

MULTIPLE CERVICAL VERTEBRAL FUSION WITH OSSIFICATION OF ANTERIOR LONGITUDINAL LIGAMENT

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ABSTRACT

Fusion of vertebrae may be congenital or acquired. It may be a complete fusion of bodies or neural arches. It is difficult to conclude whether the fusion is developmental or post inflammatory. Ossification of paravertebral ligaments is associated with Forestier disease and Ankylosing Spondylitis. This case report is about a specimen of fused cervical vertebral mass of C2 to C6 with ossification of the anterior longitudinal ligament. Fusions of all zygapophyseal joints were observed. The CT image of the specimen confirmed the ossification of the anterior longitudinal ligament with mild calcification of intervertebral discs. With the above features and bony ankylosis of articular facets, it was concluded that this fusion might be due to ankylosing spondylitis.

Key Word: cervical vertebra; ossification; ligaments; intervertebral disc; ankylosis

INTRODUCTION

Fused vertebrae are called as 'block vertebra'. The most common fusion is between the second and third cervical vertebrae (Razmi and Khong, 2001). A fusion of the vertebrae may be congenital or acquired. Fusion of neural arches has been always a developmental anomaly. Non-segmentation of the somites at cervical region between the 3rd and 8th week of

gestation results in a congenital cervical fusion. Fusion may be complete or incomplete involving the body of the vertebra or neural arches alone. Complete vertebral fusion may be of no clinical significance but frequently disc degeneration develops above or below the fused vertebrae due to altered mechanics in the spine (Renton, 2009).

CASE REPORT

During visual inspection of the vertebral collection housed in the Department of Anatomy, Meenakshi Medical College and Research Institute, a single specimen of fused C2 to C6 cervical vertebrae was observed. Total length of the vertebra was measured by using a digital vernier caliper. The specimen was thoroughly observed for the fusion of various parts of the vertebrae. To study the state of the ligaments and the intervertebral discs and to arrive at a

probable diagnosis, the specimen was subjected to CT scan.

Bodies of C2 to C6 vertebrae were fused into a single mass of length 114 mm. Foramina transversaria with intertubercular lamellae and intervertebral foramina were well seen and normal. The articular processes were fused in all the vertebrae. Lamina of C2 was fused with the lamina of C3 in the middle, with a narrow space on either side of the fusion. Lamina of C5 was completely fused with the lamina of C6 on

the left side. The spine of C2 was fused with C3 spine at its root. Spine of C4 was fused with the spine of C3 and spine of C5. The spine of C5 was fused with C6 spine at its root. C6 vertebra had a prominent non-bifid spine and resembled vertebra prominens (Figure 1). Ossification of the anterior longitudinal ligament (Figure 2), ligamentum flavum, interspinous ligament and ligamentum nuchae was noticed at

different levels. Fusion of zygapophyseal joints was noticed at all levels.

The CT image of the specimen showed mild calcification of intervertebral disc at all levels, ossification of interspinous ligaments between C2-C3 and C4-C5, diffuse ossification of the anterior longitudinal ligament and bilateral bony ankylosis of facet joints at all levels (Figure 3).

