



ANTERIOR LONGITUDINAL LIGAMENT OSSIFICATION/CALCIFICATION IN LUMBAR REGION – A CASE REPORT

T. Ramesh Rao and Suresh R. Rao*

Department of Preclinical Sciences, Faculty of Medical Sciences, The University of The West Indies, St. Augustine
Trinidad & Tobago.

*** Corresponding Author: Dr. Suresh R. Rao**

Department of Preclinical Sciences, Faculty of Medical Sciences, The University of The West Indies, St. Augustine Trinidad & Tobago.

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ABSTRACT

Anterior longitudinal ligament ossification or calcification is normally asymptomatic and has not been widely disseminated. Any ossification or calcification of the spinal ligaments have been considered as a part of diffuse idiopathic skeletal hyperostosis, previously known as Forestier's disease. Ossification of the anterior longitudinal ligament rarely leads to neurological complications. In this case report, we observed ossified anterior longitudinal ligament between 2 lumbar vertebrae. Therefore this case report would serve as ray of light for knowing the possible anatomical variations associated with the ossification of spinal ligaments, which will be important to the clinicians in correct diagnosis and treatment of patients suffering spinal problems.

KEYWORDS: ossification, vertebrae, anterior longitudinal ligament, posterior longitudinal ligament.

INTRODUCTION

The human spinal column provides main support to the body and also protects the spinal cord from the injury, it is made up of 33 vertebrae. The vertebrae are numbered based on the regions where it is placed like cervical vertebrae-7, thoracic vertebrae - 12, lumbar vertebrae 5, sacral vertebrae- 5 (fused to form sacrum), and 4 – coccygeal vertebrae (fused to form coccyx). While vertebrae have unique regional features The vertebrae are held together by strong muscles, flexible tendons and ligaments like anterior and posterior longitudinal ligament and ligamentum flavum which provide stability to the vertebral column and allows limited movements of the spinal column.^[1]

The anterior and posterior longitudinal ligament is a long, thick ligament that traverses the entire length of the spinal column. These ligaments prevents excessive movement of flexion/extension of the vertebral column. Structurally these ligaments is made of dense, connective fibre that adjoins bones, cartilage and soft tissue. These

ligaments plays an important role in ensuring proper spine alignment and overall spine health. Yet, any of these structures affected by calcification, strain, injury, or disease can cause pain. In calcification of the these ligaments can lead to a noticeable loss of spinal column movements and can even lead to chronic pain as a result of deterioration of the these ligaments.^[2]

CASE REPORT

During routine visual inspection of the vertebral collection housed in our Anatomy unit, we found that the ossification of the anterior longitudinal ligament between 2 lumbar vertebrae, which made the two lumbar vertebrae to get fused. We also observed a normal gap between the mass and the bodies of the vertebrae. The facet joints were found to be free. Intervertebral disc space, intervertebral foraminae and vertebral canal was maintained normal. Articular facets were completely fused and the spinous process were remained normal without any fusion. [Fig. 1].

Figure 1: Showing the ossification of anterior longitudinal ligament with fusion of the articular facets of the lumbar vertebrae

1. Ossified anterior longitudinal ligament
2. Fusion of articular facets
3. Spinous process



DISCUSSION

The anterior longitudinal ligament is one of the important ligaments in the spinal column that provides stability to the spine. The anterior longitudinal ligament runs along the front of each vertebral body and disc extending from the base of skull to the sacral promontory.^[1] Ossification of the anterior longitudinal ligament is usually found in diffuse idiopathic skeletal hyperostosis (Forestier's disease), a rheumatological abnormality which mainly occurs in the spinal ligaments. According to the radiological studies ossification of anterior ligament is classified 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. In the present case, ossification is of segmental type.

The body of a vertebra develops from the cells of the sclerotome, a derivative of the notochord.

Two ossification centres, one for the ventral and the other for the dorsal half of the body, appear by the 9th gestational week. Ossification of these centres is complete by the 12th week. These centres soon fuse to form a single large centre which later divides the body of the future vertebra into two thick plates where endochondral ossification occurs. The portions of the notochord incorporated within the body undergo atrophy and disappear. Those which lie within the intervertebral discs enlarge and persist as the nuclei pulposus. Any deviation in the normal development of the body of a vertebra leads to many congenital anomalies.

