Studies on the Lumbar, Sacral and Coccygeal Vertebrae of Indian Muntjac (Muntiacus muntjak)

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ABSTRACT
Morphology of the lumbar, sacral and coccygeal vertebra was studied in Indian muntjac. The lumbar vertebrae were six in number. Each vertebra presented two strongly curved cranial articular processes having fused mamillary processes on lateral aspect and two strongly curved caudal articular processes with ventro-lateral cylindrical condyle like articular area. The sacrum was triangular and was formed of four fused sacral vertebrae. The coccygeal vertebrae were five in number of which the first two were typical. Haemal processes were absent.

Key words: Coccygeal vertebra, Indian muntjac, Lumbar vertebra, Morphology, Sacrum

A very little information is known on anatomical features of lumbar, sacrum and coccygeal vertebrae in Indian muntjac called as the “barking deer”. Hence, the present study was undertaken to elucidate the anatomical features of these vertebrae in Indian muntjac.

MATERIALS AND METHODS
Lumbar, sacral and coccygeal vertebrae were collected from three Indian muntjac, which were brought for post-mortem examination to the Department of Pathology, College of Veterinary and Animal Sciences, Pookode. Bones were processed (Young, 1980) to record anatomical features.

RESULTS AND DISCUSSION
Lumbar vertebrae: All the six lumbar vertebrae were typical. The vertebral bodies were constricted in the middle. The cranial extremities of the bodies were convex while the caudal ones were concave transversely. The length of vertebral body of first three and the sixth lumbar vertebrae was 2.4 cm while that of fourth and fifth were 2.6 cm and 2.5 cm, respectively. The height of vertebral body decreased gradually in the succeeding lumbar vertebrae from 1.2-0.9 cm. A pronounced ventral crest was present in the last four vertebrae of cattle (Nickel et al., 1986).

The caliber of the vertebral canal increased from the first to the last lumbar vertebrae. In the lumbar region, the inter arcuate spaces were more marked caudally and were well developed at lumbo-sacral junction. The cranial vertebral notches were shallow whereas, the caudal ones were deep. However, caudal vertebral notches were not converted into foramina as reported by Nickel et al. (1986) in cattle. The intervertebral foramina were larger in the caudal series.

These vertebrae had broad and vertical spines except in the last two vertebrae, where the dorsal spine was inclined forward (Fig. 1). A gradual decrease in height of spinous process from 2.4 cm of the first to 1.8 cm of sixth lumbar vertebra was noticed. The free extremity of the spine expanded to form a ridge that projected both cranially and caudally as in cattle (Nickel et al., 1986). The spine of the last one was the smallest. The transverse processes were broad, projected laterally and curved forward. They also had sharp free borders with expanded extremities. The transverse process of the first vertebra was the shortest with a length of 1.8 cm, while that of second and third was longer with length of 3.0 cm and 3.2 cm, respectively. The fourth lumbar presented a maximum length of 3.7 cm whereas, it diminished to 3.5-3.2 cm in the fifth and sixth vertebrae (Fig. 1) as reported in cattle (Getty, 1975).

Each vertebra presented two strongly curved cranial articular processes with sagittal dorso-medial deep concave facets as reported in sheep (Getty, 1975). The well-developed caudal articular processes situated on either side of the dorsal spine showed ventro-lateral...
cylindrical condyle like articular areas that were overlapped by the cranial articular processes. These sagittal articular facets prevent lateral flexion of the lumbar region. All lumbar vertebrae carried the tuberous mamillary processes which were fused to the cranial articular processes to form the mamillo-articular processes as recorded in cattle (Nickel et al., 1986). The accessory processes were absent.

Sacrum: The sacrum was triangular and was formed of four fused sacral vertebrae and presented a length of 10.2 cm (Fig. 2). The fused and longitudinally curved single bone narrowed from cranial to caudal extremity. The breadth at the base and the apex was 3.8 cm and 1.2 cm, correspondingly. Its smooth ventral surface was concave cranio-caudally. The ventral crest and the vascular groove on this surface was absent as in sheep (Nickel et al., 1986). This surface showed three transverse lines and three large ventral sacral foraminae.

The breadth of sacral canal at the base and apex was 3.5 cm and 1.1 cm, respectively. The dorsal surface showed in the middle a caudally directed median sacral crest (Fig. 2). The caudal end of the median sacral crest formed a pointed projection over the opening of the sacral canal. Two low but prominent lateral sacral crests that faded out in the last sacral segment were observed on the dorsal surface. The caudal articular process of the last sacral segment was rudimentary. The last two dorsal sacral foraminae were divided by the lateral sacral crest.

The plate like thin lateral borders of sacrum had ventro-laterally curved irregular margin. The broad quadrangular sacral wings at the base curved ventrally and cranially. The caudal surface of the wings caudo-dorsally showed auricular facet for the ilium. The transverse process of last sacral segment was well developed, thin and projected caudally.

The broad base presented central dorso-ventrally flattened wide body of the first sacral segment. The promontorium on the cranio-ventral border of body of sacrum was less distinct as in other domestic animals. On both the sides, the body showed a smooth notch and two well-developed cranial articular processes. The cranial articular processes showed deep concave facets medially. The caudally facing apex was smaller and presented the elliptical flattened caudal surface of the body of the last sacral segment as reported in cattle (Nickel et al., 1986).

Coccygeal vertebrae: Coccygeal vertebrae were five in number (Fig. 3). The first two coccygeal vertebrae were typical with a complete vertebral arch and processes. The length of coccygeal vertebrae gradually decreased from the first to the fifth and each was around 1.4±0.2 cm. The transverse processes sprang more caudally from the body of the vertebrae. In the first vertebra, the transverse process was large, plate-like and quadrilateral. But in the others it became smaller. Well-developed cranial articular processes seen in first three were gradually disappeared. The spinous process large in the first decreased gradually up to the fourth. The fifth had no spinous process. Haemal processes were absent as in sheep (Nickel et al., 1986; Getty, 1975).

REFERENCES

