

Post Operative Leg Pain Relief after Microdiscectomy through Fenestration in Patients Having Sciatica Due to Lumbar Intervertebral Disc Prolapse

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ABSTRACT

Objective: To measure the post operative leg pain relief after Microdiscectomy through fenestration in patients having sciatica due to lumbar intervertebral disc prolapse.

Place and Duration of Study: This descriptive case series study was done at Department of Neurosurgery, Nishtar Hospital, Multan from 05-05-2012 to 04-11-2014.

Materials and Methods: One hundred patients undergoing Microdiscectomy through fenestration for prolapsed unilateral, single level, lumbar intervertebral disc, meeting inclusion criteria, were selected. Informed consent was taken from the patients. Leg pain was assessed using “visual analogue scale (VAS)” before surgery. Postoperative leg pain was assessed using VAS on 7th postoperative day.

Results: Out of total 100 patients 77 (77%) were male and 23 (23%) were female. Mean age was 30.90 ± 7.22 years, the age distribution was from 15 to 45 years. The mean decrease in VAS leg pain score was 4.13 points (from mean pre-operative 7.79 to mean postoperative 3.66 at 7th post-operative day), 97% patients had reported a decrease in VAS score of 2 or greater than 2 points post-operatively. Leg pain relieved in 97 (97%) patients.

Conclusion: Good pain relief was observed in our study after Microdiscectomy through fenestration in patients having sciatica. The procedure is safe, effective and reliable in pain management in patients having sciatica due to lumbar intervertebral disc prolapsed.

Key Words: Leg pain relief, Microdiscectomy, fenestration.

Abbreviations: VAS: Visual Analogue Scale.

INTRODUCTION

Sciatica represents most common & specific symptom of herniated intervertebral disc.¹ Lifetime risk of sciatica is 30 – 70% while 55% suffer from lower back pain at any given time and annual risk of its incidence ranges from 1% to 5%.² It is one of the **leading causes** of disability not only in industrialized nations but also encounters low and middle income countries.³ Lumbar disc herniation is frequently encountered by **Neurosurgeons** and it is major cause of sciatica and lower back pain while pathogenesis is poorly elucidated.^{4,5}

Symptoms of Sciatica are quite consistent with about 33% patients having sciatica have to undergo lumbar surgeries.⁶ Lumbar radicular pain is generally caused by irritation or compression of one of the lumbosacral nerve roots. Sciatica represents a set of varying symptoms rather than being a particular diagnosis which are made by due to herniated lumbar disc. The diagnosis generally specific history followed by physical examination. MRI is helpful in visualizing soft tissues more efficiently than that of CT scan, so it is preferred diagnostic modality. Major symptom is

lower limb pain which radiates in the foot and toes.^{7,8} Different procedures (operative and non-operative) have been applied for the treatment of these patients showing different rates of their efficacy. In majority of patients treatment plan involved patient education, physiotherapy, alternative medicine options and pharmacotherapy while surgery is recommended upon failure of these techniques.⁹

Disc prolapse is quite common cause of sciatica having lesions occurring mostly at L₄ – L₅ and L₅ – S₁ segments.¹⁰ Estimated 12 – 33% of the young working force is affected by lower back pain every year and it has further been suggested that around 70% to 95% of adult population will have this disease at some time during their lifetime. The most useful tool for diagnosis is physical examination of the patients which indicate exact site tissue where pain originates and help for making a proper diagnosis.¹¹⁻¹³

As it hits main workforce of the society so it have got its socio-economic, financial, cultural and psychological implications particularly in developing countries like Pakistan. In the developing country, like Pakistan, spinal endoscope and required expertise for percutaneous disectomy is not freely available. Many studies have been conducted to compare decompressive laminectomy with microinvasive disectomy in different aspects throughout the western world, but no such study available in Pakistan. Leg pain relief after fenestration and disectomy need to be evaluated in our population as well, so this study has been conducted. In view of potential benefits of microinvasive disectomy, it is a better option in selected patients in our set-up.

OBJECTIVE

To measure the post operative leg pain relief after Microdiscectomy through fenestration in patients having sciatica due to lumbar intervertebral disc prolapse.

MATERIALS AND METHODS

One hundred patients fulfilling the inclusion criteria were selected from the patients admitted in the neurosurgical department through the out-patient department. After thorough counseling with the patient and his/her relatives, informed consent for Microdiscectomy through fenestration was taken. Patients of both sexes, between 15 to 45 years of age, having sciatica which was not relieved after conservative medical

treatment of 3 weeks, and MRI evidence of unilateral, single level, lumbar intervertebral disc prolapse were included in this study while patients with bony spinal stenosis, having paraparesis or sphincteric loss and patients with MRI evidence of central disc prolapsed were excluded from this study. Leg pain was assessed using visual analogue scale before surgery. Operation was done by the consultant neurosurgeon having 5 year experience of disc surgery. Preoperative and postoperative antibiotic cover and analgesics was given according to protocol of hospital. Postoperative leg pain was assessed using visual analogue scale on 7th postoperative day. Patients were discharged after assessment by consultant neurosurgeon. Decrease in VAS score of 2 or greater than 2 points was deemed as leg pain relief on 7th postoperative day. Score (0) was considered no pain while score (10) was considered severe most pain. Score in between shows the progressive increase in severity of pain in ascending order. Preoperative and postoperative pain scores were noted and compared. Decrease in 2 or greater than 2 points on VAS leg pain score was considered as leg pain relief.

