



ISSN: 2456-2912

VET 2024; 9(1): 808-810

© 2024 VET

www.veterinarypaper.com

Received: 15-11-2023

Accepted: 16-12-2023

Vikas Kumar

Assistant Professor, Department of Veterinary Anatomy, Arawali Veterinary College Sikar, Rajasthan University of Veterinary and Animal Sciences, Bikaner, Rajasthan, India

Neelam Kumari Faran

Assistant Professor, Department of Veterinary Anatomy, Arawali Veterinary College Sikar, Rajasthan University of Veterinary and Animal Sciences, Bikaner, Rajasthan, India

Sanjeev Joshi

Department of Veterinary Anatomy & Histology, College of Veterinary and Animal Science (CVAS) Bikaner, RAJUVAS, Bikaner, Rajasthan, India

Kavita Rohlan

Assistant Professor, Department of Veterinary Anatomy, Arawali Veterinary College Sikar, Rajasthan University of Veterinary and Animal Sciences, Bikaner, Rajasthan, India

Sanwar Mal

Assistant Professor, Department of Veterinary Anatomy, Arawali Veterinary College Sikar, Rajasthan University of Veterinary and Animal Sciences, Bikaner, Rajasthan, India

Vijay Kumar Yogi

Veterinary Officer, Department of Animal Husbandry, Barmer, Rajasthan, India

Surendra

Department of Veterinary Public Health and Epidemiology, Arawali Veterinary College, Sikar, Rajasthan, India

Corresponding Author:

Vikas Kumar

Assistant Professor, Department of Veterinary Anatomy, Arawali Veterinary College Sikar, Rajasthan University of Veterinary and Animal Sciences, Bikaner, Rajasthan, India

Radiographic anatomy and computed tomography of the skull of Blue bull (*Boselaphus tragocamelus*)

Vikas Kumar, Neelam Kumari Faran, Sanjeev Joshi, Kavita Rohlan, Sanwar Mal, Vijay Kumar Yogi and Surendra

Abstract

The present study has been carried out computed tomography and radiographic anatomy of the skull of blue bull. The radiograph of the skull showed the dolichocephalic type shape (long head). The nasal canal was divided by the nasal septum. The cranial cavity was distinctly visible and foramen magnum was located caudo ventrally. The groove for canine tooth was absent. Computed Tomography scan showed the paranasal sinuses. Three pair of sinuses was present (frontal, maxillary and sphenopalatine sinuses) in the sagittal section of the CT scan.

Keywords: Radiographic, computed tomography, sinuses, blue bull

Introduction

Blue bull (*Boselaphus tragocamelus*) sometimes also called as Nilgau is categorized as of "Least Concern" by the International Union for the Conservation of Nature and Natural resources (IUCN) and protected under Schedule "III" of the Indian Wildlife Protection Act, 1972. Computerized tomography (CT) is used to investigate the complex structure of some organs that has a higher density resolution and no overlap of other anatomical organs. Radiographic Anatomy of the skull may be done to diagnose fractures of the bones of the skull, birth defects, infection, foreign bodies, pituitary tumors, and certain metabolic and endocrine disorders that cause bone defects of the skull. Skull X-rays may also be used to find tumors, check the nasal sinuses, and detect calcifications within the brain.

Materials and Methods

In this study six specimens of adult Blue bulls (*Boselaphus tragocamelus*) were used. The permission for the collection of bones was sought from Additional Principal Chief Conservator of Forest (APCCF), Rajasthan. The skeletons were collected from the Bikaner Zoo vide approval letter No. F3 (04) TECH-II/CCF/2013, Dated 6th May 2016 with dispatch No.566 from Additional Principal Chief Conservator of Forest, Jaipur (Rajasthan).

The radiographs were taken in the department of Veterinary Surgery and Radiology, College of Veterinary and Animal Science, Bikaner Rajasthan. The radiographic factor was 10 mAs and 48 kVp. The CT scans were taken to the Dr. Bothra's diagnostic imaging center Bikaner, Rajasthan. CT examination was performed on serially sectioned skull using the CT scanner. CT was examined in three series of cross-sections: sagittal, horizontal and transversal. The images taken were from the nostrils until the level caudal temporomandibular joint with 3.750 mm. Intervals (scanning conditions: 120KV, 99 MA).