Congenital fusion of vertebrae commonly occurs in the cervical vertebral bodies, it is found less frequently in the

thoracic vertebrae and very rarely it involves in the lumbar vertebrae.^[3,4] Review of literature suggest that the thoracic vertebral fusion is often seen associated with ossification of anterior longitudinal ligament in clinical conditions like diffuse idiopathic skeletal hyperostosis, ankylosing spondylitis, osteochondritis, etc. The congenital vertebral synostosis is due to partial or complete deviation in the normal development of the vertebrae at the time of organogenesis, which manifest into various spinal deformities. Whereas the acquired fusion of vertebrae is usually secondary to diseases like Juvenile rheumatoid arthritis, tuberculosis, other infections or trauma. The block vertebrae may cause restricted movements, premature degenerative changes and associated neurological deficits.

The ossification of the anterior longitudinal ligament predominantly affects the older men and most of the time it remains asymptomatic; however, review of literatures shows that dyspnea, dysphagia, spinal cord compression, and peripheral nerve entrapment associated with ossification of anterior longitudinal ligament. Inflammatory changes and accompany fibrosis in the wall of the esophagus or from esophageal denervation may results in dysphagia. Evaluation of dysphagia even in the presence of Forestier's disease must rule out occult malignancy. Dysphagia in the setting of Forestier's disease is an under recognized entity amenable to surgical intervention.^[5]

During the regular demonstration class we noticed the ossified anterior longitudinal ligament between 2 lumbar vertebrae. It maintains the stability of the intervertebral joints and is the only intervertebral ligament that limits the extension of the vertebral column. Anterior longitudinal ligament along with the posterior longitudinal ligament hold the vertebrae firmly together but also permits a small amount of movement to take

place between them. The diffuse idiopathic skeletal hyperostosis was defined as showing ossification or calcification in the anterior and anterolateral aspect of four vicinal vertebral bodies without affecting the height of the intervertebral disc in the affected area; which distinguishes it from the degenerative discogenic disease. As per our study, the upper and the lower cut ends of the ossified anterior longitudinal ligament suggest that the sample may be included under the category of the diffuse idiopathic skeletal hyperostosis, most common in the age group of 40 and more who are obese leading to mild to moderate restriction of joint movement, low back pain and stiffness. The fusion of the bodies of thoracic vertebrae due to ossification of anterior longitudinal ligament and it is a part of Diffuse Idiopathic Skeletal Hyperostosis which should be differentiated from ankylosing spondylitis as both have different etiology and treatment.^[6]

Although ossification of the posterior longitudinal ligament is associated with radiculomyelopathy, ossification of the anterior longitudinal ligament has not been widely described since it is rarely symptomatic. Many authors coined the term diffuse idiopathic skeletal hyperostosis for Forestier's disease and ossification of the spinal ligaments has been considered as a part of this entity. They defined diffuse idiopathic skeletal hyperostosis as showing calcification or ossification along the anterior to anterolateral aspect of four contiguous vertebral bodies with relative preservation of the height of the intervertebral disc in the affected areas, distinguishing it from degenerative discogenic disease. In the past dysphagia because of anterior longitudinal ligament has been confused with that caused by degenerative disc disease because of poor recognition of ossification of the spinal ligaments. The management of symptomatic anterior longitudinal ligament is still controversial. Although conservative treatment with anti-inflammatory medication may be effective, aspiration pneumonia has been described and there may be myelopathy due to coexisting spinal stenosis.^[7]

Ossification of the anterior longitudinal ligament typically affects males compared to females and over the age of 60 years and usually it is asymptomatic rarely showing neurological complications. The anterior longitudinal ligament over upper two lumbar vertebrae were fully ossified and may signifies either malignancy or metabolic disorders. So, the knowledge of this anatomic variation would be helpful for clinicians in early detection of different pathological conditions and in correct diagnosis and treatment of patients suffering from this clinical entity.^[8&9]

CONCLUSION

Ossification or calcification of the anterior longitudinal ligament results in significant loss of flexibility and can even lead to chronic back pain with the involvement of spinal nerve or the spinal cord when it becomes irritated

or constricted as a result of the deterioration. Early complete ossification of the anterior longitudinal ligament signifies either malignancy or metabolic disorders but usually occurs in male population after the age of 60 years. So, the knowledge of this anatomic variation would be helpful for orthopaedicians, radiologist and other clinicians for early detection and treatment of different spinal column related disorders.

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