

EXCISION OF LUMBER DISC THROUGH FENESTRATION A PROSPECTIVE STUDY TO ANALYSE FUNCTIONAL RESULTS

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Abstract

Background: Fenestration provided better results in comparison to laminectomy procedure, and at the same time preserved the spinal stability and provided the early mobility & early return to previous job. Present study is conducted to analyse the results of lumbar disc prolapse operated by fenestration. **MATERIAL AND METHODS:** It is a prospective study of 25 cases of prolapsed lumbar inter vertebral disc. The cases of low backache and sciatica were identified by defined criteria and treated surgically for disc prolapse. Patients with clinical signs and symptoms of prolapsed lumbar intervertebral disc having radiological correlation by MRI study were subjected to disc excision by interlaminar fenestration method.

Results: Results of operation in our series were excellent (13), good (11), fair (1). None of our patients became worse after surgery. Average follow up period was 19.1 months. Postoperatively the mean±SD score of pain on the VAS came out to be 2.96±1.02 which is found to be statistically significant ($p < 0.005$) when compared with preoperative pain.

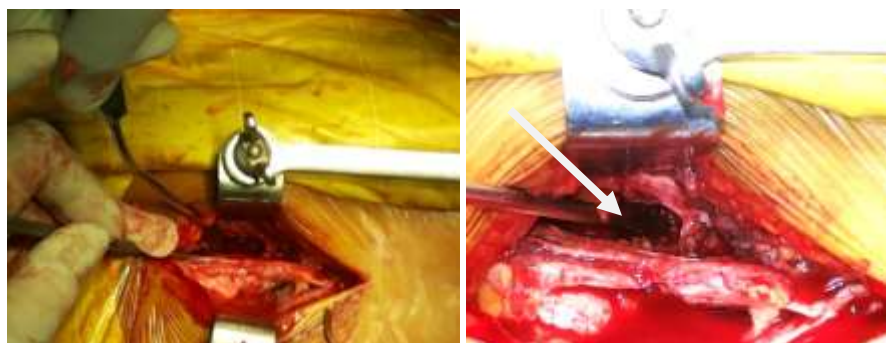
Conclusion: Interlaminar fenestration and open disc excision under direct vision offers sufficient adequate exposure for lumbar disc excision with a smaller incision, lesser morbidity and shorter convalescence. Patient returned to their usual activities in lesser time.

Introduction

In orthopedic practice patients having lesions of lumbo sacral region causing low backache with sciatica are not uncommon since the beginning of recorded history¹. Lumbar disc disease is a common cause of medically authorized work². The pain is due to the irritation of the dura covering of nerve root by the protruded part of inter vertebral disc³. Surgeries of laminectomy and discectomy of lumbar spine are one of the most commonly performed surgeries in spine. Now it is truly within surgeons control to deliver consistently good results with surgical interventions. Fenestration technique for removal of the lumbar disc has been in use for a number of years. It has certain distinct advantages over the more commonly used laminectomy technique of disc excision. Love described extradural removal of herniated disc and devised interlaminar fenestration for treatment of lumbar disc prolapse⁴. The advantages of fenestration and interlaminar approach have been demonstrated. Mishra et al compared laminectomy and fenestration for disc excision and concluded the superiority of later approach in respect to early postoperative mobilization, early return to work and low incidence of postoperative backache as it is less extensive⁵. It is very safe, effective and reliable surgical technique for treating properly selected patients with herniated disc. This approach is free from spinal instability and membrane formation resulting from laminectomy. The recent techniques like percutaneous lumbar disc decompression (PLDD), percutaneous endoscopic lumbar discectomy (PELD) and Young endoscopic spine system (YESS) need lots of expertise, experience and expensive equipments which are not available at every center^{6,7}. Hence disc excision through fenestration is the procedure which can be performed by majority of orthopaedic surgeons even in small peripheral centers. The aim of the present report is to analyse the results of 25 cases of lumbar disc prolapse, operated by fenestration technique, to assess the suitability of this technique in disc excision and to identify the factors affecting the final functional results.

