

# Complete Aplasia of the Posterior Arch of the Atlas with Bifid C7 Spinous Process: A Case Report

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## Abstract

We report a unique case of complete aplasia of the posterior arch of the atlas with concomitant bifid spinous process of C7 vertebra. This type of defect is very rare, usually an incidental finding following trauma. This case report highlights the importance for clinicians to be aware of such anatomical variants, as they can be associated with vertebral instability and cord compression, possibly requiring intervention.

## INTRODUCTION

We report a case of complete aplasia of the posterior arch of the atlas associated with bifid spinous process of C7 vertebra seen in our department. This particular finding is very rare in medical practice, and its clinical and radiological variations should be known to health professionals who may come across this scenario.

## CASE REPORT

A 46-year-old male presented to the A&E Department following a Road-Traffic Accident. The patient sustained his injuries whilst in the passenger seat of a car travelling at 60mph. Multiple laceration wounds were noted in his abdomen, torso, left hand and knee. No focal neurology was found. Unremarkable past medical history elicited.

Standard radiographs of pelvis, chest and abdomen revealed no injury. However, the cervical radiograph showed an increased gap posterior to the C1-C2 vertebral level (Figure 1). A subsequent Computerised Tomography (CT) of the cervical spine confirmed the absence of the posterior arch of the atlas (Figure 2). In addition, a further incidental finding was the presence of a bifid spinous process of C7 vertebra (Figure 3). The patient was treated satisfactorily for his superficial body injuries.

## Figure 1

Figure 1: Complete aplasia of the posterior arch of the atlas



**Figure 2**

Figure 2: CT-Scan showing complete aplasia posterior arch of the Atlas



**Figure 3**

Figure 3: CT-Scan showing bifid spinous process of the C7 vertebra



## DISCUSSION

Posterior aplasia of the atlas is a rare congenital abnormality<sup>12</sup>, often reported in association with genetic syndromes<sup>3,4</sup>, but never with a concomitant bifid spinous process of other cervical vertebrae. It is generally an incidental finding following cervical imaging<sup>2</sup>. However, when associated with traumatic injuries it can manifest with neurological deficits due to cord or nerve root compression<sup>5</sup>, and surgical intervention may be needed urgently<sup>26</sup>. This is particularly true if in association with posterior arch remnant or loose bony fragment<sup>267</sup> (Type D defects).

The most commonly used classification for congenital abnormalities of posterior arch of the atlas is from Curriano et al., (Table 1). Type A defects are the most common, accounting for 90% of cases with a population prevalence of 4%, whereas the other types have a population prevalence of 0.69%<sup>8</sup>. Our case was found to have the rarely reported Type E defect<sup>9,10</sup> with an additional finding of a bifid spinous process of the C7 vertebra – a unique combination. The literature suggests assessment of C1 instability by extension cervical radiograph and CT scan<sup>8</sup>, especially if a posterior arch loose fragment or focal neurology is present<sup>267</sup>. However, considering that many of these anomalies are asymptomatic, further investigations should be contextualised in each clinical scenario.

Table 1: Curriano et al.<sup>3</sup> classification of posterior arch aplasia of atlas

## CONCLUSION

Complete aplasia of the posterior arch of the atlas is an extremely rare and generally benign congenital anomaly. Further investigations should be warranted only if neurological deficit is present, or when initial imaging suggests overall instability (e.g. loose fragment of posterior arch). The current classification provides a good anatomical description, but not a direct correlation with clinical findings and potential vertebral instability.

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