



Right juxtacondylar bony facet on the basiocciput: a proatlas segmentation variant

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Abstract

The cranio-vertebral region is a region of spine with a high level of variability. Presence of unusual bony masses at or near the foramen magnum may lead to craniocervical instability and also cause compression at the spino-medullary junction leading to vascular and neurological signs and symptoms. This article documents the presence of a basilar bony facet located medial to the right occipital condyle along the rim of foramen magnum, extending just beyond the middle of the anterior margin. The embryological and clinical bearings of such variant at the cranio-cervical junction are discussed.

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Key words [craniovertebral variations] [proatlas] [segmentation variants] [brainstem compression]

Introduction

Bony variations related to failure of segmentation of most caudal of the occipital sclerotomes, the pro-atlas, are rare, but have been documented [1]. The developmental failures lead to unusual bone formation at the anterior rim of foramen magnum, either in midline or laterally. Developmental osseous anomalies of the cranio-vertebral complex can result in neural compression, vascular compromise and disturbed orthokinetics.

Case Report

An unusual oblong facet placed medial to the right occipital condyle along the anterior rim of foramen magnum, at the base of one skull was observed during routine undergraduate teaching. The maximum anteroposterior and transverse dimensions measured 19mm and 9mm, respectively (Figure 1). The facet extended from the middle of the medial aspect of the right occipital condyle till just beyond the median plane of the anterior rim of foramen magnum. The facet had a depressed surface and also protruded well over the rim, narrowing the foramen magnum on the right anterior aspect. The lateral part of this bony mass anterior to the occipital condyle displayed a protruded edge (Figure 2).

Discussion

The key sclerotome in the understanding of craniovertebral junction variations is the fourth occipital sclerotome or the pro-atlas [2]. The ventral portion of the neural arch component of the pro-atlas forms the anterior margin of the foramen magnum and the occipital condyles. Any unusual bone formation in the vicinity of occipital condyles near the anterior rim of foramen magnum results from the persistence of the lateral part of the hypochordal arch of the pro-atlas, which could be unilateral or bilateral and the disappearance of its medial part [3]. This explains the presence of the unilateral bony mass described in our case.

The most interesting feature of these pro-atlas segmentation variations is the diversity of bony presentations, which although rare, but have been variously described as 'condylus tertius,' 'basilar processes,' 'median or third occipital condyle' [4, 5].

The presence of such a bony process as is seen in our case, constricting the foramen magnum may lead to the speculation of a similar additional facet on the superior surface of atlas articulating with each other. This may lead to highly restricted neck movements and cervical stiffness.



Figure 1. Arrow pointing towards the bony facet located anteromedial to the right occipital condyle. Extent of the facet along the anterior rim of foramen magnum is seen.

Narrowing of anterior part of the foramen could also lead to the compression of the anterolateral part of spinomedullary junction during movements of the neck as has been documented, and lead to neurovascular compromise [6].

The surgical access for many space occupying lesions is usually done at the level of foramen magnum through ventral or dorsal approach. Surgical approaches, such as lateral transjugular, transtuberular and transcondylar approaches require surgical resection of occipital condyles [7]. This requires a

thorough anatomical knowledge of cranio-vertebral junction and its variants. As in the present case, radiological assay and knowledge of such a variant may definitely alter the surgeons pre operative strategy since such an additional bony mass situated anteromedial to the right occipital condyle may pose as hindrance to a transcondylar surgical approach.

While evaluating imaging of craniovertebral junction and making a specific diagnosis, the clinicians should be aware of these rare bone variants, as this would affect the surgical treatment and management of patients.



Figure 2. Arrowhead showing the protruded margins of the facet narrowing the foramen magnum.

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