

A Rare Case Report of Anterior Atlantoclival Assimilation and Posterior Assimilation of Posterior Arch with Posterior Elements of C2 VertebraP.V.S. Abhishek¹, Adimulam Josthsna², Ponugoti Spoorthi³¹Assistant Professor, Department of Radiodiagnosis, Chalmeda Anand Rao Institute of Medical Sciences, Karimnagar, Telangana, India² Resident, Department of Radiodiagnosis, Chalmeda Anand Rao Institute of Medical Sciences, Karimnagar, Telangana, India³Resident, Department of Radiodiagnosis, Chalmeda Anand Rao Institute of Medical Sciences, Karimnagar, Telangana, India

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Conflict of interest: Nil

Abstract:

Craniovertebral junction anomaly or variant is an uncommon condition. The craniovertebral junction includes the occiput, atlas, axis, and supporting ligaments. We are reporting a case of 42-year-old female patient presented with occipital headache associated with tingling and numbness radiating to neck since 1 week following head trauma. Plain CT Brain imaging revealed normal brain parenchyma and an incidental finding of anterior fusion of anterior arch with clivus and posterior fusion of posterior arch with posterior elements of C2 vertebra along with increase in atlantoaxial interval with posterior subluxation of dens with resultant stenosis of foramen magnum causing cervicomedullary junction compression. This may be a first such case reported in our literature.

Keywords: Craniocervical Junction, Atlanto-Occipital Assimilation, Basilar Invagination, Atlantoaxial Subluxation.

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Introduction

Anatomical variations/anomalies of craniovertebral junction. The craniovertebral junction includes the occiput (posterior skull base), atlas, axis, and supporting ligaments. It encloses the soft tissue structures of the cervicomedullary junction (medulla, spinal cord, and lower cranial nerves) [1].

Among various craniovertebral junction anomalies, atlanto-occipital assimilation (AOA) is one of the most common. Atlas assimilation is fusion of atlas with base of occiput. We are reporting a rare case of anterior atlantoclival assimilation and posterior assimilation of posterior arch with posterior elements of C2 vertebra.

Case Report

A 42-year-old female with occipital headache associated with tingling and numbness, radiating to neck since 1 week following head trauma at work which was associated with loss of consciousness for 5-10mins. Patient had no signs of any motor or sensory disturbances, lower cranial nerve problems, vascular compromise and brainstem disorder.

CT Brain imaging revealed normal brain parenchyma and an incidental finding of anterior assimilation of anterior arch with clivus and posterior assimilation of posterior arch with posterior elements of C2 vertebra. Increase in atlantoaxial interval measuring 7.6mm along with posterior subluxation of dens. Due to posterior subluxation of dens there is resultant stenosis of foramen magnum measuring 7.2mm causing cervicomedullary junction compression. Tip of the odontoid process is projecting above the chamberlain line into foramen magnum (basilar invagination). No evidence of tonsillar herniation noted. Then dedicated CT and MRI cervical spine was done for better evaluation. MRI imaging findings revealed T2 hyperintensity noted at upper cervical spinal cord, basilar invagination causing compression of cervicomedullary junction and crowding of foramen magna. These features are indicative of compressive myelomalacia changes.

As patient is asymptomatic conservative treatment was given and advised for follow up scans.

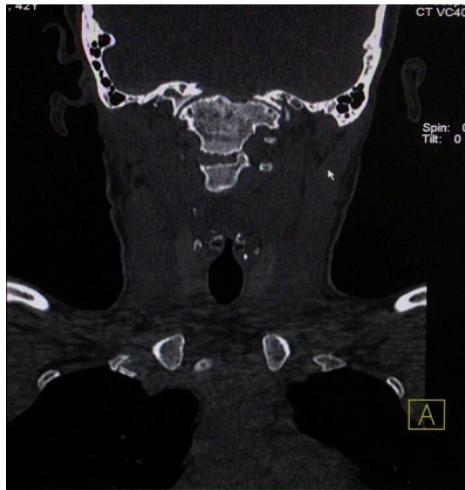


Figure 1

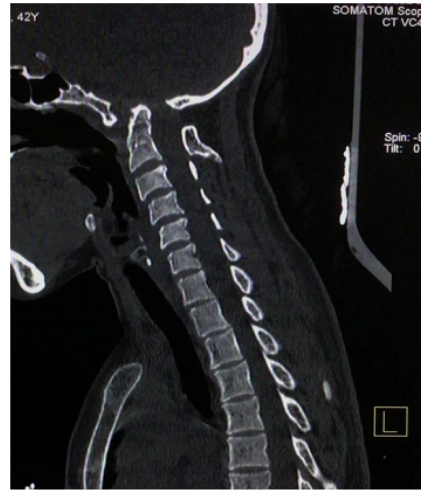


Figure 2

Figures 1 & 2 are plain coronal and Sagittal CT bone reconstruction images are showing assimilation of anterior arch with clivus.



