

Lumber Spine Decompressive Laminectomy Surgeries In Lateral Decubitus Position And Spinal Anaesthesia

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Decompressive Laminectomy Surgery (DLS) to relieve compressed nerve roots in Lumbar Spinal Canal Stenosis (LCS) is one of the most common surgical procedure performed all over world, with about 80 percent successful and satisfactory outcomes, as reported by various prospective and retrospective studies, so far. Thanks to the invention of MRI and CT imaging, the diagnosis of spinal canal stenosis is possible with certainty and this has resulted into a marked increased in spinal canal surgeries. The purpose of our Retrospective study is to compare the merits-demerits of Prone and Lateral Positioning in terms of ease and comfort in the execution of DLS. It should be noted that our study is not to compare outcome of any Conservative vs. Surgical Treatment.

In order to reduce the various potential risks associated with Prone position for spinal surgeries, we preferred the Lateral Decubitus Position, which, also allowed us the liberty to employ spinal anaesthesia. We performed decompressive laminectomy surgeries (DLS) without any bony fusion or Posterior Stabilization, except in cases where there was obvious spinal instability -Listhesis, which had the potential risk to worsen after Laminectomy alone. A Dutch surgeon, introduced the concepts of spinal canal stenosis and coined the term stenosis of the vertebral canal, in 1949. In 1954, he brought the term to the knowledge of Orthopaedicians and Neurosurgeons. Later on Kirkaldy-Willis and colleagues^{8,9} worked more into the subject and did the detail study about the pathology and pathogenesis of lumbar spondylosis and stenosis^{4,5,6,11,15}. Schlesinger introduced the term Lateral recess stenosis which was found in two patients¹⁰, in 12 patients by Epstein, et al.³ in 1972, and in 16 patients by Ciric, et al.² in 1980. Furthermore, Katz and coworkers⁶ have shown that initial improvement last for few months and then deteriorates over time in DLS. There have been numerous retrospective studies in which the results of surgery with and without fusion have been reported. Turner, et al.¹³ conducted a Metaanalysis of 74 journal articles, published from 1966 to 1990, that met the inclusion criteria. On average, 64% of patients treated surgically for LSCS had a good to excellent outcome. After reviewing 47 articles in which patient outcome after lumbar spinal fusion was reported, the same authors² found no advantage to using . Presenting Symptoms-In our study, symptoms associated with LSCS included: Pain in the back in 94.3% of patients with an average duration 36 months, radiating pain in the; leg seen in 98.5% of patients, average duration being 24 months; paresthesias was reported in 76.5% of patients; and difficult ambulation in 79.7% of patients. Symptoms of disc prolapse included : backache in 100% of patients, average duration 65 months; legs pain in 97.6% of patients, average duration 36.8 months; paraesthesias in 75.1% of patients; and difficulty in walking in 87% of patients. Symptoms associated with lateral recess stenosis included: Backache in 100% of patients, average duration 43months; pain in leg 95.7% of patients, for average duration 26.5 months; paraesthesia in 87.5% of patients; and difficulty walking in 65% of patients.

Clinical Examination: Straight Leg raising found positive in 58%; Sensory loss or impairment in 48.2%; Motor weakness in 34.7%; and

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deep Reflex changes in 57.8% of the patients. In case of Lumbar Stenosis and Herniated Disc we noted: straight leg raising was positive in 85.2%; Sensory loss in 67.6%; Motor weakness in 58.7%; and Deep tendon Reflex changes in 56.7%, and in patients who had Lateral recess stenosis clinical signs were: Straight Leg raising positive in 89%; Sensory impairment in 58.6%; Motor weakness in 56.2%; and deep tendon Reflex changes in 54.7%. Diagnostic Investigations- Our diagnostic study is magnetic resonance imaging, and this procedure was used in all the patients included in this study.

Exclusion Criterion- In this comparative study we have excluded surgeries performed in Prone position, at level other than L4-5 and L5-S1 and, which involved the Fusion and Pedicular fixation. Surgery were not performed in obese or overweight patients.

