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Case Report Open Access

Posterior Correction Surgery of Progressive Degenerative Cervical Spondylolisthesis - A Case Report

Morito Takano*, Soraya Nishimura, Hiromasa Nagahari and Michihiro Kamata

Department of Orthopaedic Surgery, Keiyu Hosipital, 3-7-3 Minatomirai, Nishi-ku, Yokohama, Kanagawa 220-8521, Japan

Abstract

Degenerative spondylolisthesis of the cervical spine is relative rare. We present a relative rare case of severe degenerative cervical spondylolisthesis with posterior corrective fusion. A 70-year-old female complained of neck pain and gait disturbance with cervical spondylotic myelopathy. Plain radiographs showed 8.3 mm anterolisthesis of C3/C4, which gradually progressed during four years. The slip was not reduced by flexion and extension position. After releasing C3/C4 facet joint and yellow ligament, posterior reduction with instrumentation were performed and resulted in successful cervical correction and fusion.

Keywords: Degenerative cervical spondylolisthesis; Cervical spondylotic myelopathy; Posterior correction surgery

Introduction

Degenerative spondylolisthesis of the lumbar spine is a common disease, which main causes are arthrosis of the facet joints and disc degeneration. These changes may occur at single or multiple motion segments [1]. However in the cervical spine spondylolisthesis is rarely seen and only few publications are dedicated to this topic. Boulos et al. reported that these patients show signs of neck pain and several neurological deficits [2]. But the precise pathophysiology and surgical strategies have not been fully understood. We recently encountered a case of degenerative cervical spondylolisthesis that gradually progressed during four years. The patient gave informed consent for data concerning her case to be submitted for publication.

Case Presentation

A 70-year-old woman presented to our hospital complaining of chronic neck pain and gait disturbance that was getting worse associated with numbness and weakness in her limbs for seven months. The patient has had no traumatic accident and past history that induced the destructive spondyloarthoropathy. And she was a housewife and not obliqued to flex her neck in her life style. The neurological examination revealed the weakness of the distal upper limbs with MMT 4, and the hyper reflexia in upper and lower limbs.

The chronological cervical radiographs showed that the C3/C4 degenerative spondylolisthesis was gradually progressed in associtaion with the deformity and thinning of the facet joint during four years (Figure 1). The preoperative radiographs showed that the severe spondylolisthesis was rigid and fixed with flexion and extension (Figure 2). Computed tomography (CT) myelography demonstrated that the slippage of C3 over C4 with severe degenerative spondylolisthesis and spinal canal stenosis (Figure 3).

Figure 1: Chronological x-rays. The C3/4 degenerative spondylolisthesis was gradually progressed during four years.

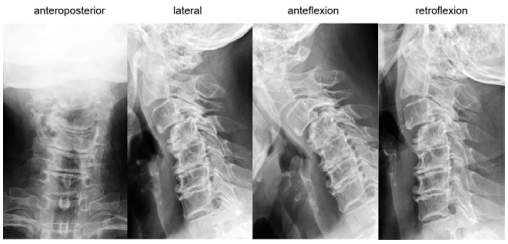

Figure 2: Preoperative x-rays. Preoperative x-rays show that the spondylolisthesis was rigid and fixed with anteflexion and retroflexion (lateral: 8.3 mm, anteflexion: 9.1 mm and retroflexion: 7.9 mm slippage).

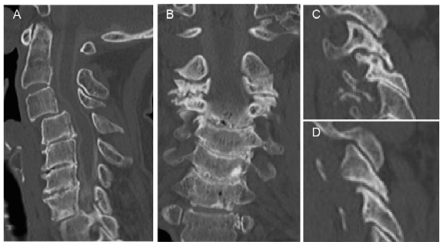

Figure 3: Preoperative CT myelography. (A) Sagittal view. (B) Coronal view. (C) The right view and (D) left view of the C3/4 facet joint. Preoperative CT myelography show that the spondylolisthesis and canal stenosis was severe and the C3/4 facet joint was destructive and thinning.

