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CASE REPORT

Spontaneous pediculolysis with associated contralateral laminar fracture. A case report

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The authors report the case of a 38 year-old female with a rare combination of spontaneous pediculolysis with an associated contralateral laminar fracture of the lumbar spine. Multimodal radiological examinations of the whole lumbar spine are recommended in the case of a symptomatic patient with low back pain who is not responding to basic physiotherapy and pain management modalities. This will provide the unsuspecting clinician a method to diagnose this rare cause of low back pain and avoid unnecessary surgical intervention.

Keywords : pediculolysis ; spondylolysis ; vertebral fracture ; pain.

INTRODUCTION

The term pediculolysis was first introduced by Gunzburg and Fraser to describe the hypertrophic non-union of a pedicle stress fracture (*11*). The pedicle is recognised as the second weakest part of the neural arch, after the pars interarticularis (*5,6,18*). Causes of pedicular stress fracture are well documented in the literature and include contralateral spondylolysis (*2,3,9,11,19*), posterolateral lumbar fusion (*18*), laminectomy (*22*) and surgery for idiopathic thoracolumbar scoliosis (*13*). This phenomenon is attributed to the abnormal distribution of forces / stress over the pedicle (*5,21*). The term pediculolysis has been used to distinguish a pedicular defect from a pars interarticularis defect which is defined as spondylolysis and generally occurs bilaterally (*7*). Although unilateral spondylolysis has been described in the literature, it is less common (*14,20*). The presence of a stress fracture of the contralateral lamina is a rare complication of spondylolysis (*15,16*).

We report the case of a 38 year-old woman with a spontaneous right-sided pedicular fracture with an associated contralateral laminar fracture. To the authors' knowledge there have been no previous reports of pediculolysis with an associated laminar fracture in the absence of spondylolysis.

CASE REPORT

A 38 year-old caucasian female, cabin crew instructor, developed a sudden onset of severe low back pain with associated bilateral sciatic pain after lifting a heavy box whilst flying. She had no asso-

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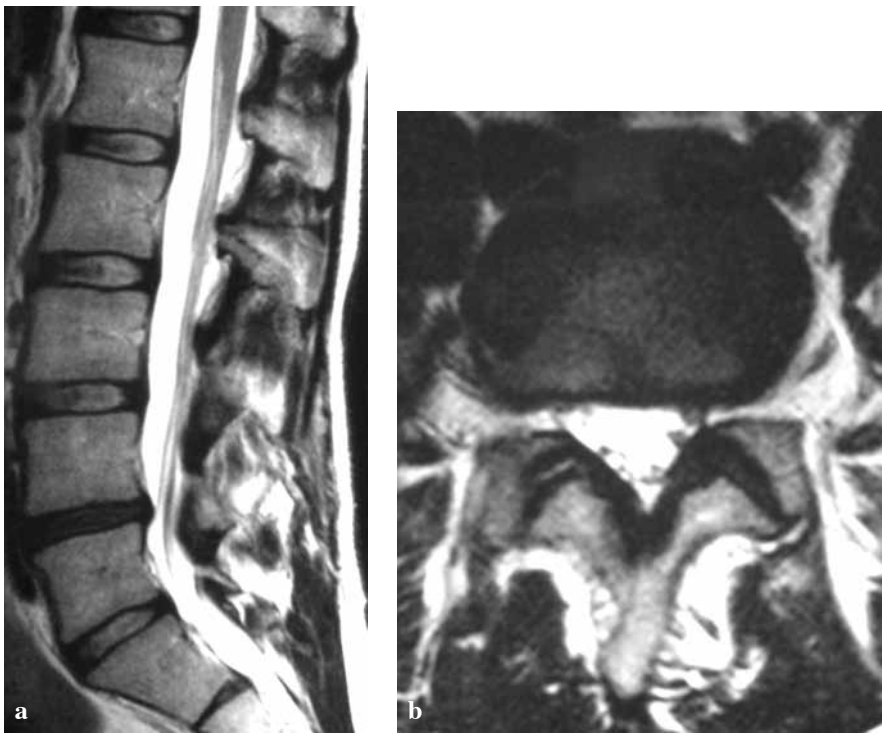