Results and Discussions

The radiographs showed the dolichocephalic type of skull and the nasal canal was divided by nasal septum (Fig.1) which was similar finding of Ramswarup (2011) [8] in chital whereas brachycephalic type in tiger (Joshi, 2004) [5]. The cranial cavity (Fig.1) was marked as round or ovoid shadow with foramen magnum placed along its caudo-ventral position which was similar to as visible in canine (Hare, 1958) [3], in feline (Hare, 1959) [4] and in yak (Archana *et*

al., 1997b)^[1] in chital (Ramswarup, 2011)^[8]. The groove for canine tooth (Fig.1) was absent which was similar to the observations of Hare (1958)^[3], in canine, in bovine, Kumar *et al.* (1991)^[6] in sheep, Kumar *et al.* (1992)^[7] in goat and Archana *et al.* (1997b)^[1] in yak. While as per Joshi (2004)^[5] the groove for canine tooth was clearly visible in tiger skull. The ventro-lateral view was found more suitable for vomer, nasal septum, nasal cavity, premolar and molar teeth, whereas according to Joshi (2004)^[5] this view was suitable for canines and premolar teeth in tiger. The dorso-ventral view provided better visualization of the vomer, palatine and maxillary sinuses, which were similar to as visible in sheep (Kumar *et al.*, 1991)^[6], in goat (Kumar *et al.*, 1992)^[7] and in bovine

skull and in Indian marsh crocodile the nasal conchae were prominently seen (Singh *et al.*, 2016)^[9].

The Computed Tomography (CT) scan clearly showed the frontal, maxillary, sphenopalatine sinuses, (Fig.2) which resembled to the findings of Gendy and Alsafy, (2010)^[2] in donkey and Ramswarup (2011)^[8] in chital. The left and right frontal sinuses were completely divided by a thick bony septum (Fig.1) and the maxillary sinus (Fig.1) was divided into rostral and caudal compartments by a thin, incomplete bony septum which was similar to Gendy and Alsafy (2010)^[2] as visible in donkey and Ramswarup (2011)^[8] in chital. Ramswarup (2011)^[8] reported that the maxillary sinus was divided into rostral and caudal compartments by a thin, incomplete bony septum as in coastal.

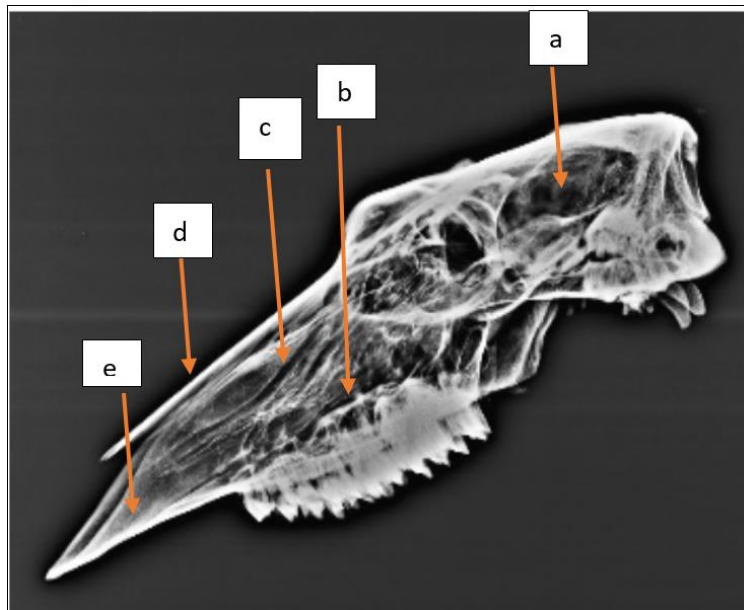


Fig 1: Radiograph showing lateral view of Blue bull skull (a). Cranial cavity (b). Maxillary sinus (c). Nasal canal (d). Nasal bone (e). Premexilla bone

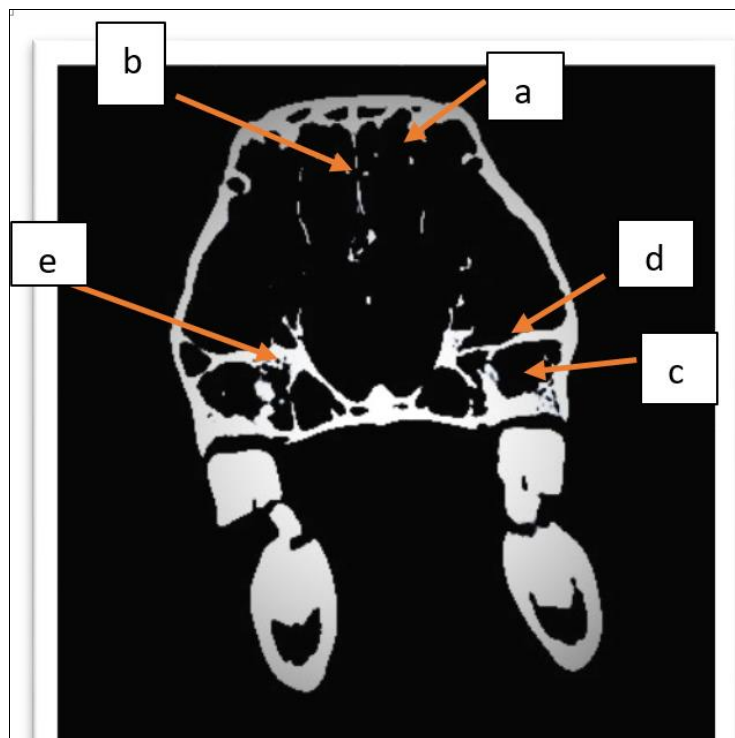


Fig 2: CT scan images of sagittal section female Blue bull (a). Frontal sinus (b). Frontal septum (c). Maxillary sinus (d). Maxillary septum (e). Sphenopalatine sinus

