

cervical radiculopathy (505-507,530,531). This theory is supported by evidence that nerve root inflammation, in the absence of frank compression may continue to cause disruptions in nerve root physiology (532). Inflammatory mediators may be secreted from a degenerated or herniated nucleus pulposus (491-493,523,533). Additionally, the gradient of compression may also play a significant role in determining whether or not a disk herniation becomes symptomatic (534).

Spondylitic changes represent the second most common cause of cervical radiculopathy. Spondylosis is an umbrella term, which covers the degenerative changes that develop in the spine over time: ligamentous hypertrophy, hyperostosis, disk degeneration, and facet and/or uncovertebral joint arthropathy (535). Hypertrophy of the facet or uncovertebral joints may cause stenosis of the intervertebral foramina and subsequent nerve root compression (535,536). Osteophytes may also compress the adjacent nerve root. Other less common, but noteworthy causes of cervical radiculopathy include facet joint cysts, nerve tumors (e.g., schwannomas), fibroproliferation, hematomas, and trauma (523,537,538).

The course and prognosis of cervical disc herniation has been studied in multiple manuscripts (500,501,539). A systematic review of the literature of the course and prognostic factors of symptomatic cervical disc herniation with radiculopathy (500) concluded that most patients with symptomatic cervical spine disc herniation with radiculopathy recovered. In addition, a clinical guideline (540) for the diagnosis and treatment cervical radiculopathy from degenerative disorders concluded that signs and symptoms of degenerative disorders of the cervical spine resulting in radiculopathy will be self-limited and will resolve spontaneously over a variable length of time without specific treatment. In another manuscript (539), it was shown that in the natural history of cervical radiculopathy, 43% of the patients had no further symptoms after a few months, 29% had only mild or intermittent symptoms, and only 27% had disabling pain. The authors of the large epidemiologic prevalence study from Rochester, Minnesota (501) over a 5-year follow-up period showed that 31.7% of patients with symptomatic cervical radiculopathy showed symptoms recurrence, with only 26% needing surgical intervention for intractable pain, sensory deficit or objective weakness (501).

Based on the pathophysiology of cervical disc degeneration, disc herniation, and resultant radiculopathy, multiple investigators have shown the effectiveness of cervical epidural injections in managing neck and upper extremity pain (55,58,60,64,70,76).

5.2.2 Cervical Spondylosis

Degenerative changes of the cervical spine reach a prevalence of nearly 95% by age 65. These changes are associated with disc protrusion, neuroforaminal narrowing, and spinal cord contour changes in up to 78% of asymptomatic individuals (539-541).

Spondylosis is a chronic degenerative condition of the cervical spine associated with the formation of osteophytes and compression of the spinal cord. Spondylosis refers to degenerative changes of the spine involving the intervertebral discs, uncovertebral joints of Luschka, facet joints, ligaments, and connective tissue of the cervical vertebrae. Degenerative changes of the cervical spine are seen in approximately 10% of individuals by age 25 and in 95% by age 65. The levels most commonly affected by both disc herniation and chronic spondylosis are C6/C7, followed by C5/C6 as these are the cervical segments where the most extension and flexion occurs.

In most symptomatic cases, spondylosis is associated with aging and with compression of the spinal cord, producing either central or neuroforaminal stenosis in patients older than 55 (542).

Cervical spondylotic myelopathy refers to clinically evident spinal cord dysfunction with the presence of long-track signs due to compression of the spinal cord. Weakness or stiffness in the legs with unsteady gait, together with weakness or clumsiness in the hands, is pathognomonic of cervical spondylotic myelopathy. The progression of weakness may be gradual in some patients or sudden in others following minor trauma. Some patients may complain of hesitancy on urination, even though loss of sphincter control or urinary incontinence is rare and considered a late sign of myelopathy.

Cervical epidural injections, specifically in radiculopathy, are known to be helpful in managing cervical spondylosis. There are no specific studies conducted for this purpose. However, the mechanism is similar to spinal stenosis and disc herniation. Consequently, epidural injections fit the pathophysiological basis for epidural interventions. Epidural steroid injections are not routinely recommended in those patients who go on to develop spondylotic myelopathy.

5.2.3 Cervical Spinal Stenosis

Cervical spinal stenosis is a common disease that results in considerable morbidity and disability (543-546). Degenerative change is the most common cause of cervical stenosis and can be due to disc herniation, osteophyte formation, or a combination of both, namely disc-osteophyte complex (547).