

Case Report

Congenital malformation of fifth lumbar vertebra: A case report

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ABSTRACT

Fifth lumbar vertebra is an atypical vertebra as it has widely separated inferior articular processes and thick transverse processes projecting out from the body and pedicles of the vertebra. On routine examination of osteology specimens we found a fifth lumbar vertebra in two separate parts. One part consisted of body, pedicles, transverse and superior articular processes. The other part consisted of lamina, spinous and inferior articular processes. Knowledge of this variation may be of importance to the clinicians for diagnosis of certain neurological deficits in the lower limb and to orthopaedic surgeons and neurosurgeons during the surgical intervention of that area.

Keywords: Congenital malformation, Fifth lumbar vertebra, Sclerotome, Somites, Vertebral column

INTRODUCTION

The lumbar vertebrae are the largest segments of the movable part of the vertebral column and can be distinguished from the cervical vertebrae by the absence of a foramen in their transverse processes and from the thoracic vertebrae by the absence of facets on the sides of their body. They have massive, kidney shaped body for bearing the body weight, backward directed pedicles, strong and thick laminae enclosing triangular vertebral foramen and long transverse processes. Their superior and inferior articular processes face medially and laterally respectively. Fifth lumbar vertebra has a large body, broad laminae, small spinous process, thick transverse processes projecting out from the body and the pedicle and widely separated inferior articular processes.¹ Accidentally, one fifth lumbar vertebra was encountered which was present in two completely separated parts. Clinical implications of this anomaly have been discussed at length in the discussion.

CASE REPORT

During routine examination of the bones of our bone bank we found a fifth lumbar vertebra in two separate parts. One part consisted of body, pedicles, transverse and superior articular processes. The other part was formed of lamina, spinous and inferior articular processes (Figure 2, 3). Apart from this anomaly, there were no other abnormalities seen in this vertebra.

DISCUSSION

There are forty two to forty four pairs of somites that develop from para-axial mesoderm by the end of the fifth week of development and will eventually help in forming the bones of the head, vertebrae and other bony structures of the thorax. The somites give rise to sclerotome. The sclerotome surrounds the notochord and neural tube. At each level of the vertebral column, it separates into a cranial area of loosely packed cells and a caudal area of densely packed cells. The cranial area of one sclerotome fuses with the caudal area of adjacent sclerotome.² Thus,

according to O’Rahilly one complete vertebra requires two somites to interact properly with each other in order to develop normally. The spinal nerve at all levels is associated with the caudal area of the sclerotome.³ After fusion, the spinal nerves remain between them.⁴



Figure 1: Completely ossified fifth lumbar vertebra showing massive kidney shaped body, transverse processes projecting out from the body and the pedicle, superior and inferior articular processes directed medially and laterally respectively and a spinous process directed backwards. The inferior articular processes are separated by a wide gap. A triangular vertebral canal enclosed between the body and the lamina of the vertebra.



Figure 2: Showing fifth lumbar vertebra present in two separate parts. One part consisting of body, pedicles, transverse and superior articular processes. The other part being formed of lamina, spinous and inferior articular processes.



Figure 3: Showing that fifth lumbar vertebra ossified in two parts. Body, transverse and superior articular processes form one part. Lamina, spinous and inferior articular processes forming the other part.

In the present study we found that the fifth lumbar vertebra had developed in two separate parts. Therefore, the fifth spinal nerve may get entrapped between these parts as they have not fused and remained mobile. This may lead to some neurological disturbances in the area supplied by fifth lumbar spinal nerve.

Each vertebra ossifies from three primary centers, one for the body and one for each half of the vertebral arch. At birth the vertebra consists of three pieces, the body and two halves of vertebral arches. During the first year, the two halves of each arch unite behind. This takes place initially in the lumbar region and then extends upwards through the thoracic and cervical regions of the vertebral column. By sixteenth year, five secondary centers appear. One for the tip of each transverse process, one for the terminal end of the spinous process and one each for the superior and inferior surfaces of the body. They fuse with the rest of the bone by twenty-fifth year of age.⁵

Occasionally, the fifth lumbar vertebra, and very rarely some of the other vertebrae develop from two centers for the arch on each side. One for the root, transverse process, and superior articular process and the other for the lamina, inferior articular process and spine.⁶ In the current study, we encountered one fifth lumbar vertebra in two separate parts. One part consisted of body, pedicles, transverse and superior articular processes. The other part was formed of lamina, spinous and inferior articular processes. The present anomaly of fifth lumbar vertebra is in accordance with the anomaly mentioned by Charles (1899).⁶

The disc located between fourth and fifth lumbar vertebrae and that between the fifth lumbar and first sacral vertebra are amongst the most likely to get injured

as they perform the maximum work, also, the fifth lumbar vertebra can be a source of tremendous pain and discomfort.⁷ Accordingly, as the fifth lumbar vertebra in the current study is present in two parts, not only it may make the intervertebral disc present between fourth and fifth lumbar vertebrae and between the fifth lumbar and first sacral vertebrae all the more prone to injury but also it may be a culprit in generating a lot of pain and discomfort in the lower back.

Knowledge of this kind of variation may be helpful to the radiologists in correctly interpreting the radiographs of lumbar region, orthopaedicians in diagnosis of low backache, physicians in diagnosing the cause of neurological deficit in the lower limb. Awareness of such variation may also help orthopaedic and neurosurgeons in order to correctly approach the regional area.

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