

Supernumerary 6th Lumbar Vertebra and its relation with the Lumbosacral Nerves and Plexus: a Self-report



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Abstract

Background: Occurrence of supernumerary lumbar vertebra is a rare condition and can lead to clinical repercussions in orthopedics, neurology, neurosurgery and anesthesiology.

Objective: To describe the relation between the 6th lumbar vertebra and the lumbosacral nerves and plexus origins.

Case report: A 55-year-old Caucasian female was diagnosed with clinical and electromyographic findings of sacral S1 radiculopathy. Her imaging studies showed a supernumerary L6 vertebra and L6-S1 intervertebral disc degeneration.

Discussion: Correlation between this specific anomaly and related electromyographical findings was discussed. The study suggests that the patient has a postfixed lumbar plexus that probably begins under the L2 vertebra and finishes under the L6 vertebra. It also reveals that the S1 nerve root probably leaves the backbone from its usual anatomic position, namely, under the S1 vertebra.

Conclusion: This uncommon backbone anatomic anomaly contributed to understanding of the lumbosacral nerves and plexus origins which have clinic relevance for several medical specialties. As far as we know this has never been described before.

Keywords: Supernumerary; Lumbar; Vertebra; Lumbosacral plexus

Abbreviations: L5: 5th lumbar vertebra; L6: 6th lumbar vertebra; S1: 1st sacral vertebra; EMG: Electromyographic; CT: Computed tomography

Introduction

The lumbar plexus usually goes from the L1 nerve root emerging from the spinal cord under L1 vertebra to the L5 nerve root exiting under L5 vertebra. Similarly, the sacral plexus usually begins when the S1 nerve leaves the vertebral canal under the S1 vertebra going until S5. Considering communications between both these plexuses they are currently described together as the lumbosacral plexus.

Supernumerary lumbar vertebra is an uncommon finding; there are few papers describing this issue [1-4]. It has been reported in 5.5% of 293 asymptomatic Chinese volunteers [1], in 4% of 591 analyzed African skeletons [2], and in 0.8% of 969 corpses studied in the USA [3]. It is well known that a supernumerary lumbar vertebra can lead to obstetric disadvantages due to pelvic circumference changes [4], but its

clinical significance in orthopedics, neurology and neurosurgery remains uncertain. No correlations between the occurrence of a 6th lumbar vertebra and the lumbosacral nerves and plexus roots have so far been described. Hence, the following questions can be raised in a patient with a 6th lumbar vertebra: Does the lumbar plexus begin under the L1 or L2 vertebra? Does it finish under the L5 or L6 vertebra? Does the sacral plexus begin under the L6 or S1 vertebra? Or in summary, the anatomical question in a patient showing anomaly is where are the L5 and S1 nerve roots situated? This case-study intends to respond to this intriguing question.

Objective

To describe a possible relation between the 6th lumbar vertebra and the lumbosacral nerves and plexus origins.

Case Report

Ten years ago, a 55-year-old Caucasian female, the first author of this paper, underwent clinical and laboratory evaluation due to a slight bilateral calf and plantar paresthesia plus other neurological findings suggestive of bilateral S1 radiculopathy. Sensory and motor conduction studies on the distal branches of both sciatic nerves were normal. Electromyographic (EMG) examination of the soleus muscles showed bilateral positive sharp waves at rest, and neurogenic motor unit potentials at minimum effort. Maximum effort showed near-complete interference

pattern. EMG diagnosis was consistent with slight bilateral S1 radiculopathy. Since then, she has experienced sporadic low-back pain episodes and calf cramps, both symptoms compatible with the previous diagnosis.

In 2017, after a traumatic multiple bone fractures in the left lower limb, the patient was submitted to lumbar and sacral spinal column X-rays and computed tomography (CT) studies, which revealed no local fractures but an abnormal supernumerary 6th lumbar vertebra (Figures 1A, 1B, 2A & 2B) plus a slight degree of L6-S1 intervertebral disc degeneration (Figures 1B & 1C).

