

Case Report

Spontaneous fusion of L5-S1 isthmic spondylolisthesis

Kyung-Jin Song^a and Kwang-Bok Lee^{b,*}

^a*Department of Orthopedic Surgery, School of Medicine, Chonbuk National University, Chonbuk National University Hospital, Jeonju, Korea*

^b*Department of Orthopedic Surgery, College of Medicine, Cheju National University, Cheju National University Hospital, Jeju, Korea*

Abstract. The natural history of isthmic spondylolisthesis involves degenerative changes in surrounding joint tissues, such as, facet joints or disc materials, due to segmental instability, and normally does not cause spontaneous fusion due to complete disc destruction. However, the author experienced a case of spontaneous interbody fusion without apparent symptoms or disease in an 83-year-old male patient with isthmic spondylolisthesis.

Keywords: Spontaneous fusion, natural history, isthmic spondylolisthesis

1. Introduction

Isthmic spondylolisthesis causes degenerative changes in surrounding facet joints or discs due to segmental instability, which results in back pain and/or neurologic symptoms caused by dural sac or nerve root compression. When such symptoms are present, non-surgical or surgical treatment is conducted according to the degree of displacement and symptom severity. Even if degenerative changes in a disc space progress and cause severe destruction, spontaneous fusion of the upper and lower vertebral bodies do not usually occur. However, the author treated an adult patient with grade II isthmic spondylolisthesis, who showed spontaneous interbody fusion without disease or a history of surgery.

2. Case report

An 83-year-old man visited our hospital due to lumbar back pain and gait disturbance. According to his medical history, he had not received any operation in the lumbar region or suffered lumbar back pain or gait disturbance attributable to febrile disease. No radiculopathy was found by physical examination except for, a step-off deformity of the lower back, hamstring tightness, and a bilateral 60-degree limitation in the straight leg raising test. Hematological and tuberculin testing and chest x-ray produced no specific findings.

Plain radiograms (Fig. 1A, B) show complete interbody fusion in Meyerding grade II isthmic spondylolisthesis at L5-S1 and L4-5 hyperlordosis. His slip angle was 45°, slip percentage 56%, and sacral inclination 34°. Slip percentage, slip angle, and sacral inclination were measured on a standing lateral roentgenogram, as described by Boxall et al. [1]. Magnetic resonance images (Fig. 2) of the L-spine show spinal stenosis (thickening of the yellow ligament), disc herniation at L4-5, and complete bony fusion at L5-S1. Since the symptoms of L4-5 spinal stenosis subsided on conservative treatment, no further treatment was administered.

* Address for correspondence: Kwang-Bok Lee, MD, Department of Orthopedic Surgery, College of Medicine, Cheju National University Hospital, 154 Samdo-2 dong, Jeju, Korea. Tel.: +82 64 750 1119; Fax: +82 64 726 0173; E-mail: osdr2815@naver.com.



Fig. 1. Lumbar spine plain AP radiogram (A) showing complete fusion of the L5-S1 disc space. Lumbar spine plain lateral radiogram (B) showing the obliteration and complete fusion of the L5-S1 disc space, L5-S1 isthmic spondylolisthesis (Meyerding Grade II), and normally (rectangularly) shaped L5 and S1 vertebral bodies.



Fig. 2. Sagittal (A) and axial (B) T2-weighted MR images showing obliteration of the L5-S1 disc, bony fusion, dural sac compression due to disc extrusion, and ligamentum flavum thickening in the L4-5 disc space.

3. Discussion

The natural history of isthmic spondylolisthesis involves degenerative changes in surrounding facet joints or discs due to segmental instability with resulting back pain or neurologic symptoms due to compression of the dural sac or nerve root. With the passage of time, disc degenerative changes progress; however, spontaneous interbody fusion caused by complete destruction of a disc has not been previously reported, although a case of spontaneous fusion has been reported in a pediatric

isthmic spondylolisthesis patient caused by disc and end plate destruction by spondylodiscitis [4]. This patient was 14 years old and suffered discitis of unknown etiology. L5-S1 interbody fusion occurred after protracted long conservative treatment, which included a 5-week course of antibiotic injections, 14 weeks oral antibiotics, 4 weeks of bed rest, 8 week of hip spica cast immobilization, and 12 weeks of TLSO immobilization. However, the present patient appeared healthy for age and had not previously received treatment for any spinal problem or suffered from an infectious dis-

ease, such as, tuberculosis. He visited our department with a complaint of back pain and gait disturbance and underwent plain radiography and MRI, when L5-S1 spontaneous interbody fusion was found incidentally.

In the case described by Nagashima et al. [4], a T2 weighted sagittal image showed L5-S1 discitis and subsequent bone destruction, loss of endplates, absorption of the L5 body posterior area, and wedged shape absorption of the S1 body in the anterocentral area. In this case, L5 and S1 were fused, and the combined height of these two fused vertebral bodies was reduced due to destructive bone loss due an infection, indicating that if discitis occurs, loss of disc material also occurs, and when upper and lower vertebral end plates are infected, bone loss may occur, and vertebral bodies lose height as their upper and lower surfaces are fused [2,3,6–8]. However, in the present case, the L5 and S1 bodies were not wedge shaped and a trace of fusion from the original rectangular form was found, and furthermore, their summed heights showed no reduction. In particular, plain lateral radiographs showed that S1 had a normal rectangular shape and height. Thus, it might be concluded that the present case had lost little bone from the fused vertebral bodies, which indicates that fusion had occurred in a different manner.

According to Sha et al. [5], after treating a case of severe L5-S1 dysplastic spondylolisthesis conservatively, a 14-year follow up through adolescence to adulthood, showed progressive ossification of the cartilage at the posterior aspect of the body of L5 and at the anterior aspect of that of S1. Moreover, this case spontaneously stabilized without surgical treatment, which implies that it could have been due to spontaneous fusion, i.e., it might have shown continuous instability, and disc degeneration due to isthmic spondylolisthesis. Also, as was suggested by Sha et al. [5], ossification might progress between the posterior and anterior aspects of L5 and S1, respectively, and then gradually stabilize, i.e., bone cells (osteoblasts, mesenchymal precursor cells etc.) of the upper and lower vertebral bodies might have been recruited by the destroyed disc space in this stabilized region to achieve spontaneous interbody fusion.

In cases of isthmic spondylolisthesis, surgical treatment is generally considered because of to segmental instability, although the type of surgery implemented depends on degree of displacement and neurologic status. The present case of spontaneous interbody fusion with incidentally identified L5-S1 isthmic spondylolisthesis, is likely to have undergone spontaneous fusion despite instability. Moreover, this observation suggests that it might be advisable to observe the course of isthmic spondylolisthesis before deciding on treatment.

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