also utilized for the present study. Osteological characteristics of seventh cervical vertebra of chiru were recorded and compared with same vertebrae of sheep. The data collected from different parts and regions of these vertebrae was processed using the SPSS Software for descriptive analysis including, mean and standard error (Snedecor and Cochran, 1994).

Result and Discussion

Seventh Cervical Vertebra

The morphometrical characteristics of the seventh cervical vertebra were relatively a quiet different from rest of the cervical vertebrae. The body was longest and widest of all the cervical vertebrae of chiru (4.3cm) and even among all the vertebrae of sheep (3.2±0.06cm). Posterior concavity of the body presented on either side a demi facet for articulation with 1st rib (Fig. 1). Concavity of the posterior end of body was shallower than that of sheep (Fig. 1).

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Fig. 1. Posterior view of 7th cervical vertebrae showing supraspinous process (1), posterior articular area of body (2), demi facets (3), single undivided transverse process (4) Neural canal (5)

The supraspinous process was in the form of a flat vertical plate of bone having broad base and narrow apex (Fig. 2).

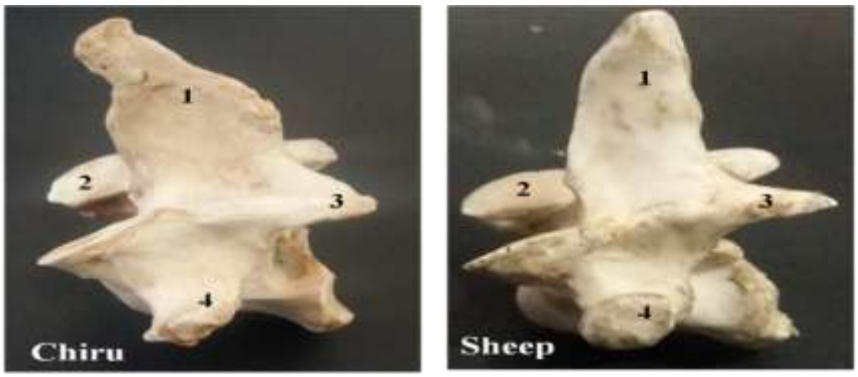

Fig. 2. Lateral view of 7th cervical vertebrae showing supraspinous process (1), anterior articular process (2), posterior articular process (3), single undivided transverse process (4)

Its average height was 3.5 cm, width 2.3 cm thickness 0.5 cm. In sheep, this process was comparatively longer with average height of 3.55±.05cm, width of 2.3±.04 cm and thickness of 0.5±.01 cm. Single undivided transverse process is only present as in all other species including chiru (Fig. 2 & 3) similar to observations in other domesticated animals (Nickel *et al.*, 1986; Sisson, 1975). The average length, width and thickness of this process of chiru was 1.7 cm 1.9 cm and 0.65 cm while in sheep all the three parameters i,e length, width and thickness were (1.07±.016, 1.07±.017 1.06± .019cm). In chiru, both right and left foramina transversaria were present on the anterior border of the pedicle (Fig. 3), whereas posterior border possesses only one opening i.e. right one (Fig. 3). In sheep, foramina transversaria were absent generally, but have been unilaterally or bilaterally found in accordance with the findings made by (Nickel *et al.*, 1986; Sisson, 1975) in sheep. Infraspinous process was absent both in chiru and sheep.

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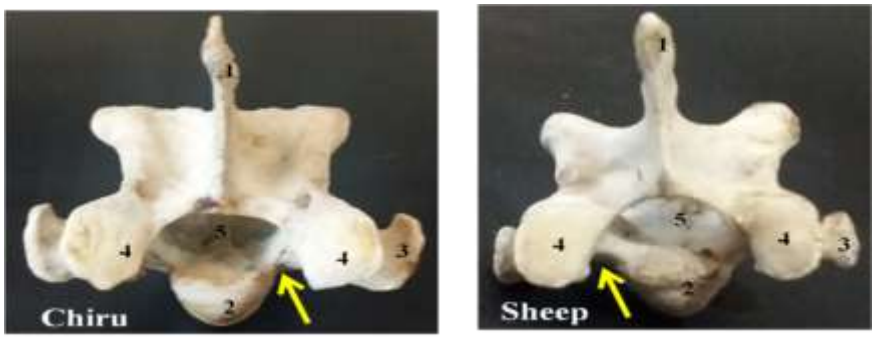

Fig. 3. Anterior view of 7th cervical vertebrae showing supraspinous process (1), anterior articular area of body (2), single undivided transverse process (3) Anterior Articular process (4) Neural canal (5) and Lateral notch (Arrow)

The distance between anterior articular process was 2.1 cm and between posterior articular process was 2.5 cm and that between (anterior and posterior articular processes) it was 2.1cm,whereas in sheep it was 1.7±.02 cm, 1.4±.04 cm and 1.7±.04 cm in the same manner. The dorsoventral diameter at the anterior and posterior extremity of body was 2.2 cm and 2.3 cm while as transverse diameter of same was 1.5 cm and 3.4 cm respectively. In case of sheep, the dorsoventral diameter at the anterior and posterior extremity of body was 1.40±.03 cm and 0.88±.01 cm while as transverse diameter in the same manner was 1.6±.02 cm and 2.4±.02 cm respectively. The dorsoventral diameter at the anterior and posterior extremity of neural canal was 1.0 cm and 1.5 cm while as transverse diameter of same was 1.9 cm and 2.0 cm respectively In case of sheep, the dorsoventral diameter at the anterior and posterior extremity of neural canal was 1.4±.02 cm and 1.2±.02 cm while as transverse diameter in the same manner was 1.5±.03 cm and 1.5±.03 cm respectively.

Conclusion

In conclusion different biometrical parameters were generally higher in chiru as compared to sheep. Further the literature available on the biometry of axial skeleton of chiru is scanty, thus this study could be used a basic tool for the future studies in the relevant field.

Acknowledgement

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