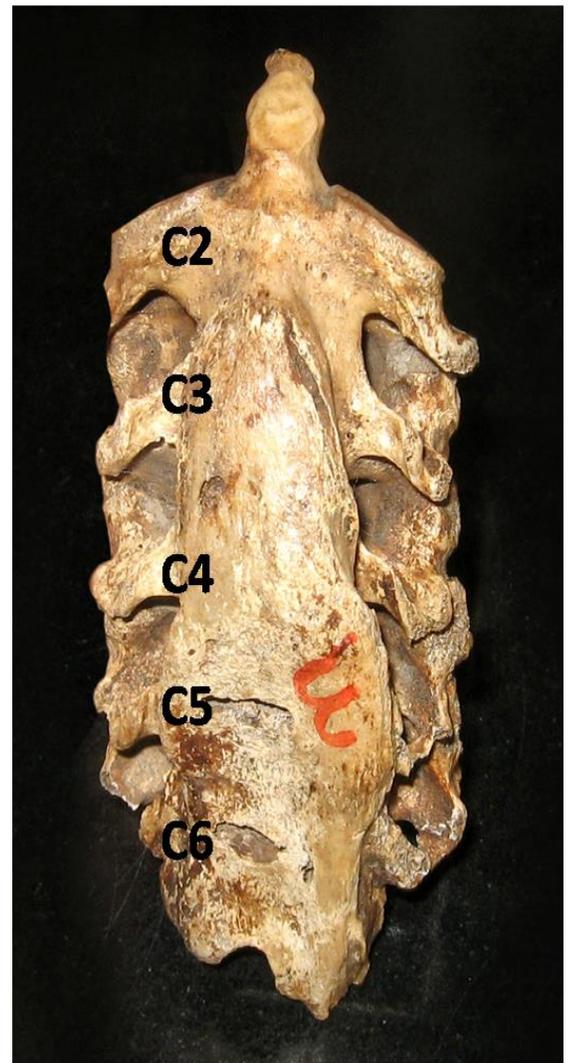
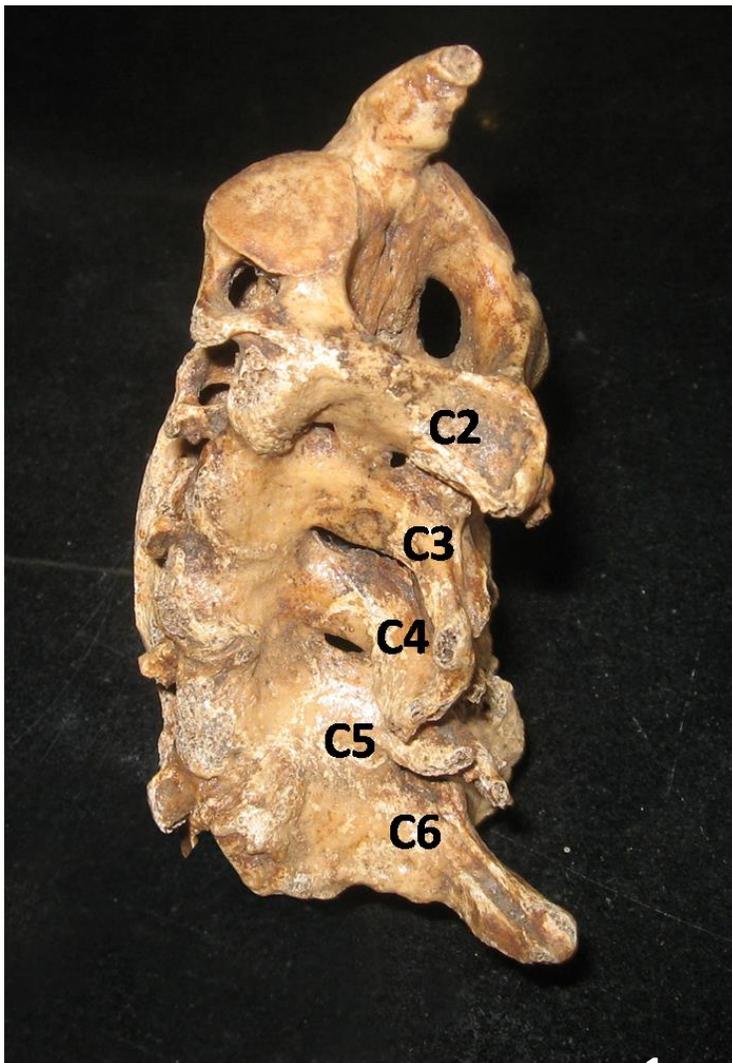


Figure 1: Left Dorsolateral view of the cervical vertebrae (C2 – C6) showing fusion of the laminae, spinous and articular processes. **Figure 2:** Ventral aspect of the cervical vertebrae (C2 – C6) showing fusion of the bodies and ossification of the anterior longitudinal ligament.



Figure 3: Arrow showing the ossification of the anterior longitudinal ligament in CT image of the vertebrae.

DISCUSSION

Para vertebral ligaments undergo degeneration secondary to attrition which may result in their ossification. This is termed as spinal enthesopathy. The most common syndrome associated with this phenomenon is Forestier disease, which is also called as diffuse idiopathic skeletal hyperostosis (DISH) and Ankylosing Spondylitis (AS) (Ehara et al., 1998). The etiology of DISH is uncertain. Diabetes mellitus, dyslipidemia and hyperuricemia have been implicated. Calcification and ossification along the anterolateral aspect of at least four contiguous vertebral bodies fall as a criteria to diagnose DISH. DISH may be associated with ossification of posterior

longitudinal ligament (OPLL) or anterior longitudinal ligament (OALL). The zygapophyseal and sacroiliac joints are not involved in DISH.

Ankylosing spondylitis (AS) is a chronic systemic inflammatory rheumatic disease, primarily affecting the axial skeleton of which sacroilitis is the hallmark. Chronic spinal inflammation (spondylitis) leads to fusion of vertebra, a process called ankylosis. Ankylosis leads to loss of mobility of the spine. The disease pathogenesis is immune mediated as evident by raising IgA and close relationship with HLAB27. Radiologically intervertebral fusion is termed as "bamboo spine" (Ghosh and Kole, 2004).

Radiological studies classify OALL into three types namely the segmental type, continuous type and mixed type. In segmental type, there is total or partial ossification over vertebral body. Disc space is not involved in segmental type. Involvement of many disc spaces and vertebrae occurs in continuous type. The combination of these two types occurs in mixed type (Mizuno et al., 2005). In the present specimen, ossification is of continuous type.

Ossification of the anterior longitudinal ligament may produce dysphagia (Epstein and Hollingsworth, 1999). Ankylosis of facet joints lead to loss of spinal flexion,

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extension and rotation. At an early stage it presents with pain and stiffness of joints (Fox et al., 1993).

In conclusion, the present case, the specimen shows fusion of bodies of C2 to C6 vertebrae and OALL, which are features common to both DISH and AS. There is an absence of OPLL. Bony ankylosis of the facet joints rules out DISH and favors the diagnosis of AS. Hence it is concluded that the fusion of the present specimen could be due to AS. Since it is a single dry specimen, other confirmatory findings like the involvement of sacroiliac joints cannot be ascertained.