Minimally Invasive Lumbar Laminectomy

see also Lumbar microendoscopic spinal decompression surgery.

Minimally Invasive Lumbar Laminectomy via unilateral approach is one of the minimally invasive methods used for degenerative spinal stenosis.

Bilateral decompression through unilateral approach is an effective method without instability effect, which provides sufficient decompression in the degenerative stenosis and increases patient comfort in the postoperative period 1).

see Laminotomy

see Facetectomy

Microsurgical technique

Development of microsurgical techniques have provided innovations towards minimizing the surgical insult in surgical approaches to canal stenosis 2).

The advantage of a microsurgical approach is the possibility of a wide bilateral decompression of spinal canal or foramen at one or multiple levels, through a minimal paraspinal muscular dissection. As a result, it is possible to preserve important soft tissues and bones, which are vital for the stability of the spinal column, while at the same time being able to remove bilateral pathologies encroaching upon the spinal canal or foramina 3).

Several authors have developed various microdecompression procedures for lumbar canal stenosis, including microhemilaminotomy, interlaminar microdecompression, intersegmental microdecompression, resculturing microlaminoplasty and segmental microsublaminoplasty 4).

Minimally Invasive Versus Open Laminectomy for Lumbar Stenosis

Relevant articles were identified from six electronic databases. Predefined endpoints were extracted and meta-analyzed from the identified studies.

Satisfaction rates were significantly higher in the minimally invasive group (84% vs 75.4%; P = 0.03), while back pain VAS scores were lower (P < 0.00001). Minimally invasive laminectomy operative duration was 11 minutes longer than the open approach (P = 0.001), however this may not have clinical significance. However, there was less blood loss (P < 0.00001) and shorter hospital stay (2.1 days; P < 0.0001). Dural injuries and cerebrospinal fluid leaks were comparable, but reoperation rates were lower in the minimally invasive cohort (1.6% vs 5.8%; P = 0.02) however this was not significant when only randomized evidence was considered.

The pooled evidence suggests ULBD may be associated with less blood loss and shorter stay, with similar complication profiles to the open approach. These findings warrant verification in large prospective registries and randomized trials 5).

Using a decision-analytic model from the Medicare perspective, a cost-effectiveness analysis was performed comparing mild® to ESI or laminectomy surgery. The analysis population included patients with LSS who have moderate to severe symptoms and have failed conservative therapy. Costs included initial procedure, complications, and repeat/revision or alternate procedure after failure. Effects measured as change in quality-adjusted life years (QALY) from preprocedure to 2 years.
postprocedure. Incremental cost-effectiveness ratios were determined, and sensitivity analysis conducted. The mild® strategy appears to be the most cost-effective ($43,760/QALY), with ESI the next best alternative at an additional $37,758/QALY. Laminectomy surgery was the least cost-effective ($125,985/QALY).

**Trumpet laminectomy fenestration**

In the Japanese Neurosurgical Society, one of the common procedures for microdecompression of lumbar spinal canal is trumpet laminectomy fenestration.

see Trumpet laminectomy microdecompression.

**Case reports**

A 68-yr-old male entailing a 2-level minimally invasive lumbar laminectomy and foraminotomy at L2-L3 and L3-L4. The patient initially presented with symptoms of treatment-refractory lower extremity numbness and limited ambulation. His imaging demonstrated coronal scoliosis and severe lumbar central and foraminal stenosis at L2-L3 and L3-L4, with enlarged spinous processes, laminae, and facets. The patient consented to the procedure and publication of their image. The operation proceeded with the patient in a prone position with paramedian dissection to the lamina through a minimally invasive tubular retractor. Laminectomies and foraminotomies were performed at each level with high-speed drill and a Kerrison rongeur, with care to identify and protect the relevant spinal nerve roots. Postoperatively, the patient reported significantly reduced numbness and improved ambulation, with a well-healed surgical incision notably smaller than those produced in an open operation.

**References**