Materials and method

Twenty five patients with signs and symptoms of prolapsed lumbar intervertebral disc who failed to respond to conservative treatment of minimum 6 weeks duration were studied prospectively. This study was undertaken in the Department of Orthopedics, Gauhati Medical College, Guwahati. A written informed consent was obtained from each patient. Presence of neurological impairment (paresthesia, motor/sensory deficit) alongwith at least three of the following clinical features formed the criteria for selection of patients for surgery. The criteria are accentuation of symptoms with cough/sneeze, position of comfort (flexion at hips/knees), spinal tenderness, selective restriction of spinal movements, positive straight leg raising test (was less then 45 degree). All patients were subjected to MRI for confirmation of the prolapsed. All those patients with prolapsed L4-5 or L5-S1 disc on MRI were included. Routine haematological and urine examination were performed to evaluate the operative risk. Spine was approached through a two to three inch midline incision depending on the levels confirmed under fluoroscopy. All patients were operated in knee –chest position under general anaesthesia. If needed, lower 3rd part of upper lamina or upper 3rd of lower lamina was cut to enlarge a fenestration for clear view. The skin and para spinal muscles were infiltrated with 1 in 100000 diluted adrenaline to decrease the bleeding. We did a standard interlaminar fenestration by cutting through ligamentum flavum and if necessary only inferior lamina using Kerrison`s rongeurs. The sequestered and extruded loose disc fragments were removed. The exiting nerve roots were cleared of compression in all cases. Patients were restricted to bed for 24 – 48 hours under coverage of standard post operative antibiotics & analgesics. Postoperatively patient was allowed to sit up on second postoperative day. Gradual walking was encouraged, prolonged stooping and flexion was avoided. Lifting, bending and stooping prohibited for 6 weeks. Appropriate exercises for back, abdominal & hip musculature and back care were taught to patient. Patients who were heavy labourers or long distance drivers were off work until 12 weeks and then advised to modify their duties. All patients were advised a regular postoperative back exercise program after 3 weeks. The follow up data was analyzed using modified Macnab criteria. Statistical analysis was performed with statistical software graphpad instat 3. Significance was accepted at p-value <0.05.

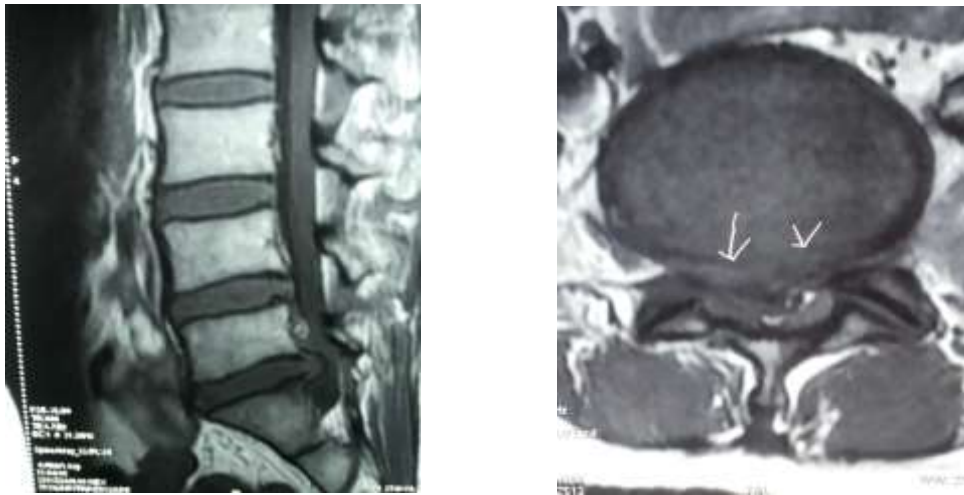


Intra operative photo showing nerve root

Results

Out of 25 patients 17 were males and 8 were females. The average age was 41.52 years ranging from 27-57 years. Eleven patients were sedentary workers. All patients were followed up for a period ranging from 9 – 27 months average being 19.1 month. The most common level of involvement was L 5 -S 1 followed by L 4 -L 5. Paracentral and posterolateral position of the prolapsed disc was most common followed by central or posterocentral. Eight patients had left sided symptoms while seventeen had right sided. Majority of the patients (76%) presented with low backache of which 6 patients also had a radiating pain. But 52 % patients presented with radiating pain. 16 patients i.e. 64% had symptoms of more than 6 months duration. Pain is measured simply asking patient to quantify it on Visual analog scale (VAS). On the VAS patient indicates pain intensity on a typical day by marking a line from 0-10 corresponding to pain level. In our study the preoperative mean \pm SD VAS score was 8.8 ± 0.816 on a scale of 10. On MRI 52% patients showed protrusion of disc and the rest showed extrusion. On clinical evaluation 24% patients showed SLRT less than 30 degrees. 68% patients showed reduced power of EHL, 24% patients had only sensory deficit and the rest had both. No patient had bowel and bladder involvement. Intraoperatively eleven patients had massive disc prolapse. Average postoperative hospital stay was 6.1 days. Average operative time was found to be 61

