

Incidental Idiopathic Bilateral Pedicle Fracture - Case Report and Literature Review

Kyongsong Kim,¹ Toyohiko Isu,² Daijiro Morimoto,³ Rinko Kokubo,¹ Naotaka Iwamoto,⁴ and Akio Morita³

In rare cases, pedicle fracture is associated with spine surgery, spondylolysis, or stress fracture. We report a patient without trauma whose bilateral lumbar pedicle fracture was detected incidentally. A 67-year-old woman reported leg numbness and pain. Lumbar MRI showed spinal canal stenosis at the L4/L5 level. Drug treatment was only partially effective. A lumbar computed tomography (CT) scan performed 3 months later revealed bilateral pedicle fracture at L4. A second lumbar MRI showed fresh bilateral L4 pedicle fracture that was not observed on the first scan. Due to the presence of osteoporosis we prescribed daily teriparatide and the wearing of a lumbo-sacral corset. Her subsequent clinical course was uneventful and the fractures fused under conservative treatment. During this period, she had no low back pain (LBP). Only 12 earlier patients with spontaneous bilateral pedicle fracture without trauma, spinal surgery, or bone abnormality have been reported. In 8 patients, including ours, the fracture level was at L4. In all except our patient, LBP was the most common symptom. Pedicle fracture as detected incidentally in our patient. Of the 13 patients, 4 were physically active adolescents; of the 9 others, 5 were women with osteoporosis. Our case is the first report of incidental spontaneous bilateral pedicle fracture.

Keywords: incidental, pedicle fracture, spontaneous, conservative therapy, without trauma

Introduction

In rare cases, pedicle fracture is associated with spine surgery, spondylolysis, or stress fracture; patients usually report low back pain (LBP). There are few reports on the characteristics and treatment of pedicle stress fractures. We report a rare patient who had not suffered trauma or LBP and whose idiopathic bilateral lumbar pedicle fracture was detected incidentally. We also present a literature review.

¹Department of Neurosurgery, Chiba Hokusyo Hospital, Nippon Medical School, Inzai, Chiba, Japan

²Department of Neurosurgery, Kushiro Rosai Hospital, Kushiro, Hokkaido, Japan

³Department of Neurosurgery, Nippon Medical School, Tokyo, Japan

⁴Department of Neurosurgery, Teikyo University, Tokyo, Japan

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Case Report

This 67-year-old woman had suffered no earlier trauma, accidents, or spinal surgery but had a 1-year history of leg numbness, leg pain, and intermittent claudication. She reported no motor weakness, bowel or bladder symptoms, or LBP. Lumbar magnetic resonance imaging (MRI) revealed lumbar spinal canal stenosis (LSS) at L4/L5 (Fig. 1). We attributed her symptoms to LSS and prescribed prostaglandin e1, non-steroidal anti-inflammatory drugs, and pregabalin. Because her symptoms persisted despite slight improvement, we performed lumbar computed tomography (CT) 3 months after the first MRI study for surgical planning (Fig. 2). Unexpectedly, it revealed bilateral pedicle fracture at L4. Dynamic radiography denied instability. A second lumbar MRI study (Fig. 1) demonstrated hypointensity at the L4 pedicle; it had not been recognized on the earlier MRI scan. There was no signal change in the other region, such as vertebral body, intervertebral disc, and facet joint. Our diagnosis was fresh bilateral pedicle fracture.

Upon careful inquiry she reported no LBP but stated experiencing a slight tic one month earlier when she twisted her body to remove baggage from a narrow space. There was no other pain then or subsequently. Her bone mineral density was 0.576 g/cm² at the proximal femur. We attributed her bilateral pedicle fracture to osteoporosis and prescribed daily teriparatide and the wearing of a lumbo-sacral corset.

Her subsequent clinical course was uneventful, her leg symptoms gradually improved, and the fractures fused spontaneously under conservative treatment (Fig. 2).

