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Review Articles

Does nonoperative management play a role in the treatment of cervical spondylotic myelopathy?

Paul G. Matz, MD*

Division of Neurosurgery, University of Alabama, Suite 1034 FOT, 510 20th Street South, Birmingham, AL 35294, USA

Abstract

BACKGROUND CONTEXT: Cervical spondylotic myelopathy has traditionally been managed through surgical decompression with or without reconstruction. Currently, a multicenter, blinded clinical trial that has supported such a therapeutic recommendation does not exist. There have been case-control studies that have and have not shown long-standing benefit to surgical decompression and reconstruction.

PURPOSE: The purpose of this review is to examine the efficacy of nonoperative therapy for cervical spondylotic myelopathy.

CONCLUSIONS: It appears that both static and dynamic factors play a role in the pathophysiology of cervical spondylotic myelopathy. Furthermore, once clinical cervical spondylotic myelopathy is evident, progression may occur despite the best of treatments, both surgical and nonsurgical.

Keywords: Cervical spondylotic myelopathy; Cervical spine; Cervical stenosis

Introduction

Cervical degenerative disease is a natural consequence of the human aging process. As disc degeneration ensues, posterior element osteophytes develop along with ligamentum flavum hypertrophy (Figs. 1 and 2). In some patients, the result is cervical canal stenosis. This resultant stenosis is largely asymptomatic. However, in a minority of patients, the compression of the spinal cord and nerve roots becomes clinically symptomatic and may be referred to as cervical spondylotic myelopathy (CSM) [1].

Traditionally, CSM has been managed through surgery. However, the efficacy of surgery compared with nonoperative treatment has never been critically examined [2]. The logic is as follows: cervical myelopathy is recognized clinically. Cervical spinal cord compression may be simultaneously confirmed from imaging (Fig. 1). Surgery provides decompression and stabilization of the diseased spinal segments. This process prevents clinical worsening and improves function anecdotally. A clinical study would be unethical because it would withhold surgical therapy from patients.

The flaws in this logical sequence are that cervical myelopathy may not always improve with decompression and that nonoperative therapy may have efficacy. Furthermore, the presence of cervical myelopathy may signal a cascade that has already begun and that may not be as readily improved with surgical decompression as one would hope. Accordingly, a review of nonoperative therapy for CSM is paramount.

Overview of the basic process

To understand CSM, one must examine some of the basic processes. Shinomiya and colleagues reported on a model of CSM in 20 cats [3]. Small screws were placed either at C5 in one group or at C4–C6 in an alternative group. Screws were advanced 1 mm every several weeks until 50% stenosis was achieved. Animals were studied clinically and using segmental and conductive evoked spinal cord potentials. These authors revealed that multilevel

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* Corresponding author. Suite 1034 FOT, 510 20th Street South, Birmingham, AL 35294. Tel.: (205) 975-8872; fax: (205) 975 8337.

E-mail address: pmatz@uabmc.edu (P.G. Matz)

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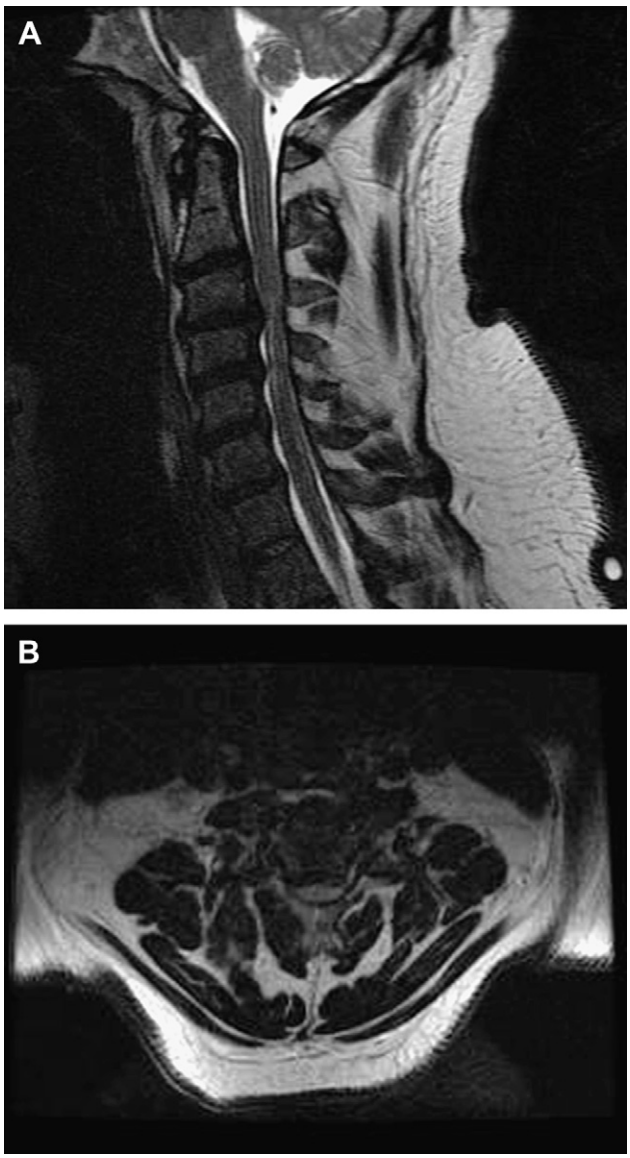

