Lumbar Spinal Stenosis in an Elderly Patient

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Background. The general population is aging, and lumbar stenosis is one of the more frequent conditions observed in an orthopedic or neurosurgical practice.

Methods. This case presentation is of an 86-year-old male who developed lumbar spinal stenosis with a progressive neurologic deficit that caused severe leg pain, affected bladder function, and affected gait. Relevant medical literature is reviewed.

Results. Bladder function and gait returned after spinal surgery, and this patient’s pain was greatly reduced. A multidisciplinary team applied therapy after surgery. The medical literature does not concentrate solely upon patients older than 80, but a few are included in studies of younger patients.

Conclusions. This case report illustrates that a patient over 80 can have a successful outcome with multidisciplinary medical coverage of medical, surgical, rehabilitative, social, and psychological areas. More studies need to be done of these patients.

It is well known that the general population is aging and people are living longer. As more people are living into their eighth decade, medical disorders that used to be associated with a much younger population are now occurring more frequently in these older patients. One of the more frequent conditions seen in any orthopedic or neurosurgical practice is lumbar spinal stenosis (1,2). Acquired degenerative spinal stenosis usually develops in the seventh decade, in males more often than females. Females will often present with more advanced disease. Symptoms usually consist of back, buttock, and/or leg pain, in combination with lower-limb sensory and motor deficits. The back and leg pain most consistent with lumbar stenosis usually worsens with ambulation. The distance that the patient can walk without pain, weakness, or numbness in their legs is usually reproducible. Pseudoclaudication is often present; that is, the patient will need to sit or lie down after walking in order to relieve the symptoms. Standing or walking on a flat surface or downhill (position of extension of the lumbar spine) will increase pain, while sitting or bending forward (positions of flexion) will decrease the pain of spinal stenosis. Examination may reveal weakness in the lower extremities, but usually there will be no localizing findings. Straight leg raising tests are usually negative. Peripheral vascular disease can result in similar symptoms; therefore, assessing the patient’s vascular status (pulses, skin color, capillary refill) is crucial. Radiographic evaluation of the patient includes plain radiographs of the spine and, if indicated, modalities such as CT scan, CT scan myelogram, or MRI (3).

This patient with very advanced age experienced the onset of lumbar spinal stenosis with pain and progressive neurologic deficits. As surgery in this special group of patients is a very complex matter due to concomitant medical illnesses, reduced cardiopulmonary reserve, and deconditioning, this case illustrates some of the unique problems that must be dealt with in any preoperative/postoperative medical and rehabilitation assessment and management plan.

CASE REPORT

CM, an 86-year-old white male, was admitted for significant leg pain and difficulty with ambulation. Indeed, for the several weeks prior to admission, he had stopped functional rest periods due to leg pain. He was unable to ascend or descend stairs due to weakness in his legs. Other recent problems included urinary incontinence, lower-limb paresthesias, and lower-limb weakness. Other medical problems included diabetes, coronary artery disease, hypertension, and hearing loss. CM had a transurethral resection of his prostate in 1960. A recent cystoscopy demonstrated a large, flaccid neurogenic bladder. Examination on admission revealed the new onset of a progressive bilateral S1 dermatomal and myotomal deficit. Lumbosacral spine radiographs (Figure 1) revealed 5 mm of retrograde spondylolisthesis of L1 on L2. Facet hypertrophy, multiple small osteophytes, end plate sclerosis at L1-2, and disk space narrowing at L2-3, L3-4, and L4-5 were also present. Computed axial tomography revealed degenerative joint disease of the lumbar spine, spinal stenosis, and compression fracture of T11 (secondary to trauma). A trial of conservative physical therapy was instituted but was not effective. Subsequently, myelography (Figure 2) demonstrated a block at the L3-4 level, with no contrast material seen below this level. Moreover, a compression fracture had been noted as above. The patient was placed on oral bethanechol. A comprehensive multidisciplinary preoperative assessment was
LUMBAR SPINAL STENOSIS

Figure 1. Plain radiograph of the lumbar spine demonstrating retrograde spondylolisthesis of L₄ on L₅, disk space narrowing, facet hypertrophy, end plate sclerosis, and multiple small osteophytes.

Figure 2. Myelogram demonstrating complete block at the L₄-₅ levels and T₁₀ compression fracture with effacement of the spinal cord.

Figure 3. Postmyelogram CT scan through the L₄-₅ interspace. There is severe spinal stenosis secondary to a combination of diffuse annular bulge and hypertrophic changes of the facet and ligamentum flavum.

completed that incorporated the patient’s current medical and functional problems and conditions. The patient was felt to be a good surgical candidate, and a decompressive laminectomy was then performed at the L₃ through L₅ levels. Postoperatively, the patient was put on an early ambulation protocol to help reduce the morbidity and mortality associated with prolonged bed rest and to facilitate the ability to transition the patient back to his home environment.

