

Anomolus & Complete Fusion of Atlas with Occipital Bone:-A Case Report Seen in Dry Skull

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Abstract

Occipitalisation of atlas is an osseous anomaly in the region of the foramen magnum.¹ This is important as skeletal abnormalities at this junction may result in sudden death.^{1,2}

Material & Methods: During routine undergraduate osteology teaching, a dry skull with Occipitalisation of atlas was encountered in the department of Anatomy, nri medical college, mangalgiri, India.

Results: In this skull, both anterior and posterior arch along with transverse process of both sides of atlas were completely fused with occipital bone.

Reduction in diameter of foramen magnum due to this condition can cause neurological complications due to compression of spinal cord or medulla oblongata, vertebral vessels, 1st cervical nerve, this knowledge of occipitalisation of the atlas is important to orthopaedicians, neurosurgeons, physicians and radiologists dealing with abnormalities of the cervical spine.

Key Words: Occipitalisation; Atlas; Assimilation; Occipital bone; Atlantooccipital fusion.

Introduction

Occipitalisation of the atlas is fusion of the atlas bone with the base of occiput.^{1,3,5,7} Occipitalisation can be incomplete/complete, can be acquired after a healed fracture (acquired) or congenital. In the congenital type the symptoms are more. The signs and symptoms may vary from headache

to neurological syndrome, symptoms include cord compression due to surrounding soft tissue abnormality.^{6,7,8}

Vertebral arterial compression or even its total occlusion in the bony canal can lead to dizziness, seizures, mental deterioration and syncope.^{7,8}

It is mostly asymptomatic & is found incidentally when other diseases are ruled out.^{5,6} Thus because of its multiple variations knowledge of such anomaly is essential.

Case Report

During osteology classes for undergraduate students we found a Skull showing completely fused atlas vertebra with the occipital bone at the base of the skull, along with its transverse processes on both sides.

The entire anterior arch fused with the basilar part of the occipital bone leaving a small gap in between. The posterior arch was with the posterior margin of the foramen magnum.

The hypoglossal canals were seen. The two superior facets of atlas fused with the occipital condyles.

The right and the left transverse process of the atlas each containing complete transverse foramen are also fused. There is a groove posterior to inferior articular facet on the posterior arch on both sides.



The inferior articular facet on the right side (17X17mm) appeared to be larger than left(14X16mm) and facets were smooth and flat.

The anterior aspect of the foramenmagnum was minimally reduced by the right(more on the right side) and left lateral mass of the atlas. More on the right side.

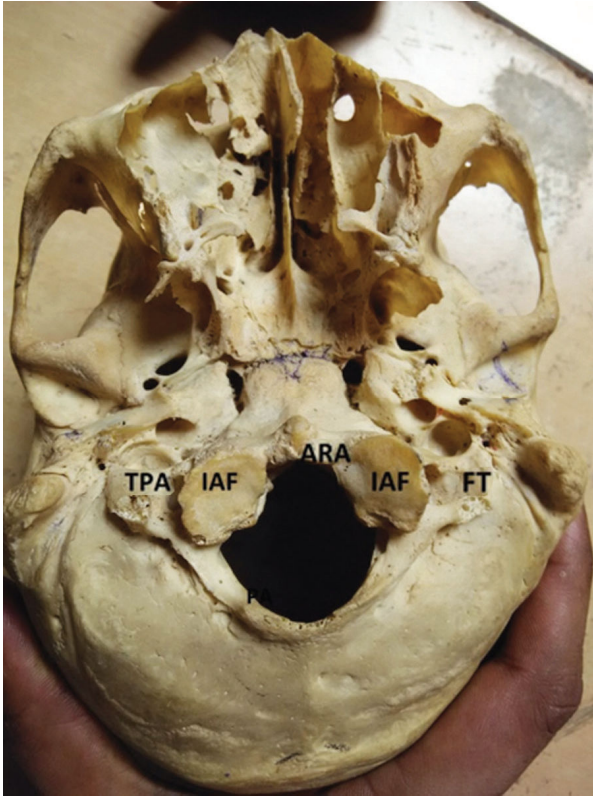


Fig. 1: Base of Skull Showing. The Occipitalisation of Atlas Vertebra.

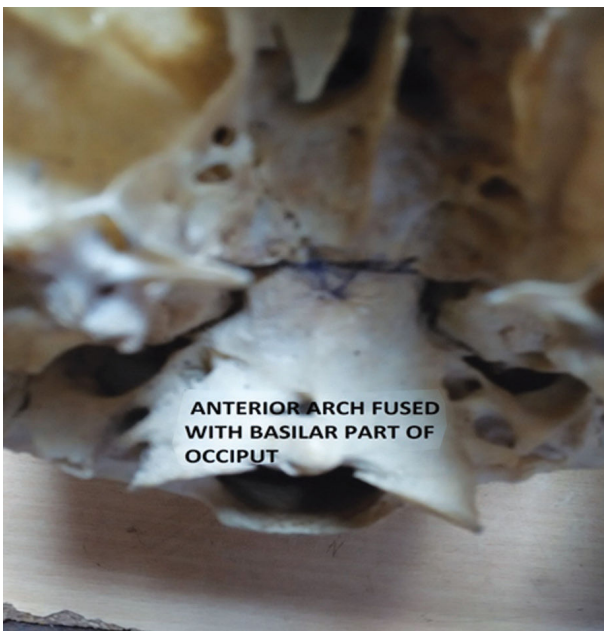


Fig. 2: Base of Skull Showing. The Anterior Arch of Atlas Fusion with Basilar Part of Occipital Bone.

