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Ossification of Interspinous and Supraspinous Ligaments of the Adult 5th Lumbar Vertebra and Its Clinical Significance- A Case Report.

[1]Dr. S. Saritha, [2]M. Preevan Kumar, [3]Dr. G. Supriya
[1](professor of anatomy), [2](lecture), ([3]asst.professor of anatomy)

Abstract: *Human Axial Skeleton has drawn much interest for Medical researchers because of the Upright posture. The human vertebral column plays an important role in stability and weight transmission. It is adapted to protect the spinal cord. Congenital or acquired anomalies are common in the vertebral column. At the same time the vertebral column is the site for many orthopedic disorders which may be pathological or developmental, leading to instability, low back pain, kyphosis, scoliosis and Ankylosing spondylitis. During routine osteology classes, processed lumbar vertebrae were collected to explain to the students of I M.B.B.S. The author realized abnormal 5th lumbar vertebra. It had ossification of Interspinous and Supraspinous ligaments may be a feature of* ***Ankylosis Spondylitis.***

This condition has a genetic and clinical importance. The purpose of present study is to highlight the I M.B.B.S. students about abnormal vertebrae and their clinical applications. This abnormal 5th lumbar vertebra was studied in detail with regards to its general morphology aspects, genetic factors, external stimulus and clinical manifestations.

Key word: *Supraspinous and Interspinous ligaments (SS&IS), ossification, calcification, 5th lumbar vertebra, Ankylosing spondylitis (AS).*

I. Introduction

The vertebral column preforms the important function of weight bearing and transmission. Lumbar part of vertebral canal houses the **Cauda Equina.** Any pathological condition of the lumbar vertebrae may be developmental or acquired. Abnormalities in any of the features may be associated with neurological signs and symptoms. These may lead to compression of nerve roots. Clinically the patient may present with low back pain, discomfort and stiffness. The ligaments which hold the spinous processes together are the **Interspinous and Supraspinous ligaments. (SS, IS)**

The Supraspinous ligament (supraspinal ligament) is a strong fibrous cord, which connects together the apices of the spinous processes from 7th cervical to the sacrum. In the lumbar and thoracic region it is thicker and broader and here it blends with the neighboring fascia. Between the spinous processes it is continuous with Interspinous ligament. The Interspinous ligament is thin and membranous, interconnects the spinous processes, from the root to the apex of adjacent processes and they run from the lower edge of one spinous process to upper edge of the next. Sometimes both the ligaments are described together as **the Interspinous/Supraspinous ligament complex**. They weakly resist spinal separation and flexion otherwise these ligaments help to limit flexion of the spine. The Interspinous ligament is important for the stability of the spine. The Supraspinous ligament serves as a midline attachment for some important muscles. **At the points of attachment to the tips of the spinous processes fibrocartilage is developed in the ligaments leading to ossification or calcification of the ligaments.** It may be due to trauma or genetic or any other factors. We are presenting the details of one abnormal 5th lumbar vertebra with regards to its general morphology, genetic factors, external stimulus and clinical manifestations in this text.

II. Observations and results:

We are presenting the details of one abnormal 5th lumbar vertebra procured from the osteology lab. The 5th lumbar vertebra had ossification of both Supraspinous and Interspinous ligaments, a feature of **Ankylosing Spondylitis**. (Confirmed by the discussions with the orthopedic surgeon).

The abnormal 5th lumbar vertebra. Lower end of the spine on the anterior surface had small oval facet which must have articulated with 1st sacral spine. The specimen was photographed in different aspects.

Lateral view **Posterior view** **Superior view**

III. Discussion:

The ossification of the Supraspinous and Interspinous ligaments of 5th lumbar vertebra may lead to clinical signs and symptoms. These findings may result to a condition of Ankylosing spondylitis which may be due to any external stimulus or genetic predisposition. Ankylosing spondylitis (AS) is a chronic disease characterized by progressive inflammatory, stiffening of the joints. It has predilection for the joints of axial skeleton especially the joints of the sacroiliac and lumbar vertebrae. It causes ossification or calcification of all ligaments. It may involve thoracic and cervical vertebrae. In extreme cases it may involve hip, knee and manubrium- sternal joints and rarely temporo- mandibular joints. Joints involvement leads to permanent damage like stiff spine limiting all spinal movements with compression of spinal roots. It has been established that genetic and environmental factors play a role in pathogenesis of AS. Trolley Track sign is single central radio dense line on Frontal radiograph is related to ossification of SS and IS ligaments. (J.Rheumatol 1995)[1]
Interspinous & Supraspinous ligaments ossification of a lumbar vertebrae can lead to compression of the Cauda Equina.(Martin H.Weiss etal)[2] Ossification of a lumbar Interspinous and Supraspinous ligaments(lumbar Spondylitis) can cause compression of Cauda Equina leading to abnormal bowel and bladder control, sensation of numbness in perineum and weakness in the thighs.(Paul Teng MD etal)[3]

Epstein in 1960 reported lumbar spondylitis may be asymptomatic or can cause nerve root compression.[4] The exact etiology of ossification of the ligaments of lumbar vertebrae is not known. A strong association has been found that there is a genetic predisposition with Ankylosing spondylitis (AS). These patients have HLA-B27 positive in their laboratory findings. In certain races AS is related to Human Leucocyte Antigen (HLA) system which leads to ossification of all ligaments of vertebrae. HLA complex gene is located on short arm of chromosome 6. However HLA-B27 +ve individuals developing AS are very rare about 4%. [5, 6.]
Scapinella in1988 reported ossification of SS and IS ligaments in patients radiological. He concluded that it may be due to external stimulus, which is initially by proliferation of fibroblasts, then Chondroblasts and finally the osteoblasts cells. The osteogenesis occurs finally leading to ossification or calcification.[7]
Calcification and Ossification of vertebral ligaments a roentgen study was done by Albert Oppenheimer[8] He inferred that calcification and ossification of ligaments are a mode of healing ligaments when there is a sustained increase of tension due to tear of ligaments in trauma,

IV. Conclusion:

Simple radiograph and MR images may be helping in assessing normal or demonstrates the ossification of SS and IS ligaments. It is said that both genetic and environmental (trauma) factors play a role in the pathogenesis of Ankylosing spondylitis. In our specimen the ossification of SS and IS ligaments of 5th lumbar vertebra is a work of its own type and has been rarely reported in the literature. We as teachers in anatomy, in routine annual survey of the bone room in department of anatomy can find number of abnormal bones**.** The same we would like to emphasize the first M.B.B.S students about its importance and its clinical significance in their future experiences.

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