Fenestration and Microdiscectomy: In this procedure only the ligamentum flavum and if necessary small portion of lamina was removed to expose and remove the prolapsed disc under microscope.

Sciatic Nerve: This was diagnosed on clinical examination and confirmed on MRI. Presence of sciatica (SLR-t $\leq 60^\circ$) and confirmation of lumbar disc prolapse on MRI was deemed as a positive case.

Clinical Examination

- (a) Straight leg raising test (SLR-t) was performed with the patient in supine position and no dorsiflexion of the ankle, using an inclinometer for precise data and rising to a maximum of 90°. Restriction to 60° or less was considered as sciatica.
- (b) Knee jerk and ankle jerk were performed with hammer. Absent or diminished knee or ankle reflex was considered as significant.

Magnetic Resonant Imaging (MRI) Verification: Focal protrusion of disc material resulting in compromise of dural root sleeve. T₁ weighted images demonstrate interposed tissue connected with the **intervertebral disc**, compressing the dural sac and nerve root. On T₁ weighted MRI images, lumbar spine disc herni-

ations were usually iso to slightly hyperintense relative to the parent disc. Disc herniation signal intensity on T₂ weighted images is variable, the herniation is often iso to hypointense to the parent disc.

Pain Assessment: Measured preoperatively and post-operatively on 7th postoperative day using Visual Analogue Scale (VAS. Score (0) was considered no pain while score (10) was considered severe most pain. Score in between showed the progressive increase in severity of pain in ascending order. Preoperative and postoperative VAS pain scores were noted and compared. Difference in VAS pain scores at day (0) and day (7) of 2 points or more were considered as leg pain relief.

Data was analyzed using SPSS version 20. Frequency and percentages were calculated for leg pain relief and gender. Descriptive statistics were used to calculate mean and standard deviation for age, pre-operative VAS pain score and postoperative VAS pain score.

RESULTS

There were total of one hundred (100) patients who were operated for prolapsed lumbar intervertebral disc in neurosurgical unit of Nishtar hospital Multan. Out of these 100 patients there were 77 male patients (77%) and 23 female patients (23%).

Patients were between the ages of 15 years to 45 years with the mean age of 30.90 ± 7.22 years, maximum age was 45 years and the patient with minimum age was of 15 years. Preoperative pain score was between 6 to 9 with mean pain score of 7.79 ± 0.82 with the minimum pain score was 6 and with the maximum pain score was 9.

Postoperative pain score was between 2 to 8 with a mean of 3.66 ± 1.18 (p = 0.001). Patients with the minimum pain score at 7th post operative day were 2 and with the maximum pain score was 8. Leg pain was relieved in 97 patients (97%) after surgery who reported a decrease in VAS score of 2 or greater than 2 points. Leg pain was not relieved in 3 patients (3%). One patient in which leg pain was not relieved falls in the age group of 26 – 35 and two patients falls in the age group of 36 – 45. So in higher age group the incidence of leg pain not relieved is greater than the younger age group that may be due to factors other than disc pathology contributing to the pain like foraminal or spinal stenosis. Also it seems that gender has no effect on the outcome. In 84 patients out of 97 patients

in which leg pain was relieved the difference in pre-operative and post-operative pain scores was 4 or above.

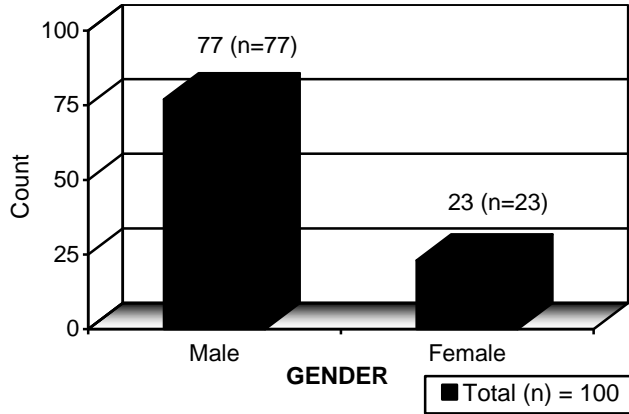


Fig. 1: Gender Distribution.