Fig. 1. — T2 weighted MRI of the spine showing modest disc degeneration at the L4/5 level with a central disc bulge without evidence of neural compression in (a) sagittal, (b) axial views.

ciated limb paraesthesia or numbness. Clinical examination revealed a mild thoracolumbar scoliosis, midline tenderness of the lumbar spine at L3/4 and L4/5 levels and mild bilateral buttock tenderness. Lumbar flexion was moderately restricted, lumbar extension also exacerbated the pain. The patient was able to straight leg raise 70° bilaterally with a weakly positive sciatic stretch test. No neurological abnormality of tone, sensation, reflexes or power was identified.

MRI of the lumbar-sacral spine showed modest disc degeneration at the L4/5 level with a central disc bulge without evidence of neural compression (Fig. 1 a, sagittal ; b, axial views).

Due to unsatisfactory results of conservative measures including oral analgesia and physiotherapy, four weeks later a CT scan of the lumbar spine was performed to exclude a bony skeletal abnormality. At this stage this showed only a slight loss of height at L4/5 disc space when compared with adjacent levels (Fig. 2).

Lumbar epidural injection (local anaesthetic and steroid) at L4/5 provided only limited analgesic relief. Our patient underwent further physiotherapy, an L4/5 facet joint injection and later a lumbar epidural injection, these provided no significant analgesic benefit.

The patient had a provocative discography due to excruciating low back pain which was performed approximately 20 weeks after the onset of her symptoms ; this was positive at the L4/5 but negative at the L3/4 and L5/S1 levels. Her pain was relieved by a local anaesthetic injection into the L4/5 disc. Further MRI spinal imaging 28 weeks after the initial MRI scan of the lumbar spine revealed a slight abnormality in the right pedicle of the L3 vertebra (Fig. 3). Further imaging performed within a couple of weeks of the second MRI included a radioisotope bone scan which showed some slight increase in uptake in this region (Fig. 4), along with further CT imaging of the lumbar spine which was also performed and now revealed a frac-

Fig. 2. — Sagittal CT scan of the spine showing a slight loss of height at the L4/5 disc space as compared with adjacent levels and without vertebral fracture.

Fig. 3. — Sagittal T2 weighted MRI scan of the lumbar spine, revealing an abnormal right pedicle of the L3 vertebra.

ture across the right pedicle of the L3 vertebra with an associated contralateral lamina fracture (Fig. 6). It was decided to manage these injuries conservatively with analgesia, bed rest for 8 weeks, venous thromboprophylaxis and subsequently regular physiotherapy**.** At the end of this period the patient still reported being in considerable pain and discomfort. She denied any history of trauma.

DISCUSSION

The term *pediculolysis* was first introduced by Gunzburg and Fraser in order to describe the hypertrophic non-union of a pedicle stress fracture (*11*). This term has been used to distinguish a pedicle defect from the pars interarticularis defect which is defined as spondylolysis and usually occurs bilaterally (*4,7,8,12,14,20*). The pedicular defect of the lumbar spine may be congenital, iatrogenic, result from a neoplastic infiltration or *de novo* having the appearance of a stress fracture (*1,2,9,11,12,24*). Reported causes of a pedicular stress fracture

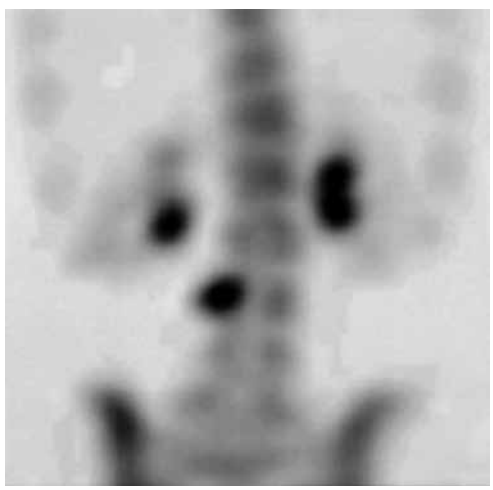

Fig. 4. — Bone scan showing increased uptake at the right pedicle of the L3 vertebra in coronal view.