Discussion

Spontaneous bilateral pedicle fracture of the lumbar spine without trauma is rare. Its etiology is unknown but may be related to stress fracture. Cadaver studies revealed that the pars interarticularis is most prone to stress fracture in the vertebral bone and that the pedicle is the second-weakest vertebral area.¹⁾ Spontaneous lumbar pedicle fracture occurs less often in the neural arch than spondylolysis; it can be associated with spinal surgery because, especially after spinal fusion, the pedicle may be subjected to increased forces.²⁾

Only 12 patients with spontaneous bilateral pedicle fracture without previous trauma, spinal surgery, or bone abnormality have been reported (Table 1).³⁻¹⁴⁾ The fracture level was at L4 in 8 patients, including ours. Spontaneous bilateral pedicle fracture differs from spondylolysis; stress fracture at the pars interarticularis is seen most often at L5.¹⁾ The average age of the patients reported by others was

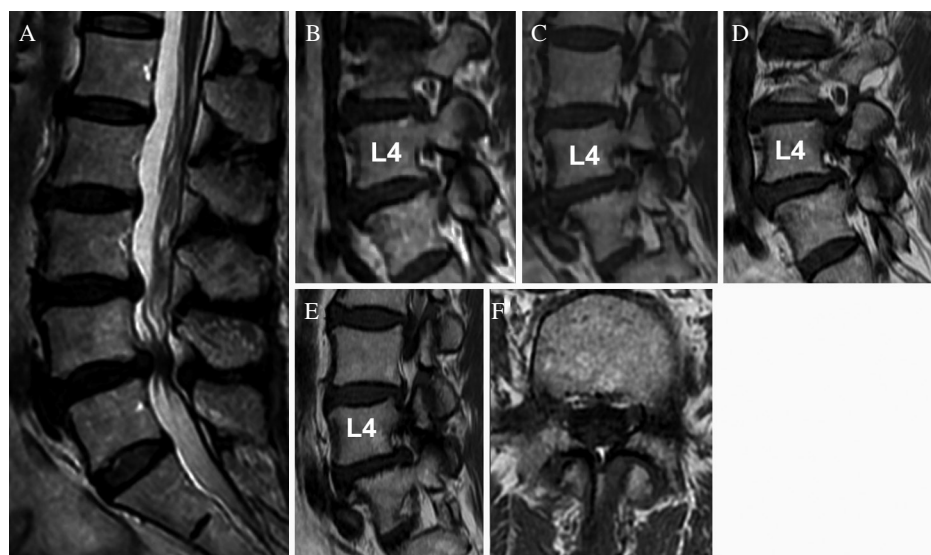


Fig. 1 First lumbar MRI scans showing lumbar canal stenosis without pedicle fracture. (A) T2-weighted image (sagittal view). (B and C) T1-weighted images (sagittal view). B = right side, C = left side. The 2nd lumbar MRI scans shows bilateral pedicle fracture at L4. (D and E) T1-weighted images (sagittal view). D = right side, E = left side. (F) T1-weighted image (axial view at L4).

