

Ossified Anterior Longitudinal Ligament in the Lumbar Region of the Vertebral Column

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Abstract

Background: Radiological investigation has classified the ossified anterior longitudinal ligament into 3 types: segmental, continuous, mixed. The associated common symptoms are the compression of the oesophagus and trachea. **Aim:** It is aimed to report the noticed ossified anterior longitudinal ligament in a bony specimen. **Material and Method:** During osteology class a bone specimen with ossified anterior longitudinal ligament was noticed. **Results:** Ossified anterior longitudinal ligament was observed in the lumbar region of the vertebral column may be between the 3rd and 4th lumbar vertebrae. In the present study, based on the projected upper and lower cut ends, it was opined, that the specimen belonged to the continuous type of the ossified anterior longitudinal ligament. **Conclusion:** The article even though reported the ossified anterior longitudinal ligament; in view of the specimen being bony, the associated clinical findings could not be surmised.

Keywords: Anterior longitudinal ligament; Ossified; Lumbar vertebrae.

Introduction

Anterior longitudinal ligament (ALL) is a wide strong fibrous band of tissue and it covers centrally the anterior aspect of the vertebral column. Its attachments are from the basilar part of the occipital bone to the front of the upper sacrum. From the anterior tubercle of the atlas, it ascends to blend with and form a central thickening in the anterior atlanto-axial and the anterior atlanto-occipital membranes. It is broader caudally, thicker & narrower in the thoracic than in the lumbar regions and is relatively thicker and narrower opposite the vertebral bodies than at the levels of the intervertebral symphyses. The longitudinal

fibres are strongly adherent to the intervertebral discs, hyaline cartilage end plates and margins of the adjacent vertebral bodies; but loosely attached at intermediate levels of the bodies, where the ligament fills their anterior concavities, thereby flattens the profile of the vertebral column. At these various levels, the ligamentous fibres blend with the subjacent periosteum, perichondrium & peripheral fibres of the annulus fibrosus of the intervertebral discs. It has several layers; the most superficial fibres are the longest and extend over 3 or 4 vertebrae; intermediate fibres between 2 or 3 and the deepest from one body to the next. It maintains the stability of the intervertebral joints and is the only intervertebral ligament that limits the extension of the vertebral column. ALL along with the posterior longitudinal ligament (PLL) hold the vertebrae firmly together but also permits a small amount of movement to take place between them.[1,2,3,4] Ossification in the ALL and PLL have been reported. Based on the radiological investigation, the ossified ALL is classified into 3 types:

- i) segmental
- ii) continuous

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iii) mixed.

Reports have also described the common symptoms such as compression of trachea and oesophagus because of the ossified ALL; radiological evaluation; surgical and medical management.[5]

Aim

It is aimed to report the noticed ossified anterior longitudinal ligament in a bony specimen.

Material and Method

During the regular demonstration classes in osteology on the vertebral column to the 1st MBBS students in the Department of Anatomy, International Medical School at Bangalore, the ossified ALL was noticed between 2 lumbar vertebrae (LV).

Results

The observed structure was a single piece with the ossified ALL between 2 LV. Subjectively, because of the rough and thick markings of the attachments of the muscles and the heaviness, it was determined that the piece could be that of an adult male and the

LV could be in the mid lumbar region of L3 and L4. The ossified ALL was continuous over the space for the intervertebral disc as well as between the LV and had broken edges at the upper and the lower ends of the piece. It was noted that the ossified ALL may be of the continuous type.

Discussion

The literature survey on the ossified ALL are mostly on the clinical and the radiological studies. The present study is an observation on the presence of the ossified ALL from the available bone piece as a study material from the lumbar region of the vertebral column. The features of the 3 types of the ossified ALL from its radiological appearance are:

- i) the segmental type may have partial or total ossification over a vertebral body without involving the space for the intervertebral disc.
- ii) the continuous type may have ossification covering over a number of intervertebral disc spaces
- iii) the mixed type may have the combinations of both the segmental and the continuous type; i.e. the ossified ALL may be segmentally present only on the anterior aspect of the vertebra and also may be continuously present over the anterior aspects of the bodies of the vertebrae including the spaces for the intervertebral disc.[5]

In the present study, the ossified ALL extended over the anterior aspects of the 2 lumbar vertebrae including the space for the intervertebral disc and the cut ends both at the upper and the lower ends also indicated that the sample belonged to the continuous type. Normal anatomical description states that:

- i) ALL is perforated by the foramina for arteries and veins passing to and from the vertebral bodies[6]
- ii) ALL forms a fascial plane with the prevertebral & endothoracic fasciae and



Figure 1: Ossified ALL

with the subperitoneal areolar tissue of the posterior abdominal wall.

Prevertebral fascia blends inferiorly with ALL of the upper thoracic vertebrae in the posterior mediastinum and the infection and other pathological processes may spread along the fascial plane.[2]

Ossified PLL associated with radiculomyopathy is reported; but ossified ALL has not been frequently described; since it is rarely symptomatic.[5] The reported associated features with ossified ALL are:

- i) Forestier's disease (FD)[7]
- ii) Dysphagia[8]
- iii) Dysphagia with diffuse idiopathic skeletal hyperostosis (Kobayashi *et al* 1999, cited[5])
- iv) Radiculomyelopathy due to the associated stenosis of the cervical spine.[5]

Of course, in the present study, any information pertaining to the associated aspects was not available. Resnick *et al*, 1975 cited[5] coined the term diffuse idiopathic skeletal hyperostosis for FD and the ossified spinal ligaments was considered as part of the FD.[9] The diffuse idiopathic skeletal hyperostosis was defined as showing ossification or calcification along the anterior to anterolateral aspect of 4 contiguous vertebral bodies with relative preservation of the height of the intervertebral disc in the affected area; which distinguishes it from the degenerative discogenic disease. In the present study, the upper and the lower cut ends of the ossified ALL suggest that the sample may be included under the category of the diffuse idiopathic skeletal hyperostosis. Articles in literature also describe the surgical and the medical management for the ossified ALL.

Conclusion

With the above background, a short note

on the observed ossified ALL in the lumbar region of the vertebral column is reported.

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