minutes and mean blood loss is 114.8 ± 14.75 ml. Intraoperative inadvertent dural tear occurred in only one case. In this case dural rent repair was done under vision. The patient recovered uneventfully. In one case disc material could not be extruded through the fenestration and so laminectomy had to be done. No extra stabilisation was required. Two patients had temporary retention of urine after the surgery which relieved by single catheterization. Three patients complained postoperative headache, relieved by intravenous saline hydration and analgesics. Based on modified Macnab criteria 13 patients showed excellent, 11 good and 1 fair result. Nineteen patients in our study returned to work in less than one month after surgery. Rest had to change their original work. Postoperatively the mean \pm SD score of pain on the VAS came out to be 2.96 ± 1.02 which is found to be statistically significant ($p < 0.005$) when compared with preoperative pain. Patients who had disc prolapsed between L5-S1 level showed better results than those with L4-5 level. 92% patients showed relief in backache symptoms, whereas radiating pain was relieved in 88% cases. 96% cases showed improvement in motor deficit whereas 92% cases showed improvement in sensory deficit after 1 week.



MRI showing L5-S1 disc prolapse

Discussion

Conservative therapy including bed rest, back school programmes and analgesic drugs is generally accepted as adequate treatment in the beginning of an acute attack of sciatica. Traction therapy has been recommended & used for many years and favorable results were reported³. But lumbar discectomy is a common operation in failure to conservative management.

Love devised inter-laminar fenestration. Refinement of fenestration technique was described by William who used an operating microscope to facilitate better visualization of dural sac, nerve roots and other inter-spinal structures including the prolapsed disc³.

The results of surgery in lumbar disc prolapsed have been reported by many authors earlier like O' Connell in 1951⁸, Sharma and Sankaran⁹ in 1980. But the aim of the present study is not to compare our own results with the previous series but to discuss the suitability of this technique in disc excision and to identify the factors affecting the final functional results.

On comparing fenestration with laminectomy as described by Nahar et al³ and Nagi et al¹⁰ fenestration had the added advantages of less surgical time and intraoperative blood loss, rapid convalescence, minimal risk of instability and they seldom landed up to post operative complications like adhesions and arachnoiditis. Due to maintenance of spinal stability early mobilisation was given to the patients. 76% patients returned to their original occupation in less

than one month time. The rest had to change their occupation. These patients usually were hard manual labours. During follow up period there was no recurrence of symptoms in any of the patients probably due to less chance of formation of adhesion and false membrane which is quite common in laminectomy. So it can be said that fenestration is a suitable procedure but surgeons must be prepared to perform foraminotomy or undercutting of upper or lower lamina in addition to lumbar disectomy if the nerve root remains tight after disc excision.

Speaking of functional outcome results of this study, state that the lumbar disectomy performed with a limited disc excision by fenestration is a safe, effective and reliable method for treating selected patients with herniated lumbar discs. The amount of disc herniations were assessed in MRI and on clinical analysis it was found that almost all of them gave good to excellent results according to modified Macnab criteria. No patients in this study deteriorated after surgery. The length of a patient's recovery period after surgery appeared to be strongly influenced by environmental factors and patient's motivation. In majority of patients with good results, the preoperative sciatic symptoms improved within first three days after surgery.

Conclusion

Results of this study, state that the lumbar disectomy performed with a limited disc excision by fenestration is a safe, effective and reliable method for treating selected patients with herniated lumbar discs. Fenestration is the procedure which requires knowledge and expertise in instrumentation and techniques, and is more cost effective. In the peripheral institutions fenestration with disc excision is quite a reasonable method to surgically treat the indicated cases of prolapsed disc and this procedure can be well performed by surgeon with adequate experience in the field of disc surgery. Fenestration provided early post operative mobilization and early return to job.

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