Management of post-laminectomy lumbar instability

Mohamed Mahmoud Ahmed Aly

Decompressive lumbar laminectomy is one of the most common procedures preformed by spine surgeons in order to decompress central and lateral lumbar canal stenosis, which is generally caused by a combination of spondylosis and a congenitally narrow lumbar canal, and less often, decompressive lumbar laminectomy is performed also for access to intra-or extradural pathology (Esses and Huler, 1992).Wide laminectomy of the lumbar spine in which there is partial resection of the medial one third to one half of the facet joints, in addition to concomitant disk removal is a destructive surgery of the posterior spinal elements.Adams and Hutton in 1983 reported the percentage contribution by various structures in the prevention of segmental instability as follows; intact facet capsules (39%), intact disc and annulus (29%), the supraspinous and interspinous ligaments (19%) and the ligamentum flavum (13%). This suggests that sacrifice or disruption of these structures numerically increases the risk for postoperative instability of the lumbar spine.The risk of instability after laminectomy is directly related to the amount of facet joint removed (Iida et al., 1990). Additionally, violation of the pars, or overzealous removal of facets, can also lead to later facet fracture and presumed secondary instability. This latter condition is more common than was previously believed (Frymoyer et al., 1996).Abumi et al in 1990 reported that, unilateral or bilateral medial facetectomy, with division of the supraspinous and interspinous ligaments did not affect the lumbar spine stability in any type of spinal motion except flexion. Total facetectomy, even created unilaterally, made the lumbar motion segment unstable in axial rotation and flexion.Esses et al in 1989 concluded that spinal instability is reported to be the third most common source of late failures after lumbar decompression; 1-Epidural fibrosis or arachnoiditis, 2-Recurrence of stenosis at operated levels and/or new stenosis at adjacent levels, 3-Persistent or acquired instability, and has been reported to account for 18% of the overall failures.Therefore, it is thought that some of the lumbar spines treated by posterior decompression seem to be the best examples of post-operative adhesions may lead to loss of mobility of the dura and nerve roots and cause onset of signs and symptoms of clinical instability even with slight movements of the lumbar spine.Fox et al. in (1996) reported that the intervertebral facet joint has an important role in stabilizing the lumbar spinal segments, especially in term of axial rotation and should be spared, in part, when possible during decompressive surgery of the lumbar spine.The manifestations and pathomechanism of postoperative

lumbar spinal instability was clarified by means of functional radiographic analysis and clinical symptoms. However, the presence and degree of instability, which are detected radiologically, are not necessarily in agreement with clinical signs and symptoms. Most of the authors define spinal instability on the basis of two aspects independently; the structural and the clinical. from the structural aspect, instability is associated with hypermobility, which can be proved by radiological examinations such as dynamic films (flexion- extension and lateral bending), where, the hypermobility is classified as movements beyond each axis of three-dimensional coordinate system. In general, the presence of anterior or posterior translation in sagittal plane that is greater than 3 to 4 mm on static or dynamic (flexion and extension) radiographs and/or the presence of more than 10° angular motion between adjacent end plates on lateral flexion and extension radiographs when compared with adjacent proximal and distal levels, this is known as “radiologic instability”. Clinically, no matter whether or not there is detectable hypermobility, the condition in which clinical sings and symptoms of instability are present (Acute low-back and leg pain that induced by dynamic changes in posture and movement “painful catch” and anxiety concerning the onset of pain with these changes “apprehension”) is known as “clinical instability”.Spinal instability or deformity is the basic indications for spinal fusion. The literature generally is supportive of the inclusion of fusion surgery in the disorders of spinal instability, especially in the absence of intact posterior elements.Posterolateral fusion with instrumentation confers immediate stability to the spinal motion segment being fused. Data from several prospective and retrospective studies does show an improved fusion rate with the addition of instrumentation. For single level posterolateral fusion without instrumentation, the expected pseudarthrosis rate is 10% to 15%. This may be lowered to 5% with the addition of pedicle instrumentation. Advantages of pedicle instrumentation include; the ability to control all three columns of the spine from a posterior approach, the ability to restore and maintain coronal and sagittal contours of the spine, the ability to achieve spinal fixation in the absence of the missing posterior elements and avoidance of space occupying implants in spinal canal.Based on the previous facts, this prospective study was conducted on twenty (20) adult patients with signs and symptoms indicating postlaminectomy lumbar instability.The protocol of surgical management used in this series consisted of:- Decompression when indicated.- Insertion of pedicular screws- Posterolateral fusion and intertransverse fusion using iliac bone graft.After an average follow up of 18 months, the postoperative results obtained from this work were assessed based on the rate of improvement as described by Ricciardi et al. (1995).• Excellent, good improvement rate were in 15 patients (75%)• Fair improvement rate were in 5 patients (25%).• Painful catch and apprehension disappeared in all patients.• All patients showed excellent improvement in claudication painAs the difficulty of radiographic assessment of fusion, clinical assessment is more important and if there is clinical problem it must investigate the fusion up to surgical exploration. 18 patients (90%) showed good alignment and fusion of the treated motion segments, pull out of the screw was found in one patient and malposition pedicle screw was found in one patient.The results of this study support the reliability of posterolateral fusion with pedicular screw fixation to be an effective treatment for management of

cases with post laminectomy lumbar instability.