C3/C4 partial laminectomy, bilateral partial facetectomy and flavectomy were carried out, and C2-C5 posterior correction surgery with instrumentation were performed using the cantilever technique that we firstly connected the C4 and C5 lateral mass screw with the pre-bending rod and reduced the C2 pedicle screw and C3 lateral mass screw on the right side (Figure 4). The surgery took 153 minutes, with an estimated blood loss of 20 ml. The postoperative CT and MRI showed that the severe spondylolisthesis was reduced completely and the C3/C4 spinal canal stenosis was released (Figure 5). All complaints disappeared in

***Corresponding author:** Morito Takano, Department of Orthopaedic Surgery, Keiyu Hosipital, 3-7-3 Minatomirai, Nishi-ku, Yokohama, Kanagawa 220-8521, Japan, Tel: 81-45-221-8181; Fax: 81-45-681-9665; E-mail: moritto@me.com

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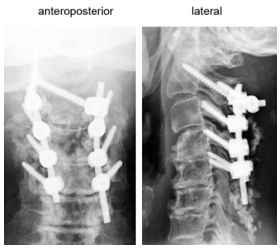

Figure 4: Postoperative x-rays. Postperative x-rays show C2-5 posterior corrective fusion.

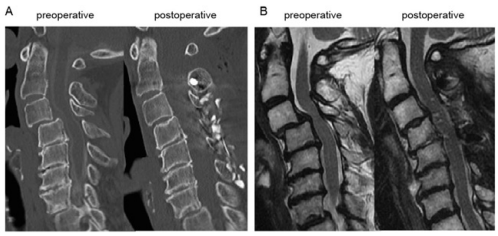

Figure 5: Postoperative CT and MRI. Postperative CT (A) and MRI (B) show that the correction and decompresstion were performed with the good cervical alignment.

postoperative course, and no neurological deficit is observed.

Discussion

In contrast to spondylolisthesis of the lumbar spine, cervical spondylolisthesis is relative rare and has received insufficient attention. However, degenerative cervical spondylolisthesis may be more common than previously thought [3]. The main causes of degenerative cervical spondylolisthesis are arthrosis of the facet joints, disc degeneration and cervical sagittal mal-alignment [4]. Increased stress with flexion and extension may damage the disc and ligaments, allowing slippage to occur [5,6]. However, our chronological radiographs suggested that thinning of the facets and narrowing of the joint space may be the primary cause of degenerative cervical spondylolisthesis rather than the disc involvement. In our case, the reasons why degenerative spondylolisthesis locates in C3/C4 level can be explained by the relative hypermobility and the different pattern of movement in association with the whole lower spine becomes rigid.

There is no guideline for the treatment of degenerative cervical spondylolisthesis. Surgical treatment is often indicated in the patients who have radiologically proven cervical spondylolisthesis with instability and spinal cord compression. The choice of surgical treatment depends on the degree of spondylolisthesis, spinal canal stenosis, and the possibility of correction by extension [7]. Shigematsu et al. reported a 40% recovery rate of the Japanese Orthopaedic Association (JOA) score with double-door laminoplasty [8]. Furhermore, Suzuki et al. showed that the average slip distance did not changed and the level with spondylolisthesis was stabilized after cervical laminoplasty [9]. On the other hands, Dean et al. reported that anterior cervical decompression and fusion yielded excellent union rates and neurological improvement [10]. However, we selected the surgical treatment with minimum posterior release and correction for severe cervical spondylolisthesis considering the primary cause of the pathophysiology. This treatment may be easier and less invasive than previously described. We suggest that posterior correction surgery may be novel surgical treatment in degenerative cervical spondylolisthesis and prospective studies should be designed in the future to draw a more reliable conclusion about the surgical treatment of degenerative cervical spondylolisthesis.

In conclusion, we present a relative rare case of progressive degenerative cervical spondylolisthesis with posterior corrective fusion. The clinicians should select surgical option in accordance with the respective pathophysiology of degenerative cervical spondylolisthesis.

Competing Interests

The authors declare that they have no competing interests.

Author's Contributions

MT and MK made substantial contributions to the conception and design, and the acquisition, analysis, and interpretation of data. All authors read and approved the final manuscript.

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