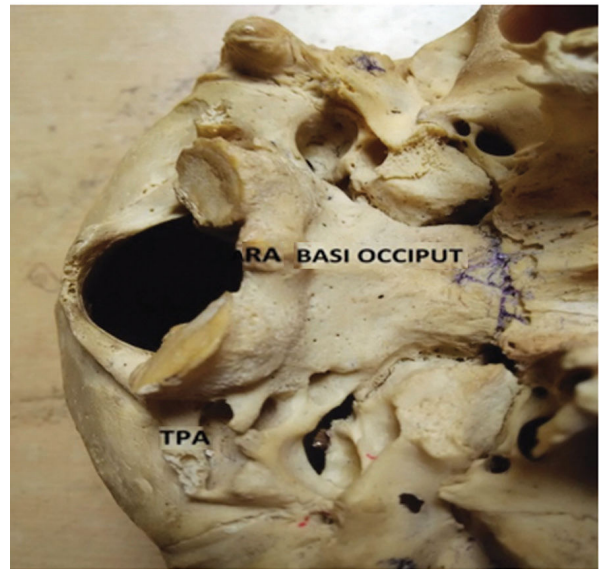


Fig. 3: Base of Skull Showing Complete Fusion of Transverse Process of Atlas with the Occipital Bone Left Side.

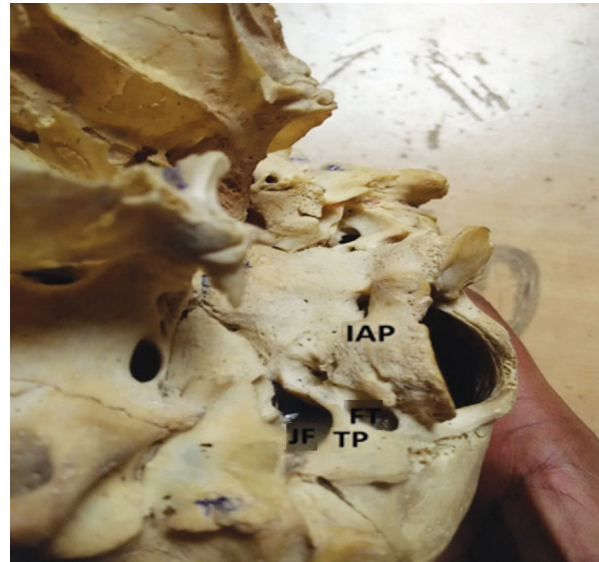


Fig. 4: Base of Skull Showing Complete Fusion of Transverse Process of Atlas with the Occipital Bone Right Side.

TPA:- Transverse process of Atlas

IAF:- Inferior articular facet

ARA:- Anterior arch of Atlas

FT:- Foramen transversarium

PA:- Posterior arch

JF:- Jugular foramen

Discussion

In the development of basilar part of occiput & atlas, the rostral half of the first cervical sclerotome combines with the caudal half of the last occipital sclerotome to form the base of the skull.^{2,3,4}

While the caudal half of the first cervical sclerotome combines with the rostral half of second

cervical sclerotome to form 1st cervical vertebra and odontoid process.^{4,5}

The disruption in the development results in atlanto-occipital fusion.

Affected individuals may have the following physical features: low hairline, torticollis, restricted neck movements, and an abnormally short neck.

Absolute immobility of the atlanto-occipital joint results in compensatory hypermobility of atlas on the axis due to exerting stress on occipito-odontoid ligament with over stretching.^{5,6,8}

The sagittal diameter of the foramen magnum is an important parameter in spinal cord compression.

The atlanto-occipital fusion may reduce the lumen of the foramen magnum and lead to neurological complications due to compression of the spinal cord & also vertebral artery influencing the blood flow to the brain resulting in syncope, seizures, dizziness, vertigo and neurological symptoms.^{6,7,8}

It may also result in compression of 1st cervical nerve affecting the sub occipital triangle muscles which are postural muscles, thus, giving rise to an abnormal posture of head and an unsteady gait.^{7,8}

There will be anterior compression of medulla oblongata leading to dysfunction of the lateral corticospinal tract, resulting in the form of hyperreflexia, spasticity, Hoffman's sign, and Babinski's sign.

The impingement of posterior column due to presence of dural bands^{6,7}, can cause Paraesthesia, numbness, impairment of 2 point discrimination and vibration and conscious proprioception impairment.

Cranial nerve findings associated with occipitalisation of the atlas include lower cranial nerve palsies leading to dysphagia, dysarthria and nystagmus.^{5,6,7} Occipito-cervical synostosis is associated with other skeletal malformations such as Spina bifida of atlas, basilar invagination,

cervical stenosis, Klippel-Feil syndrome fusion of the second and third cervical vertebrae) and Arnold Chiari malformation (pathophysiology of both is essentially the same).⁸

Transverse process is very important landmark for head and neck surgeons, when it is inclined and fused to occipital bone, there may be difficulty in reaching various structures and may lead to asymmetry in structure and shape of apertures for the vessels and nerves around the foramen magnum.⁸ Therefore, the knowledge of such anomaly is essential.

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