Surgical Technique- Patient is given Spinal Anaesthesia and turned to one side-a Lateral Decubitus position, depending on the side of the disease. For Right sided Radiculopathy, Left Lateral Position and for Left sided, Right Lateral Position is utilized. Surgery is started with marking of intended level under Carm guidance. Posterior Midline incision of about 1.5-2 inch in size for one level and 2.5-3 inch size for two level Decompressive Laminectomy is usually carried out. Subperiosteal dissection on affected side is undertaken and extended laterally to expose the affected level lamina till facetal joints. Micro-scoop or curette is used to clear the area. Ligamentum flavum is curettage from under the surface of caudal and cephalic margin of adjacent upper and lower bony lamina. Kerrison Rongeur is used to carry out medial facetectomy of superior facetal joint which exposes the underlying nerve root. Then using blunt dura dissector as a protection between dura and lig. Flavum, part of the hypertrophied ligament is incised and removed using rongeur. Part of the bony lamina is also excised using burr and bone nibbler. Epidural venous bleeding is usually not much of problem. Continuous suction and Bipolar cautery is used to stop the bleeding if there is any. We rarely come to use bone wax, Surgigel or surgisilk etc. to control the oozing. Depending on the level and area of compression, more or less compressive ligament and bony tissue is excised. Nerve roots are identified and Retracted medially to expose the protruded disc, if present, to remove the offending disc material. Nerve root is cleared of all compression and/or adhesion to make sure that about 1cm of nerve root is clearly visible and seen to be entering the foramen. Most of the time we found bruised spots on nerve root, a telltale sign of chronic compression. The lower limb of the affected side is flexed and extended at hip to watch out for any tension at nerve root and to be sure of root's complete freedom from any compression or impingement. At the end, wound is irrigated with Normal Saline and closed in layers by Polyamide sutures. After 6 hours of surgery, patient is encouraged to sit up and stand up. Next day, patient is allowed to walk if pain permits. Between January 2012 and OCT 2015, 310 patients underwent surgery in Lateral Decubitus position for (A) Lumbar stenosis- L4-5 or L5-S1 (202 patients), (B) Lumbar stenosis and Herniated Dig - L4-5 or L5-S1 (61 patients), (C) Lateral recess stenosis(L4-5 or L5-S1 - 47 patients). The male/female ratio for each group was 51:49, 64:36, and 68:32, respectively. The average age for all groups was 62.1 years. Complications of Surgery-In 5 patients, a dural

tear occurred during initial laminectomy, 3 of them required suturing at the end of surgery. 6 patients had superficial infection, which were treated successfully by sensitive Antibiotics and debridement. 15 patients had persistent Radicular pain, which reduced in intensity over 6-months period, but not resolved completely. 32 patients had lower backache, which was relieved by medication and physiotherapy. 3 patients had Foot drop (had calcified disc and excessive nerve root retraction caused the neuropraxia). 2 patients recovered completely in 3-5 months. One did not recover, who required Tendon transfer surgery. Follow-Up Evaluation -For patients with LSCS, the success rate was 87.2% at 6 weeks and 85.2% at 6 months. For patients with LSCS and herniated disc, The success rate was 86% at 6 weeks and 84.6% at 6 months. In patients with Lateral Recess Stenosis, the success rate was 70.1% at 6 weeks and 78.6% at 6 months. The success rate for patients with Lateral recess stenosis was much lower. We believe that in Lateral recess stenosis the nerve root which was compressed too much, required more healing time for recovery. In some instances, where prolapsed disc was calcified, the root manipulation was considerably more. So, the patients had sensory and motor deficit for 3-4 weeks, due to Neuropraxia.