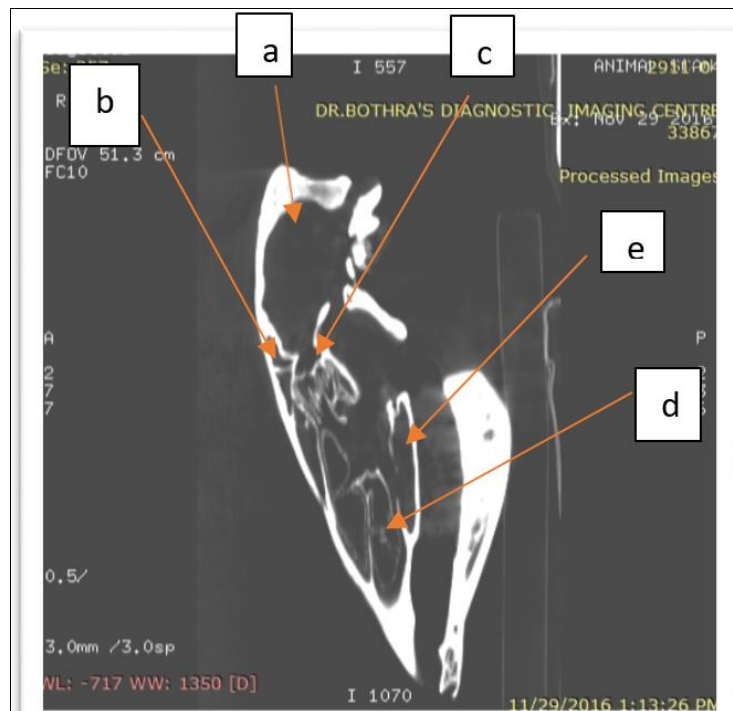


Fig 3: CT scan images of lateral view Blue bull skull (a). Cranial cavity (b). Frontal sinus (c). Ethmoid bone (d). Turbinates bone (e). Maxillary sinus

Conclusion

The CT scan showed the paranasal sinuses and turbinates bones. Three pairs of sinuses were clearly visible (Frontal, maxillary and sphenopalatine sinuses) in the sagittal section of CT scan. The left and right frontal sinuses were completely divided by a thick bony septum. The maxillary sinus was divided into rostral and caudal compartments by a thin incomplete bony septum.

In radiographic anatomy, the dorsal radiographs of the skull showed dolichocephalic type shape (long head). The nasal canal was divided by nasal septum. It was clearly visible. In lateral view, the nasal cavity and frontal sinus were relatively large and the teeth were linearly arranged and clearly visible. The lacrimal fissure. The external acoustic meatus was seen as a black spot due to air density. The orbital region of the skull was overlapped partly by the frontal sinus. The tympanic bulla was visible in oblique projection.

References

1. Archana Sudhakar LS, Sharma DN, Varshney AC. Radiographic anatomy of the skull of yak. *Indian J Vet. Anat.* 1997b;9(1/2):44-52.
2. Gendy SA, Alsafy MAM. Gross anatomy and Computed Tomography of the Donkey. *Anatomy and Embryology Department, Faculty of Veterinary Medicine, Alexandria University, Edfina, Rashed, Behera, Egypt J Vet. Anat.* 2010;3(1):25-41.
3. Hare WCD. Radiographic anatomy of the canine skull *J Am. Med. Ass.* 1958;133:149-157.
4. Hare WCD. Radiographic anatomy of the feline skull. *J Am. Med. Ass.* 1959;134:349-366.
5. Joshi H. Thesis entitled Gross anatomical studies of the skull of Indian tiger (*Panthera tigris*) submitted to College of Veterinary And Animal Science, RAU, Bikaner; c2004.
6. Kumar P, Singh K, Kumar S. Radiographic anatomy of the skull of sheep. *Haryana Veterinarian.* 1991;30:157-60.

7. Kumar P, Singh K, Kumar S. Radiography anatomy of the skull of goat (*Capra hircus*). *Indian J Vet Surg.* 1992;13(1):25-26.
8. Ramswarup. Thesis entitled Gross anatomical studies on the bones of the skull in chital (*Axis axis*) submitted to College of Veterinary and Animal Science, RAJUVAS, Bikaner; c2011.
9. Singh R, Venkatesan S, Basha SH, Ramesh G. radiographic anatomy of skull of Indian marsh Crocodile (*Crocodylus palustris*). *Souvenir compendium XXXI annual convention of IAVA; c2016, p. 19.*