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Bony Tubercle on the Posterior Border of Foramen Magnum - A Case Study

Dr. Girish V. Patil*, Dr. Shishirkumar**

*Associate Professor, **Assistant Professor
Department of Anatomy, DM- Wayanad Institute of Medical Sciences, Meppadi, Wayanad, Kerala, India

Abstract: ***Presence of tubercles in the foramina of the cranium has aroused the curiosity of anatomists. The foramen magnum is the large opening situated in the occipital bone, and transmits important neurovascular structures. During routine study of skull in the department of Anatomy at DM – Wayanad Institute of Medical Sciences, Meppadi, Kerala, a triangular projection was found at the posterior margin of foramen magnum, with the apex directed forwards towards the anterior margin of foramen magnum. The tubercle measured 1.5mm antero-posteriorly and 1.5mm transversely.***

Keywords: Cranium, Foramen magnum, Neurovascular, Occipital bone, Tubercles

1. Introduction

Presence of tubercles in the foramina of the cranium has aroused the curiosity of anatomists. The foramen magnum is the large opening situated in the occipital bone, and transmits important neurovascular structures. Such tubercles are clinically important as it may compress the vital structures that goes to and fro from the brain. It is also important in the field of kinesiology that such structures may retard the movement at the atlanto-occipital joint.

2. Case Report

During routine study of skull in the department of Anatomy at DM – Wayanad Institute of Medical Sciences, Meppadi, Kerala, a triangular projection was found at the posterior margin of foramen magnum, with the apex directed forwards towards the anterior margin of foramen magnum. The tubercle measured 1.5mm antero-posteriorly and 1.5mm transversely.

Figure 1: Arrow showing a bony tubercle at the posterior margin of the foramen magnum

3. Discussion

The cartilage centres appear in the base of skull during the second month in three areas 1. Around the cephalic part of the notochord 2. Around the hypophysis cerebrai 3. Between the optic and nasal capsules.

The cephalic part of the notochord extends up to the dorsum sellae of sphenoid bone. This part of the notochord is surrounded by the paracordal cartilage which subsequently unites to form basal plate. This is continuous behind with fore precervical or occipital sclerotomes . This fuses with one another to form the basiocciput. The rudimentary transverse processes unite and constitute the ex-occiput, which persists as jugular processes. The lamina of the sclerotome meet behind the foramen magnum and continue further upwards as a supra occiput which develop as squamous part of the occipital bone [1].

The occipital bone is perforated by the foramen magnum with the squamous part behind the foramen, the condylar parts lateral and the basilar part in front. The assimilation of various vertebrae into the occipital segments of the skull is responsible for the variable morphology of the craniovertebral region among vertebrates. A partial liberation of one of the vertebral elements which normally enter into the composition of the basiocciput results in an 'occipital vertebra' [2]. Besides being of anthropological and ethnological interest, these variants may be important in a clinical context. The basilar process of occipital bone is formed by fusion of the first three primitive vertebrae (or occipitoblasts), the most caudal of which is so-called occipital vertebra or pro-atlas [3]. The failure of distal occipitoblasts to fuse with others gives rise to abnormal bone formations on the external surface of skull around foramen magnum, phenomenon called as “manifestation of occipital vertebra” [3]. Tubercles are formed by exostoses. Albrecht designates – all elements of cranio-vertebral articulation including intraligamentous ossification as “pro-atlas” vertebra. The apical ligament of dens, which forms part of this pro-atlas region, occasionally contains rudiments of notochord within it [4]. An anomaly at the foramen magnum has been attributed to occipitalization of the atlas or assimilation of the atlas to the occipital bone. Sometimes posterior atlanto occipital membrane may be ossified, under

such conditions the tubercles may be found. Even sometimes bony canals which surround the 3rd part of vertebral artery have been documented [5].

4. Conclusion

In conclusion it may be stated that one has to be familiar with the anatomical features at the foramen magnum, in order to prevent damage to the neurovasular structures at the formamen magnum. Future scope lies in the field of orthopaedics and neurology as such anomalies may cause compression of the neural structures and also is important in pain management.

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Author Profile

Dr. Girish V Patil has completed his MBBS from KIMS Hubli and has completed his M.D in Anatomy from VIMS Bellary. He has also finished his DNB Anatomy. He is presently working as an Associate Professor in the Department Of Anatomy, DM-WIMS Meppadi, Kerala, India

Dr. Shishirkumar has completed his MBBS from KLE'S JNMC Belgaum and has completed his M.D in Anatomy from K.S.Hegde Medical Academy, Deralakatte, Mangalore. He is presently working as an Assistant Professor in the Department Of Anatomy, DM-WIMS Meppadi, Kerala, India