As mentioned before, we wanted to compare the Merit and Demerit of Lumbar surgery in Prone and Lateral position from our past experience, in terms of feasibility, comfort, adequate execution and time taken in the whole process of surgery, and for that matter, we had the following points to make. Prone position is accepted out of training, familiarity and experience. Additional gadgets like special Spinal Frames, Bolsters, special Spine table is needed for surgery in Prone position - but no such requirement needed for Lateral position. In Prone position- Excessive bleeding from pressure on the abdomen due to Epidural Venous Engorgement have been reported- but considerably less oozing was noticed in Lateral position. So, the requirement of Bone wax, Surgigel, Surgisilk or Haemoloketc was considerably less. Prone position is Static position and alteration in position during surgery is not possible-While, Lateral position allowed the alteration in lower limb position, like flexing the hip and knee to relax the nerve roots. Maneuvering of C ARM image intensifier is difficult and strain the surgeon in Prone position, while in Lateral position, C-arm handling is quite easy and hassle free. Disadvantages to Anaesthetist in Prone position included the universal need for General Anaesthesia, and complications like Cardio Pulmonary events - which may prove difficult to manage in this position. Disadvantages to patient in Prone position include stress on pressure points, Cervical spine strain, Pressure on Eyeball which can result rarely in blindness-In Lateral Position, pain due to pressure on arm and shoulder can make patient uncomfortable if spinal anaesthesia is used and surgery is prolonged. But this problem was not significant as most of our surgeries would finish in less than one hour.

OUR OBSERVATION AND EXPERIENCE IN 310 SPINAL SURGERIES

PERFORMED IN LATERAL DECUBITUS POSITION

1. Ease of surgery. In our experience, it was far easier to perform surgery in Lateral position as it allowed the surgeon to

sit comfortably on chair/stool and perform the procedure, rather than stand and tire himself or herself.

2. Surgery Time-our surgical time had reduced to 50 percent or less as compared to our past experience in prone decubitus position, due to virtually bloodless clear operative field and minimum oozing of epidural venous blood, thus allowing surgeon to gain time, which otherwise used to be lost in maintaining haemostasis. Minimum recorded time was 25 mins (Skin incision to Closure). Surgery never extended more than 70 mins (mostly under one hour).

3. Comfort for Assistant- It was easier for the assistant to notice the procedure and be interested in learning the proceeding as both Surgeon and Assistant have clear vision of surgical field, without straining their body.

4. Anaesthesia related issues-Anaesthetist found it easier to manage and monitor the patient in Lateral position with regards to fear of displacement of ECG Leads and Endotracheal tube. As pressure on abdomen is less, and resulting Epidural Venous Oozing at operative area is considerably reduced, there is no need for the Anaesthetist to maintain hypotension.

5. Lateral position allowed to the use of Spinal Anaesthesia, which greatly reduces the overall surgical time, by avoiding time taken for Reversal. After surgery, patient is immediately shifted out of O.T.

6. Transfer or Shifting of patient was faster and easier as Lateral position does not utilize special gadgets like Spinal Frames or Bolsters etc.

7. Field of vision at surgical area- it was quite astonishingly clear and allowed the visualization of roots, its axilla, and the telltale sign of Compression like Bruising or Laceration mark on dura of nerve roots Our end point of adequate surgery was, when we have cleared the nerve root of all the compressing tissues, like hypertrophied ligament, osteophytes, prolapsed disc material etc. and about 1 cm length of root starting at Axilla, and, then passing on to Intervertebral Foramen, is clearly visualized, and found free from all the adhesions or compressive material.

Conclusion: From my experience, I found that Open Lumbar Spine Decompressive surgeries like laminotomy-Flavotomy or Laminectomy, Discectomy, Lateral root canal Decompression etc. in Lateral Decubitus position at L4-5& L5-S1 level, offers various advantages over that in Prone position. Important and most significant of that being, (1) feasibility to perform surgery in Spinal Anaesthesia, (2) Less bleeding offers safety and reduces surgery time considerably. Our minimum surgery time for Decompressive Hemilaminectomy and Disc Excision @ L5-S1, from skin incision to closure, was just 25 mins recorded, and from induction of spinal anaesthesia to shifting the patient out of theatre was noted only 38 mins. I strongly advocate performing spinal surgery in Lateral position under Spinal Anaesthesia, as a better choice in terms of safety and adequate surgical execution, over prone position.

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