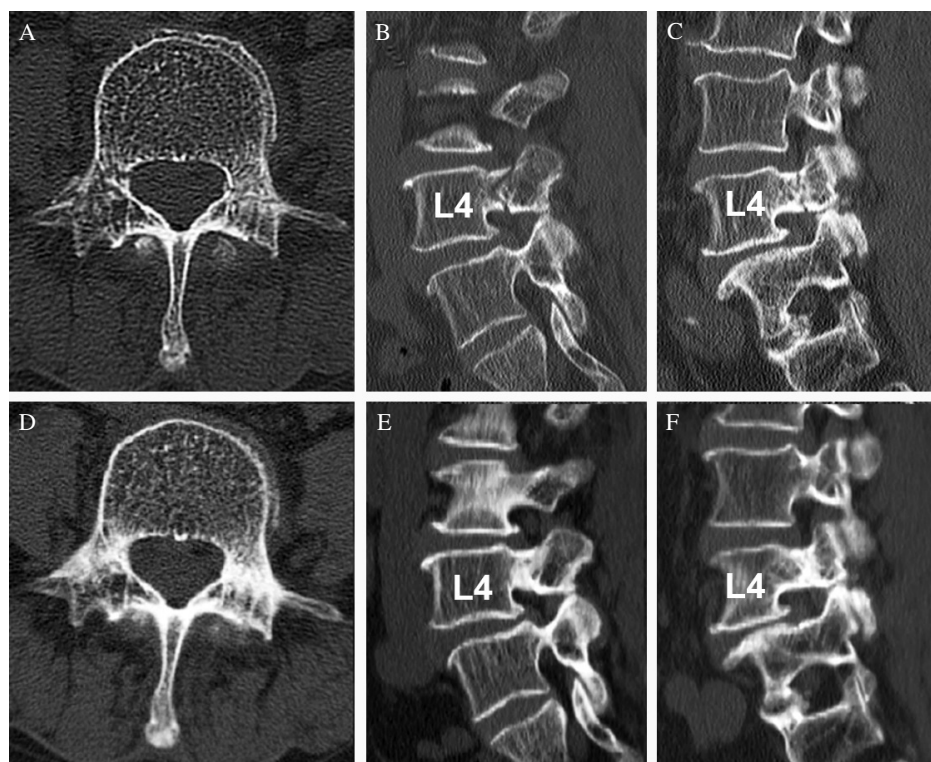


Fig. 2 First lumbar CT scans at the level of L4 showing bilateral pedicle fracture. (A) Axial view. (B) Sagittal view (right side). (C) Sagittal view (left side). Lumbar CT scans obtained 4 months later showing fracture healing at L4. (D) Axial view. (E) Sagittal view (right side). (F) Sagittal view (left side).

43.4 years; 4 (3 females, 1 male) were physically active adolescents^{3,8,11,14} and all 12 reported LBP. Of the older patients, 5 manifested osteoporosis possibly related to their spontaneous stress pedicle fracture. Our 67-year-old patient did not suffer LBP; her symptom was intermittent claudication due to LSS. This is the first reported case of incidentally-detected idiopathic bilateral pedicle fracture.

Spontaneous bilateral pedicle fracture may be a condition similar to spondylolysis, which can be addressed conservatively in the early stage. On CT images, patients with spondylolysis manifest fissures (early stage), fractures identified as a

narrow gap or round-edged lesions (progressive stage), and pseudarthrosis (terminal stage).¹⁵ Of the 12 previously-reported patients with spontaneous bilateral pedicle fracture, 2 were treated by rest and 3 by external fixation. Conservative treatment was successful in 2 adolescents in the early stage.^{3,14} Fusion surgery was performed in 7 patients; 2 of these were in the progressive stage and conservative therapy with external fixation had failed.^{9,11} In our elderly patient, conservative treatment resulted in spontaneous healing of the early-stage fracture. The early discovery of pedicle fracture may result in successful conservative treatment even in older individuals.

Table 1 Patients with bilateral pedicle fracture without previous spine surgery or trauma

Reference	Age	Sex	Symptom	Activity level	Level	Osteoporosis	Fracture stage	Conservative treatment	Operation	Fracture union
Ireland ⁸⁾	18	F	LBP	Ballet dancer	L2	–	Early	Rest	–	–
Traugher ¹⁴⁾	16	F	LBP	Unknown	L5	–	Early	Rest	–	+
Amari ³⁾	14	M	LBP + LP	Ballet dancer	L4	–	Early	Corset	–	+
Parvataneni ¹¹⁾	19	F	LBP	College lacrosse	L5	–	Progressive	Corset	+	+
Sadiq ¹²⁾	36	F	LBP	Sedentary-minimal physical activity	L2	–	Terminal	Only pain control	–	–
Hajjioui ⁶⁾	54	F	LBP	Unknown	L4	+	Terminal	Only pain control	–	–
Kim ¹⁰⁾	70	F	LBP + LP	Unknown	L4, L5	+	Terminal	–	+	+
Schmid ¹³⁾	60	F	LBP + LP	Unknown	L2, L3, L4	–	Progressive	–	+	+
Ha ²⁾	50	F	LBP + LP	Unknown	L5	Unknown	Early	–	+	+
Doita 2009 ⁴⁾	77	F	LBP + LP	Unknown	L4	+	Early	–	+	+
Diota 2008 ⁵⁾	57	M	LBP + LP	Unknown	L4	Unknown	Early	–	+	+
Johnson ⁹⁾	50	F	LBP + LP	No strenuous activities	L4	+	Progressive	Corset	+	+
Our case	67	F	LP	No strenuous activities	L4	+	Early	Corset	–	+

F: female, M: male, LBP: low back pain, LP: leg pain.

Conflicts of Interest Disclosure

All authors have no conflict of interest.

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Corresponding author:

Kyongsong Kim, MD, PhD, Department of Neurosurgery, Chiba Hokusyo Hospital, Nippon Medical School, 1715 Kamagari, Inzai, Chiba 270-1694, Japan.

✉ kyongsong@nms.ac.jp