Fig. 1. T2 sagittal (A) and axial (B) magnetic resonance imaging of a 47-year-old man who developed cervical myelopathy. Multilevel disc displacement may be seen without significant hypertrophy of the posterior longitudinal ligaments. Also evident is loss of the cervical lordosis. This combination results in compression of the cervical spinal cord.

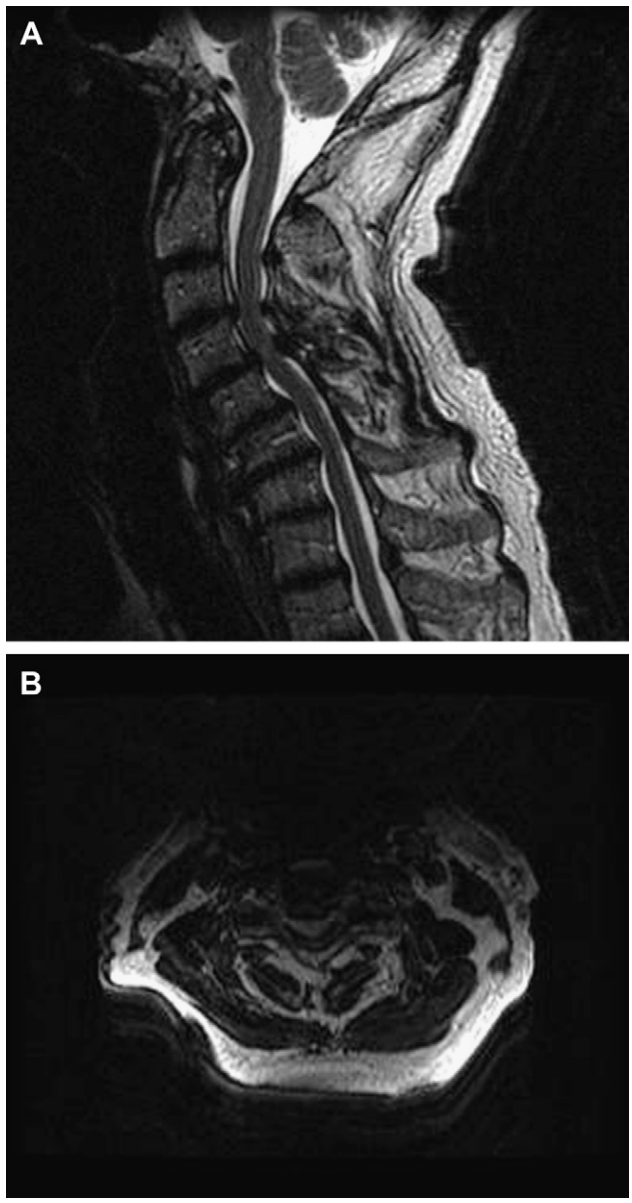

Fig. 2. T2 sagittal (A) and axial (B) magnetic resonance imaging of a 75-year-old man who developed cervical myelopathy. Multilevel calcified disc displacement may be seen with associated hypertrophy of the posterior ligamentum flavum. The result is circumferential spinal cord compression.

compression impaired clinical and electrophysiological performance more than single-level compression.

White and Panjabi reviewed the biomechanical factors associated with CSM [4]. They argued that CSM pathophysiology should be separated into two categories: dynamic and static (Table 1). Dynamic problems may arise from abnormal motion, mechanical abnormalities of the spinal column, and a hypotonic ligamentum flavum. Static factors that may contribute to CSM include congenital stenosis and degenerative changes. They noted that motion in the spine might create a pincher effect on the spinal cord exacerbating the clinical spinal cord dysfunction. These studies reveal cervical myelopathy to be a multifactorial process that is more severe when occurring over several spinal segments and that may be exacerbated by both dynamic and static factors.

A Cochrane review of the role of surgery in the treatment of CSM not surprisingly included only one manuscript that met inclusion criteria and dealt specifically with CSM [5]. In this study, 49 patients received either surgical treatment or nonoperative therapy. Outcome measures in this study included surgical morbidity, pain intensity, functional performance (Sickness impact profile), and quality of life (Short form-36 [SF-36]). No differences were