Computed Tomography in the Evaluation of a Congenital Absent Lumbar Pedicle

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Abstract. A case of congenital absence of a lumbar pedicle is described and the value of computed tomography (CT) examination is discussed. A comparison with formerly described cases is made.

Key words: Lumbar spine – Congenital abnormalities – Pedicle aplasia – CT scanning

Congenital lumbar pedicle aplasia is a rare disorder that should not be mistaken for a neoplastic or inflammatory lesion. Computed tomography (CT) is valuable in the differential diagnosis and provides definite diagnosis without the need for more expensive and aggressive examinations. At the present time no report has been made of the use of CT in the diagnosis of this condition.

Case Report

A 59-year-old white male complained of severe recurrent low back pain and right paralumbar soft tissue swelling. He has worked in a steel factory all his life but has limited himself in the last 10 years to administrative work, after suffering from a stroke from which he recovered completely. The recent radiographs show an absent left L4 pedicle which was already manifest on previous X-rays and has not evolved since.

To rule out an acquired lesion, such as malignancy or inflammation, AP tomograms, isotopic bone scintigraphy, and CT scanning were performed. These examinations support the diagnosis of a congenitally absent lumbar pedicle. The soft tissue swelling was considered to be an associated muscle spasm. The patient was referred to the department of orthopedics of our hospital and is feeling well after symptomatic treatment.

Radiographic Findings

Plain lumbar spine films show scoliosis and severe spondylarthrosis at L2–L3 levels with disc space narrowing, reactive sclerosis, and osteophytosis. At L4 an hypoplastic, anteriorly located transverse process and a tilt of the spinous process accompanies the aplasia of the pedicle. The adjacent apophyseal joints are distorted. The pedicle sclerosis on the right side is confirmed by isotopic bone scanning and adjacent disc spaces are normal (Fig. 1).

AP tomograms confirm the absence of the pedicle and the asymmetry of the apophyseal joints. L5 forms part of the posterior arch of L4. No signs of inflammation or neoplasia can be seen (Fig. 2). CT of the lumbar spine was performed on an Elscint 705 total body scanner. The apparatus is operated at 130 kV, 23 MA, and has a scan time of 20 s. A slice increment of 10 mm, slice thickness of 8 mm, and a circle diameter of 330 mm, in order to include the surrounding soft tissues, was used. The X-ray dose is about 3 rad.

Fig. 1. Slightly rotated AP view showing pedicle aplasia, heterolateral spinous process tilt. The small left transverse process is abnormally attached to the vertebral body.

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per slice. Later, magnification reconstructions were performed (Figs. 3 and 4). No soft tissue mass is seen, the erector spinae muscles are slightly hypertrophied on the right. The left pedicle and transverse process are hypodense with very little mineralisation. They show densities compatible with fibrous tissue. The transverse process seems to be completely detached from the rest of the vertebra. The spinal canal and intervertebrals foramina are slightly compromised. Arthrosis was found at higher levels.

Discussion

In a recent article, Stelling [3] reviewed the English literature about this rare disorder and found about 21 reported cases of lumbar pedicle aplasia. It is essential not to misinterpret this condition as a malignant or inflammatory lesion. In this paper a CT evaluation of this disorder is presented for the first time. The use of tomography, isotopic scintigraphy, and CT scanning are essential in the differential diagnosis. A survey of the developmental abnormalities of the pedicles include [4]: persistent neurocentral synchondrosis, cleft pedicle, hypoplasia of the pedicle, and complete or partial agenesis of the pedicle and neural arch. The etiology of this last disorder is not clear. The defect might be situated in either one of the three developmental stages of the vertebrae (membranous, cartilaginous, or osseous stage, the last being the least likely).

The literature reports a small male preponderance (61%), ages averaging between 9 and 66 years. The lesion is usually situated in the cervical or lumbar spine, especially L4 as in our case [3]. A curious predominance of left sided defects at L4–L5 was reported by Maldague and Malghem [1]: they were 2.4 times more frequent than right sided ones. In our case, the defect was also situated on the left. Less than 50% of the patients have low back pain and frequently the diagnosis is made accidentally. In our patient the initial symptom, leading to consultation,