Spinabifida of atlas

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Abstract
During the routine osteology demonstration for the first year MBBS students, the authors came across the presence of incomplete posterior arch in one of the atlas. Congenital clefts and other developmental anomalies of the atlas are rarely encountered. They are incidental findings discovered while investigating the cervical spine following trauma. Differentiation of developmental variants of the atlas from the Burst fracture of Jefferson is essential to prevent unnecessary medical intervention. Posterior midline cleft of atlas/rachischisis/spinabifida occulta are well recognized and attributed to the defect/absent development of cartilaginous preformation of the arch and not to the disturbance of the ossification.

Key words: Atlas, Spinabifida, Midline cleft.

Introduction
Cervical vertebra anomalies are classified into two main categories, posterior arch deficiencies and fusions. Posterior arch deficiencies include spinabifida and Dehiscence. Fusions include fusion, Block fusion, assimilation and occipitalization. Congenital anomalies of the posterior arch of atlas are rare. They range from partial clefts to total agenesis of posterior arch of atlas. Congenital clefts and other malformations of atlas are incidental findings which are identified while investigating the cervical spine following trauma.

Case report
During the routine osteology demonstration for the first year MBBS students at Dr. B. R. Ambedkar Medical College, Bengaluru, the authors came across the presence of incomplete posterior arch in one of the atlas, with the tapering ends. (Fig. 1 and Fig. 2)

Fig. 1 - Superior surface of atlas.

Fig 2 - Inferior surface of atlas.

A- Anterior arch ; P- Posterior arch ; The gap in the posterior arch of atlas measured 0.65mm.

Discussion
Atlas usually ossifies in three centres, one appears for centrum during 8th week, one centre each for lateral mass/neural arch during 7th week. At birth, the anterior arch is fibrocartilaginous and separate centre appears at the end of first year and unites with the lateral masses between 6th & 8th year. The centre for posterior arch appears during second year and they unite between third and fourth year.
The defects of posterior arch of atlas are commonly believed to be due to a local mesenchymal defect leading to lack of chondrification⁷.

Posterior midline clefts of atlas are attributed to the defective development of cartilaginous preformation of arch & NOT due to the disturbance of ossification⁸.

The basic defect in agenesis of posterior arch of atlas is the lack of a cartilage template on which the ossification process builds⁷. (Fig. 3)

Cervical vertebra anomalies are usually associated with cleft lip, cleft palate, the common pathogenesis most probably relates to simultaneous embryogenesis of both structures.

Congenital anomaly of posterior arch of atlas leads to cervical canal stenosis and that may cause cervical myelopathy.

Conclusions

Defects of the posterior arch of atlas are very rare. The basic defect is due to local mesenchymal defect leading to lack of a cartilage template and not due to disturbance in ossification. Congenital clefts and other malformations of atlas are incidental findings which are identified while investigating the cervical spine following trauma.

Acknowledgement

The authors express heartfelt thanks to Non teaching staff and students of Dr. B R Ambedkar Medical College, KG Halli, Bengaluru for their support.

References


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