Fig. 5. — AP radiograph of the lumbar spine showing a mild degree of scoliosis.

include contralateral spondylolysis (*2,3,9,10,11,19*), as a complication of posterolateral lumbar fusion (*18*), laminectomy (*22*) as well as surgery for idiopathic thoracolumbar scoliosis (*13*).

Stress fracture of the contralateral lamina has been reported but it is a rare complication of spondylolysis (*15,16*). O'Beirne and Horgan suggested, based on observations of Porter and Park (*17*), that in the presence of unilateral spondylolysis, the remainder of the neural arch is exposed to abnormal stresses which may cause a contralateral lamina stress fracture (*15*).

The pedicle is the second weakest part of the neural arch after the pars interarticularis (*5,6,18*). Pediculolysis is attributed to an abnormal distribution of forces/stress over the pedicle (*5,21*).

Although a fracture of the pedicle has been reported as a complication of spondylolysis (*9,11*), a spontaneous pedicular fracture with an associated contralateral laminar fracture in the absence of spondylolysis has not previously been reported to our knowledge.

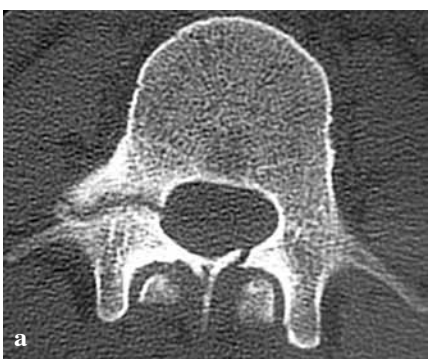

Fig. 6. — CT scan of the spine identifying a fracture across the right sided pedicle of the L3 vertebra and into the lamina of L3 on the left hand side in (a) axial and (b) sagittal views.

Our patient has had a long history of mild thoracolumbar scoliosis. In view of the absence of traumatic injury, a reasonable explanation of the pedicular stress fracture in our patient could be the increased and abnormal distribution of stress forces across the scoliotic part of the skeletal spine (Fig. 5). The onset of excruciating low back pain was likely exacerbated by the lamina fracture on the background of the existing pedicular fracture (Fig. 6). Such a combination of injuries is likely to have occurred, as a weakening in one portion of a ring often stresses another portion of the ring resulting in a stress reaction, manifested here as the second (lamina) fracture. This is supported by the presence of a large callus at the site of the pedicular fracture and the absence of a callus formation at the site of the laminar fracture. This finding strengthens our assumption that the two fractures occurred at least a few weeks apart (Fig. 6), and only became evident when repeat MR and CT imaging of the lumbar spine was performed.

A pedicle stress fracture should be considered in the differential diagnosis of focal abnormal scintigraphic activity in the spine. The bone scintigraphy and the complementary SPECT play a primary role in the diagnostic process of this entity. Computed tomography helps to provide additional information to delineate the precise diagnosis, it is also a valuable tool in the selection of a therapeutic modality as well as the determination of fracture healing during follow-up (*23*).

A unilateral pedicular fracture can lead to a laminar fracture on the contralateral side due to the abnormal distribution of forces in the neural (posterior) arch. Although pediculolysis is not known as a common cause of low back pain and is hardly ever seen in routine daily practice, it is important to emphasize its inclusion in the differential diagnosis of lower back pain, to help avoid misdiagnosis and prevent unwarranted surgical intervention.

Consent

Written informed consent was obtained from the patient for publication of this case report and any accompanying images.

Abbreviations

CT : Computed tomography, Fig. : Figure, L : Lumbar, MRI : Magnetic resonance imaging, SPECT : Single-photon emission computed tomography, MDT Multi-Disciplinary Team meeting.

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