CASE REPORT

Fractures of lower cervical vertebrae in the presence of a congenital cleft of the atlas

K.S.R. Gade a,*, D.J.M. Macdonald a, J.R. Lindsay a, L. Stewart b

a Department of Orthopaedics, Stirling Royal Infirmary, Livilands, Stirling FK8 2AU, UK
b Department of Radiology, Stirling Royal Infirmary, Stirling FK8 2AU, UK

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Introduction

Congenital anomalies of the posterior arch of the atlas mimicking a fracture although rare are a known entity. Its detection in the setting of acute trauma may be confusing. The detection of posterior element defects in other cervical vertebrae adds to the dilemma of whether it is a fracture or similar congenital anomaly. We report a rare case of fracture of C6 and C7 in the presence of an un-fused posterior arch of C1 vertebra.

Case report

A 35-year-old man was admitted after a motor vehicle accident. He was a driver of a car travelling at 60 mph that lost control and hit a lamppost. He arrived in the Emergency Department immobilized and complaining of pain in his neck.

On examination, he had generalized tenderness over his cervical spine in the midline but no evidence of altered neurology in his limbs. Plain X-rays of his cervical spine revealed a bony defect in the posterior arch of atlas (Fig. 1). This was initially interpreted as a fracture. There was also no increase in the width of the prevertebral soft tissue shadow opposite C1/2. A computed tomography scan of the C1/C2 region was therefore obtained to delineate the pathology further. This confirmed the presence of a defect in the lateral masses of the posterior arch of C1 with rounded sclerotic margins (Fig. 2). This was consistent with a congenital anomaly. Defects in the posterior elements (spinous process) of C6 and C7 were also detected (Fig. 3a–c). These were concluded to be fractures as the margins were not smooth in an acute trauma setting.

A repeat flexion CT scan 1 week later did not reveal any instability or any neurological effects. A Miami J collar was applied following which the patient was mobilised. He remains well at follow up.

Discussion

The usual reported incidence of posterior arch defects of C1 is 3%. They are mostly incidental findings as in this case and the clinical significance is not very clear. Normally three ossification centres for the atlas appear during the embryonic period. The two centres for the lateral masses normally unite posteriorly by perichondral growth, giving rise to the posterior arch at 3–5 years of age. The anterior centre for the anterior tubercle and
anterior arch usually unites with the two lateral centres at 5—9 years of age.

An anatomical classification of the defects of the posterior atlas was proposed by Currrarino et al.\(^1\) and modified by Von Torklus and Gehle\(^7\):

**Type A**: Failure of the posterior midline fusion of the two hemiarches.

**Type B**: Unilateral cleft.

**Type C**: Bilateral clefs.

**Type D**: Total absence of the posterior arch with a persistent posterior tubercle.

**Type E**: Total absence of the posterior arch with missing posterior tubercle.

According to this classification, the present patient has a type C abnormality.

Congenital anomalies of the remaining cervical vertebrae are much rarer. The reported cases include division of the transverse process foramina

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**Figure 1** Plain X-ray cervical spine lateral view showing defect in posterior arch C1.

**Figure 2** CT scan: congenital defects in lateral masses of atlas.
or their incomplete closure and bifid spinous process. In our case the presence of posterior defects in C6 and C7 were thought to be traumatic of origin by their CT appearances. After finding no instability at the flexion/extension CT scans the patient was treated conservatively.

Conclusion

It is essential to be aware of congenital deficiency of the posterior arch of the atlas as it may lead to false diagnosis, especially in trauma victims. It is additionally, equally important that fractures do occur in other areas of cervical spine in the presence of congenital C1 vertebra. When treating trauma victims it is important to have a high index of suspicion for these conditions. CT scan is very helpful in delineating fracture from congenital anomalies and also for determining instability.

References