Figure 3

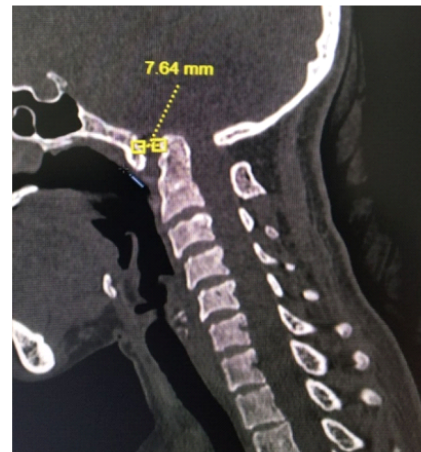


Figure 4

Figures 3 & 4 are plain Sagittal MRI and CT images are showing increased atlantoaxial interval (measuring 7.64mm) along with subluxation of dens posteriorly causing resultant stenosis of foramen magnum with compression of cervicomedullary junction and T2 hyperintense signal in upper cervical cord.



Figure 5

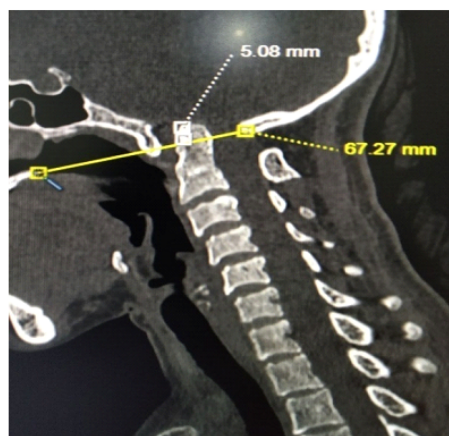


Figure 6

Figure 5 is plain Sagittal bone reconstruction image showing fused posterior arch with posterior elements of C2 vertebra. Figure 6 is showing projection of tip of odontoid process above chamberlain's line.

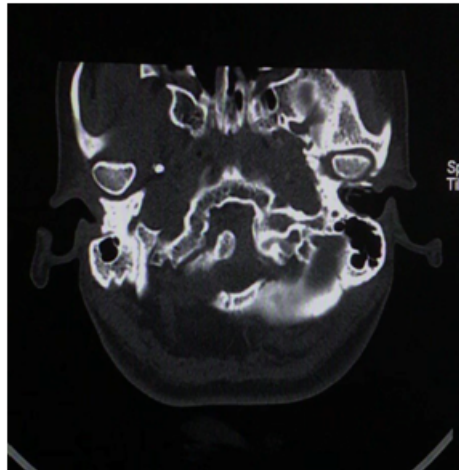


Figure 7

Figure 7 plain CT bone axial images are showing assimilation of anterior arch and occipital condyles with clivus.

Discussion

Atlanto-occipital assimilation (AOA) is one of the most common disorders of craniocervical junction and can be congenital in origin or acquired during lifetime with an incidence ranging from 0.1% to 2.7% [2]. AOA is divided into two types - complete and partial types with partial type being more common [3].

In complete type, entire atlas is fused with occiput, whereas in partial type, asymmetrical fusion of part of atlas to the occipital bone. This occurs due to the failure of segmentation between the fourth occipital sclerotome and the first spinal sclerotome [4].

It can also be categorized as anterior arch assimilation, posterior arch assimilation and assimilation of both anterior and posterior arches. Atlanto-occipital assimilation is associated with basilar invagination or fusion of C2 and C3 (occurs in 50% of cases)[5].

Sagittal and coronal CT and Sagittal MRI imaging are necessary for diagnosing the condition. We are reporting a case of mixed atlanto-clival assimilation along with posterior arch assimilation with posterior elements of C2 vertebra and is a rare type of craniocervical junction anomalies which is outside the classification of the USUAL CVJ anomalies (atlanto-occipital assimilation).

So, hereby a third type should be added to the usual classification as “mixed type” for such kind of disorders as presented in our case. Atlas assimilation may be asymptomatic but some patients may present with neurological symptoms due to cord/brain stem compression. Various types and severities of craniocervical anomalies are determined by anatomy relative to one or more standard lines of references (Chamberlain line and McGregor’s line). The present case is considered as congenital in origin.

Conclusion

Different types of atlas bone assimilation cases are reported. We are reporting a rare type of mixed craniocervical junctional anomaly - atlantoclival assimilation and posterior arch assimilation with posterior elements of C2 vertebra. This may be a first such case reported in our literature. Most of them are asymptomatic but some have neurological symptoms which correlate with the radiological findings.

Findings: Nil

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