PRELIMINARY EXPERIENCE WITH PEDICLE-LENGHTHENING OSTEOTOMY FOR THE TREATMENT OF LUMBAR SPINAL STENOSIS

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Introduction.

Lumbar spinal stenosis (LSS) is defined as a reduction in the diameter of the spinal canal and/or neural foramina which leads to significant disability, particularly in the elderly. The most frequent cause of LSS is a degenerative disease, including narrowing and bulging of the intervertebral disk, hypertrophy of the facet joints, thickening and buckling of the ligamentum flavum, and/or degenerative spondylolisthesis. A variety of nonoperative measures have been advocated for treating LSS, including physical therapy, spinal injections, and medications. Open lumbar laminectomy is the primary surgical therapy for LSS. This procedure is a moderately invasive operation and is most commonly performed under general anesthesia. Unfortunately, open laminectomy may pose an unacceptable risk to some older, medically compromised individuals with LSS besides the risk of a future iatrogenic instability. A new procedure for LSS uses bilateral pedicle-lengthening osteotomies to expand the dimensions of the spinal canal and neural foramen. This percutaneous procedure lengthens the lumbar pedicles through an expanding osteotomy at the junction of the pedicles and the vertebral body. The small gap produced by the pedicle-lengthening device moves the anterior elements away from the posterior elements, resulting in expansion of the spinal canal and neural foramen. The object of this study was to define the postoperative outcomes and complications of pedicle-lengthening osteotomies for symptomatic LSS.

Methods. A cohort of 12 patients with symptomatic LSS was treated by pedicle-lengthening osteotomy procedures at 1 or 2 levels. All patients had symptoms of neurogenic claudication or radiculopathy secondary to LSS and had not improved after a minimum 6-month course of nonoperative treatment. Clinical outcomes were measured using the 12-Item Short-Form Health Survey (SF-12) and a visual analog scale (VAS).

Results. The pedicle-lengthening osteotomies were performed through percutaneous approaches with minimal blood loss in all cases. There were no operative complications. Clinically, significant improvement was observed in the mean values of each of the outcome scales. Most of patients demonstrated bridging bone on the 6-month postoperative CT scans at the osteotomy site, consistent with healing of the osteotomy. Most of patients demonstrated an increase in the mean cross-sectional area of the spinal canals on the 6-month CT scans as compared with the preoperative CT scans.

Conclusions.

The pedicle-lengthening osteotomy is a new mini invasive technique for correcting lumbar spinal canal stenosis. This approach has some theoretical advantages due to the fact that it can be performed percutaneously, thus reducing the surgical morbidity associated with a traditional open laminectomy. Additionally, the pedicle-lengthening osteotomy procedure removes no normal spinal structures. Longer-term follow-up will be required to define the durability of the treatment effect with this procedure besides the benefits and risks of the pedicle-lengthening osteotomy procedure in relation to other LSS therapies.