

2013 Outstanding Paper Runner-up

Clinical outcomes following surgical management of coexistent cervical stenosis and multiple sclerosis: a cohort-controlled analysis

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Abstract

BACKGROUND CONTEXT: The presentation of myelopathy in patients with the concomitant diagnosis of cervical stenosis (CS) and multiple sclerosis (MS) complicates both diagnosis and treatment because of the similarities of presentation and disease progression. There are only a few published case series that examine this unique patient population.

PURPOSE: To define the demographic features and presenting symptoms of patients with both MS and CS and to investigate the immediate and long-term outcomes of surgery in patients with MS and CS.

STUDY DESIGN/SETTING: Matched cohort-controlled retrospective review of 77 surgical patients in the MS group and 77 surgical patients in the control group. Outcome measures were immediate and long-term postoperative neck pain, radiculopathy, and myelopathy; Nurick Disability and modified Japanese Orthopaedic Association scores were collected as well.

METHODS: Retrospective review was performed for all patients presenting at one institution between January 1996 and July 2011 with coexisting diagnoses of MS and CS who had presenting symptoms of myelopathy and who then underwent cervical decompression surgery. Each study patient was individually matched to a control patient of the same gender and age that did not have MS, but that *did* have cervical spondylotic myelopathy or myeloradiculopathy. Each control patient underwent the same surgical procedure within the same year.

RESULTS: A total of 154 patients were reviewed, including 77 MS patients and 77 control patients, for an average follow-up of 58 months and 49 months, respectively. Patients in the control group were more likely to have preoperative neck pain (78% vs. 47%; $p=.0001$) and preoperative radiculopathy (90% vs. 75%; $p=.03$) than their counterparts in the MS group. Patients in the MS

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group had a significantly lower rate of postoperative resolution of myelopathic symptoms in both the short-term (39% in the MS group did not improve vs. 23% in the control group; $p=.04$) and the long-term (44% in the MS group did not improve vs. 19% in the control group; $p=.004$). Preoperative myelopathy scores were worse for the MS cohort as compared with the control cohort (1.8 vs. 1.2 in the Nurick scale, $p<.0001$; 13.7 vs. 15.0 in the modified Japanese Orthopaedic Association scale, $p=.002$). This difference in scores became even greater at the last follow-up visit with Nurick scores of 2.4 versus 0.9 ($p<.0001$) and modified Japanese Orthopaedic Association scores of 16.3 versus 12.4 ($p<.0001$) for the MS and control patients, respectively.

CONCLUSIONS: Myelopathic patients with coexisting MS and CS improve after surgery, although at a lower rate and to a lesser degree than those without MS. Therefore, surgery should be considered for these patients. MS patients should be informed that myelopathy symptoms are less likely to be alleviated completely or may only be alleviated temporarily because of progression of MS and that surgery can help alleviate neck pain and radicular symptoms. © 2014 Elsevier Inc. All rights reserved.

Keywords:

Multiple sclerosis; Cervical stenosis; Myelopathy; Spinal cord compression; Surgery; Outcomes

Introduction

Multiple sclerosis (MS) is an autoimmune inflammatory demyelinating disease of the central nervous system that presents in approximately 0.1% of the population of North America with a variety of neurologic symptoms [1,2]. The establishment of diagnosis of MS can be difficult because of a commonality of presenting symptoms with other pathologies [3]. Notably, spinal cord compression from advanced spondylosis presents with symptoms similar to MS, including gait ataxia, upper/lower extremity weakness, sensory loss, spasticity, bowel and bladder dysfunction, Lhermitte sign, and neck and upper limb pain [4]. When MS and cervical stenosis (CS) occur concomitantly, the diagnosis and treatment plan is further obfuscated. Treatment for MS typically involves immunomodulatory therapy, such as corticosteroids and interferon beta [1,3], whereas surgical decompression is often indicated for CS with myelopathy [4–6]. Patients with coexisting MS and CS pose a diagnostic and therapeutic dilemma both to neurologists and to spine surgeons. It is difficult to determine which disease process is causative and if surgery is indeed the correct strategy, particularly given that physiologic stress (ie, surgery) can induce an MS exacerbation [7].

The immediate and long-term outcomes following decompression surgery for patients with coexisting MS and CS with myelopathy are unclear. The literature consists of only a limited number of small case series describing this unique population [8–12]. The purpose of this study was twofold: to investigate the clinical outcomes of surgical treatment of myelopathic patients with coexisting MS and CS and to determine if cervical spine surgery results in acute postoperative neurological deterioration (ie, MS exacerbation) in MS patients. We performed a retrospective cohort-controlled study investigating the postoperative outcomes of patients at our institution with coexistent MS and CS. These patients, who all presented with myelopathic symptoms, were compared with matched control patients with equivalent cervical pathology but without MS. Our

hypothesis was that patients in both groups would benefit from cervical decompression surgery and that MS patients would have a higher incidence of acute exacerbation of MS-related symptoms and findings following surgery.

Materials and methods

A retrospective review was performed of all patients that presented to the Cleveland Clinic between January 1996 and July 2011 with coexisting diagnoses of MS and CS who presented with myelopathy and underwent a cervical decompression surgery. Each patient with coexisting CS and MS was individually matched to a control patient that did not have MS but was the same age and gender, also presented with myelopathy, and underwent the same surgical procedure within the same year. The electronic medical record was used to retrieve patient data that fit our criteria. Study data were securely collected and managed using REDCap [13] (Research Electronic Data Capture, Cleveland, OH, USA). There were no external funding sources or conflicts of interests for this study.

Patient information collected included age, gender, and body mass index. Preoperative data included the presence and duration of symptoms (including neck pain, radiculopathy, myelopathy, bladder/bowel impairment). Severity of myelopathy was also assessed pre- and postoperatively using both the Nurick scale [14] and the modified Japanese Orthopaedic Association (mJOA) classification of disability [15,16]. Postoperative data were further categorized as to whether there was resolution (either complete resolution or restoration of normal functions), improvement (but with persistent symptoms), or no change from the preoperative symptoms. These were subjective assessments based on patient report in the medical record. Postoperative symptoms were collected from both the immediate postoperative visit (first follow-up visit after the operation, typically 1–3 months postoperatively) as well as the long-term postoperative period (last follow-up visit [LFU]) with either the

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