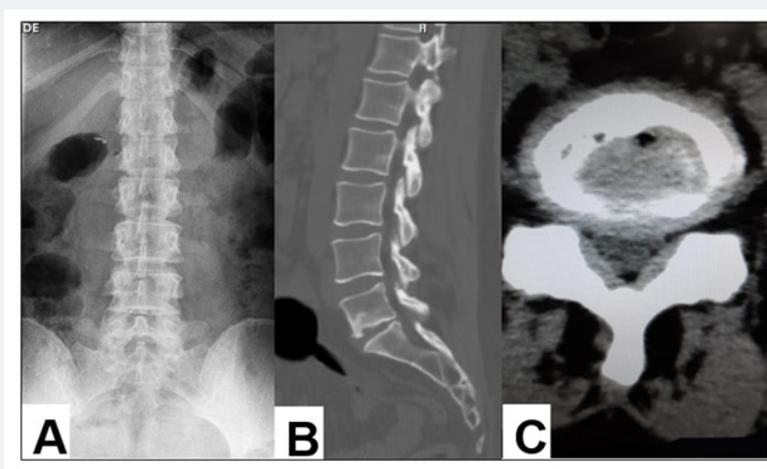


Figure 1: X-rays showing a supernumerary L6 vertebra (A) and CT scan showing slight degree of L6–S1 intervertebral disc degeneration (B and C).

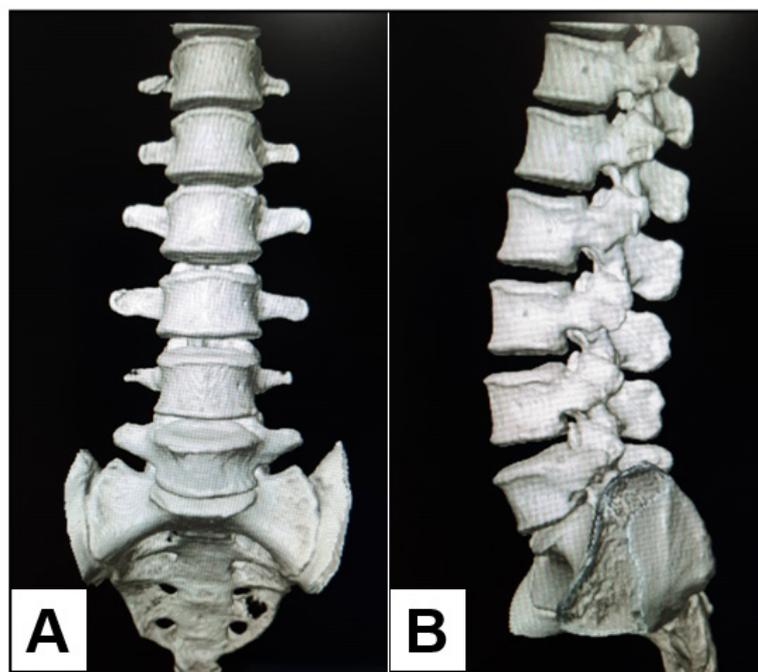


Figure 2: 3D reconstruction of CT scan showing 6th lumbar vertebra (A and B) and a clear reduction of the L6–S1 interspace (B).

Discussion

In EMG laboratories, it is generally accepted that the soleus muscle is innervated by the S1 nerve root [5]. Besides, published papers confirm that calf plus plantar paresthesia is related to the S1 dermatome [6]. In this patient, the sensory symptoms related to the S1 dermatome, the normal conduction studies on the distal branches of the sciatic nerves, and the abnormal neurogenic EMG findings obtained from the bilateral soleus muscles, all together this, led to the clinical and EMG diagnosis of bilateral S1 nerve root impairment, in accordance with literature. The slight degree of L6-S1 intervertebral disc degeneration is also consistent with the clinical and EMG findings of S1 bilateral radiculopathy, meaning a local compression of the S1 roots on their way down in the cauda equina.

The clinical, laboratory and imaging studies of this patient suggest a post fixed lumbar plexus that probably begins under her L2 and finishes under her L6 vertebra. Additionally, the findings reveal that her S1 nerve root probably leaves the backbone from its usual anatomic position, namely, under the S1 vertebra. An anatomical study of 33 cadavers carried out by Matejčík et al. [7] did not find cases of isolated post fixed lumbosacral plexus [7]. Besides being important for orthopedists, neurologists and neurosurgeons, this anatomical anomaly may also be relevant for anesthetists, as the spinal cord cone could end at L2 or L3 levels, lower than the usual L1 vertebra. Thus, lumbar puncture for spinal anesthesia could be harmful if the needle reaches the spinal cord. As far as we know this case report is the first description of post fixed lumbar plexus.

Conclusion

We describe a patient with a 6th lumbar vertebra with a probable post fixed lumbar plexus beginning under the L2

vertebra and finishing under the L6. This anatomical anomaly is important for different medical specialties, including orthopedics, neurology, neurosurgery and anesthesiology.

Conflicts of Interest

The authors report no conflicts of interest.

Ethics approval

This study was approved by the Human Research Ethics Committee of Botucatu Medical School.

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