Neck Pain from a Spine Surgeon's Perspective

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• Neck pain • Radiculopathy • Spondylosis • Myelopathy
• Spine surgery

Through the myriad of abnormalities encountered by spine surgeons, neck pain is one of the most perplexing. The nature, onset, and location of the pain all provide information as to what the potential pain generator may be. By synthesizing data garnered from the physical examination, imaging studies, and history, a spine surgeon must formulate a differential diagnosis and treatment plan. The surgeon must determine whether the patient has cervical radiculopathy, myelopathy, or simply cervical spondylosis because the treatment of each of these is vastly different.

CERVICAL SPONDYLOSIS

Generalized arthropathy of the cervical spine, or cervical spondylosis, results in hypertrophied facets, bone spurs, and degeneration of the disks. Although the contribution of each of these to the patient's symptoms has not been elucidated, nociceptive pain endings have been found in the peripheral portions of the disk and in the capsule and synovium of the facet joints.[1–4] Patients typically present with neck pain that is not radicular in nature. Physicians must be cognizant of the upper cervical dermatomes, such as the upper shoulder and trapezial areas, realizing that pain in these distributions may represent referred or radicular pain. In addition, other causes of neck pain, such as cervical instability, must be ruled out with flexion-extension radiographs.

Once the physical examination and imaging studies determine that the patient has cervical spondylosis, extensive conservative management should be initiated. Use of nonsteroidal antiinflammatory drugs (NSAIDs), muscle relaxants, and other analgesics is the common first-line treatment option. In addition, a 4- to 6-week course of

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physical therapy should be initiated. Studies have shown that a physical therapy regimen that includes isometric and active strengthening, active range of motion, and aerobic conditioning has beneficial effects in patients with chronic neck pain.[5,6] Other conservative modalities, such as heat and cold therapy, transcutaneous electrical nerve stimulation units, and cervical traction, were not shown to have any reproducible benefit in a recent meta-analysis of the literature.[7]

Persistent pain in patients despite a 6-month course of conservative management is a difficult diagnostic dilemma for surgeons. Because of the paucity of prospective randomized controlled studies examining the success rates of cervical fusions for axial neck pain, most surgeons are hesitant to offer this as a treatment option. Surgical success rates seem to improve when preoperative diskography is used to localize symptomatic levels. Palit and colleagues[8] performed anterior cervical fusions on patients with axial neck pain who had positive results of diskograms. This prospective study on 38 patients showed that approximately 80% of the patients were satisfied with the surgical outcome and underscored the importance of preoperative provocative diskography when performing cervical fusions for axial neck pain. Whitecloud and Seago[9] also performed anterior cervical fusions for axial neck pain and reported good outcomes in 70% of the patients. However, this study was retrospective, had 85% follow-up, and did not use quantitative outcome criteria.[9,10] Despite the lack of definitive data, the overall trends have resulted in most physicians obtaining preoperative diskograms in patients with axial neck pain to better delineate the pain generator and minimize the number of levels fused.

Provocative discography is performed by injecting a water-soluble radiopaque dye under fluoroscopic guidance into an intervertebral disk. It is used to confirm the diagnosis of internal disk disruption and demonstrate the presence of normal disks adjacent to the level of an intended spinal fusion. Its role as an evaluative procedure is based on whether the disk injection reproduces the patient's neck pain. The distribution and presence of dye extravasation are also noted. The patient's pain intensity is measured on a standardized scale, and the concordance of the pain caused by the diskogram with the patient's original presenting pain is also rated. A control disk injection is often performed to add validity to the study and must have a negative result to declare the diskogram positive.

There are many challenges with the evaluative quality of provocative diskography. Differentiating pain caused by the injection from the patient's baseline neck pain can be difficult and confounded by patients with regional pain that does not originate from the intervertebral disk. Furthermore, the patient's own neurophysiologic modulation of pain pathways, which may amplify or downregulate nociceptive signals from the injected disk, affects the subjective reporting of pain perception on which the procedure relies. Factors commonly reported to increase the risk of false-positive results of injections include patients with increased psychological distress, concurrent chronic pain syndromes, disputed compensation claims, previous diskectomy at the injected disk, and a history of persistent clinically benign backache.[11]

In addition to the controversy surrounding the evaluative efficacy of diskography in patients with degenerative disk disease and severe neck pain, there are risks associated with the procedure. The literature has reported risk for diskitis, subdural empyema, spinal cord injury, vascular injury, and prevertebral abscess formation. In a retrospective analysis of 4400 cervical disk injections in 1357 patients, Zeidman and colleagues[12] reported significant complications from the procedure in less than 0.6% of the patients and 0.16% of cervical disk injections. Of the 4400 injections, 7 were complicated by diskitis, with patients presenting within a week after diskography complaining of acute exacerbation of mechanical cervical pain without a radicular