After discharge, this patient received physical and occupational therapy as well as nursing education and care. This was coordinated through a multidisciplinary geriatric rehabilitation outpatient program. His sensory deficits gradually resolved and his legs grew stronger. Rather than urinary retention with overflow incontinence, he started to experience incontinence due to active bladder contractions. This was confirmed by a cystometrogram. Within a few weeks, he was ambulating independently with a wheeled walker, was independent in all aspects of daily living, and returned to his usual lifestyle in our community.

DISCUSSION

The volume of the lumbar canal tends to decrease with age so that by 80 years old, most individuals have at least an anatomic lumbar stenosis relative to the volume of a younger population (4,5). Progressive focal neurologic deficits despite conservative therapy are very concerning signs, especially in this patient population (6,7). Decompressive laminectomy in these instances reduces pain and improves function (8–10), including the ability to ambulate longer distances. If the patient discussed in this case study had poor cardiopulmonary function or multiple advanced comorbid illnesses, the risks of surgery would outweigh the benefits. For the elderly, net treatment benefit markedly diminishes as treatment risks in-
crease (11). Many of the studies investigating outcomes of patients after decompressive lumbar laminectomy for spinal stenosis cut off the elderly population at or below 80 years old (7,8). In addition, investigators often do not separate out subjects over 80 in order to determine how they, as a group, responded to these interventions (9).

An extensive literature search utilizing MEDLINE revealed that no studies had looked exclusively at the diagnosis, management, and outcomes of lumbar stenosis in persons aged 80 or older. There were investigations that exclusively evaluated subjects aged 65 or older (which included octogenarians) (12–14). Other studies had populations whose mean age was 65 or older (but less than 80 years old) (15–20). Analysis of these reports allows certain observations to be made.

1. Rates of surgery for spinal stenosis have increased and vary by geographic region.
2. Operative complications and mortality increased with age in some studies but not in others.
3. Comorbidity increased complication rates.
4. The long-term outcome of decompressive surgery in the elderly is good if patients were selected appropriately.
5. Caudal epidural blocks are a reasonable therapeutic option in some patients with lumbar stenosis, especially those who are a poor surgical risks or who have refused surgery.
6. Decompression with and without arthrodesis is successful in improving pain and walking distance.
7. Exercise treadmill testing is a safe and quantifiable means of assessing baseline functional status and outcome in patients with symptomatic lumbar spinal stenosis.
8. Increasing failure rates of surgery with time from the index operation can be improved with certain techniques, but the heterogeneity of this patient population (varying patterns and levels of symptomatic stenosis) precludes application of rigid surgical protocols.
9. Lumbar decompressive laminectomy can have a beneficial effect on bladder function in a significant number of patients with advanced lumbar spinal stenosis.
10. The outcome of lumbar decompression surgery is similarly successful in diabetic and nondiabetic patients with lumbar stenosis. Failure rates of surgery in the diabetic population occur because of mistaken preoperative diagnoses, such as diabetic neuropathy (characterized by the absence of posture-related pain relief and the presence of night pain) and peripheral vascular disease.
11. The most common predictor in patients with early failure after laminectomy is the absence of actual neurogenic claudication coupled with the absence of severe stenosis on preoperative imaging studies. The most common technical error is inadequate neural decompression.

It is again important to note that the observations from the above studies did not separate out patients over 80, and there were wide variations in outcomes and major deficits in study design.

Proper selection of patients may influence outcome. In a group of patients who underwent lumbar decompressive laminectomy for spinal stenosis, the most common cause of treatment failure was poor selection of patients (20). Also, the natural history of spinal stenosis is not always poor. In some patients, expectant observation may be a reasonable alternative to surgical treatment (21). As lumbar stenosis with focal neurologic deficits in the elderly poses separate and unique challenges, it deserves special study. Areas that need further attention include nonsurgical management, alternative surgical approaches, evaluation and treatment of the very old (over age 80), and appropriate selection of patients for surgery. Other challenges will be to define why female patients often present with more severe pathology and respond better than males to surgical intervention (22).

The concomitant medical problems warrant close preoperative assessment and management. Many older patients present with associated problems (such as vascular disease, diabetes mellitus, osteoporosis), which makes evaluation and treatment more complicated than in a younger population. Preoperative and postoperative rehabilitative intervention facilitates early functional achievements and facilitates return to functional independence. Early recognition and management of barriers via a multidisciplinary health management team will allow for increased success in dealing with the elderly patient with lumbar spinal stenosis.

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