

Occipitalization of the atlas vertebra: a case report

Abstract

Occipitalization of the atlas vertebra is an important congenital malformation of the craniovertebral region due to its proximity to the spinomedullary region, which can produce narrowing of the foramen magnum and compression of the spinal cord or brainstem. Rarely, it also results in compression of the vertebral artery, leading to dizziness, convulsions and syncope. Therefore, knowledge of such an anomaly is essential for orthopedists, anesthesiologists and clinicians.

Keywords: Atlas vertebra, Occipitalization

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Introduction

Congenital bony fusion of the atlas vertebra to with the occipital bone of the skull is defined as occipitalization of the atlas. This abnormality of the craniovertebral junction can occur partially or completely, where complete fusion involves the anterior arch of the atlas, the lateral masses or the entire atlas, but partial fusion is the most common form.¹ Atlas occipitalization was first described by Rokitansky in 1844 and radiographically demonstrated by Schuller in 1911.² Its incidence ranges from 0.14 to 0.75% of the population, being affected by gender.^{1,3} The aim of this study was to report a case of fusion of the atlas with the occipital bone.

Case report

During a routine study at the Anatomy Laboratory of the Federal

University of Sergipe (UFS), a skull was found showing fusion of the first cervical vertebra (the atlas) with the occipital bone (Figure 1). In this finding, it was observed that the anterior and posterior arches of the atlas completely merged with the basilar and squamous parts of the occipital bone respectively. The superior articular facets were completely fused with the occipital condyles and the inferior articular facets were asymmetrical, the right one being elongated in an anteroposterior direction and the left one was rounded. There was also fusion of the right transverse process lateral mass with the squama of the occipital bone while the left one was free. The foramina transversaria were absent on both sides of the atlas, the right one fused with the squama of the occipital bone and on the left this fusion did not occur. Hypoglossal canals of the skull were present on both sides, being larger on the right side.

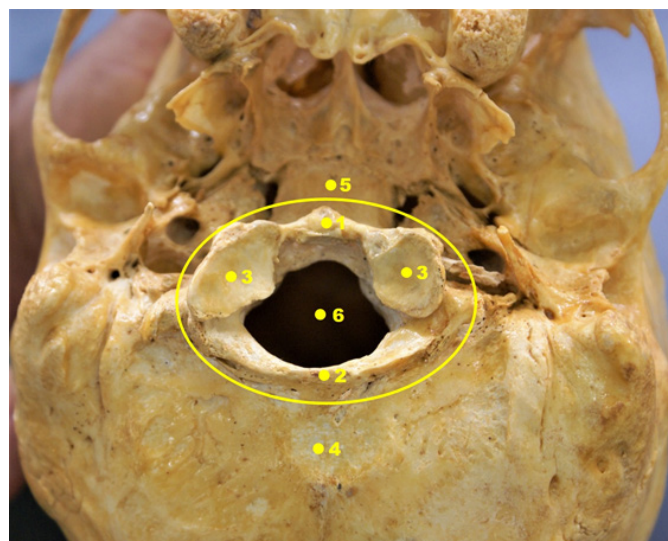


Figure 1 Occipitalization of the atlas vertebra.

Discussion

Occipitalization of the atlas is commonly associated with concomitant neurovascular and musculoskeletal anomalies at the craniovertebral junction, which can produce a variety of symptoms. The incidence of atlanto-occipital fusion ranges from 0.08 to 3% of the general population.^{1,3,4} However, in Caucasians, the incidence of atlanto-occipital fusion is in the range of 0.5 to 1.0%.⁵ Menezes et al.,⁶ reported an incidence of 10.7% with assimilation of the atlas in patients with craniovertebral junction abnormalities. In general, congenital malformations in the cervico-occipital region are of great importance due to its proximity to the spinal cord region with the possibility of neurological compression syndrome. There are several abnormalities and anatomical variants in the region of the atlanto-occipital junction, and congenital bony fusion of the atlas vertebra to the occipital bone base of the skull, also described as atlas assimilation, occipitocervical synostosis, atlas occipitalization and atlanto-occipital fusion, appears to be the more common in this region⁷⁻⁹ resulting from a congenital failure of bone/fibrous segmentation, in complete or partial fusion⁴ and affects 0.08 to 2.8% of the population.¹⁰ This fusion can be uni or bilateral, segmental or focal and occurs at several points.¹¹ For Gholve et al.,¹² 20% of the fusions concern the anterior arch, 17% the lateral masses and 13% the posterior arch and 50% remainder are mixed forms. In our case, this merger occurred completely. It is never symptomatic when isolated. It can sometimes be manifested by neck pain or, more rarely, by a bulbomedullary junction compression syndrome when other neck malformations coexist.³

Conclusion

The atlanto-occipital fusion may reduce: the size of the foramen magnum and may lead to neurological complications due to spinal cord compression. But most of the time, it exists without any typical presentation of symptoms, but sometimes it can cause orthopedic or neurological problems.

Acknowledgments

None.

Conflicts of Interest

None.

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