Table 1: Cross – Tabulation of Leg Pain Relief with Regards to Gender.

| Leg Pain Relief | Gender | | P-value |
|-----------------|---------------|-----------------|---------|
| | Male (n = 77) | Female (n = 23) | |
| Yes | 75 | 22 | 0.679 |
| No | 2 | 1 | |
| Total | 100 | | |

Table 2: Stratification of Leg Pain Relief with Regards to Age.

| Leg Pain Relief | Mean Age | Std. Deviation | P – value |
|-----------------|----------|----------------|-----------|
| Yes | 30.68 | 7.16 | 0.083 |
| No | 38.00 | 6.24 | |
| Total | 30.90 | 7.22 | |

DISCUSSION

Prolapsed intervertebral disc, a common cause of sciatica, occurs in 5 – 10% of all the patients who present with the. Even a small herniated disc in the presence of a slightly narrow spinal canal can lead to significant compression of cauda equina and its nerve roots. Patients in our study had unilateral and single

level lumbar disc prolapse who presented with the radiating leg pain along the distribution of sciatic nerve, restricted SLR, reflex abnormalities due to compression of nerve roots.

Initially the patients who presented with backache, typical radiating pain, and reflex abnormalities were evaluated by taking detailed history and thorough clinical examination. Among the clinical examination most significant test considered was Straight leg raising test, preoperatively if it was less than 60 degrees then it means patient is having significant sciatica. MRI was considered the investigation for choice all the 100 patients in our series were investigated by getting MRI of lumbosacral spine, most of the patients had prolapsed disc at L₄₋₅ level and then at L₅ – S₁ level, few patients had prolapsed disc at L₃₋₄ level.

The simple diagnostic test, which was used to measure pain, was by asking the patient to identify the pain on pre-validated Visual analogue scale. On this scale patients indicated intensity of pain by marking a line from 0 – 10 corresponding to level of pain.

In our study there was male gender predominance as there were 77% male patients. Similar findings have been documented in other studies as well showing more frequency of sciatica due to lumbar intervertebral disc prolapse. in males than females. A study from Rawalpindi Pakistan,¹⁴ reported 73% male patients with sciatica due to lumbar intervertebral disc prolapse which is same as that of our study results.

Patients were between the ages of 15 years to 45 years with the mean age of 30.90 ± 7.22 years in our study. Shehzad et al,¹⁴ from Rawalpindi reported 38.18 ± 9.29 years which is close to our study results. The findings show that this disease hits generally main adult workforce of our society so it has an economic impact on the suffering families as well.

In our study preoperative mean VAS score was 7.79 and at 7th post op day mean VAS was 3.66 ($p < 0.001$) showing that changes in pain score were statistically significant which demonstrated a significant reduction in patients perception of pain and improved functional capacity after surgery. A study conducted by Dewing CB,¹⁵ the mean decrease in VAS leg pain score was 4.7 points (from mean preoperative 7.2 to mean postoperative 2.5); 80% (146) reported a decrease of greater than 2 points. These findings are same as that of our study results showing significant reduction in mean VAS score among targeted population. Similar findings have been reported by Shehzad et al,¹⁴ from Rawalpindi.

In another study carried out by Sangwan SS,¹⁶ the preoperative mean \pm SD VAS score was 9.34 ± 0.84 which improved to 2.19 ± 0.84 postoperatively. A paired student t test showed that the above changes were statistically significant ($p < 0.001$), which shows a significant reduction in patient's perception of pain¹⁰. These observations of Sangwan et al,¹⁶ are similar to that of our study results.

Pain reduction is primary goal while treating sciatica by conservative procedures which is targeted either by use of analgesics or with reduction of pressure over nerve root. However some studies have reported no improvement in conservative management of natural course of sciatica or reduction of symptoms in these patients. Proper awareness of these patients regarding possible causes and expected outcomes and prognosis remains hallmark in the management strategy. In our study use of microscope was done to improve visualization and illumination, this leads to decrease wound size and minimal tissue manipulation during procedure. Out of 100 patients only 1 patient in our series had post operative CSF fistula that was recovered with the bed rest and conservative management. Two patients had wound infection which settled after antibiotic treatment. There was no reported case of wound dehiscence or spinal instability. Ninety seven patients (97%) had significant pain relief. Three patients reported no marked improvement in pain and were treated conservatively by giving NSAIDs and advising bed rest and follow up on OPD basis.

CONCLUSION

There is a significant decrease in perception of pain when compared using VAS preoperatively and postoperatively on 7th post-operative day in patients undergoing Microdiscectomy through fenestration for single level, unilateral lumbar disc prolapse. On the basis of results it is concluded that procedure of fenestration and open disc excision using microscope offers the complete visualization of nerve root and complete removal of the offending disc along with loose fragments in the facilities where spinal endoscopes and percutaneous discectomy facilities are not available.

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REFERENCES

1. Heliövaara M, Impivaara O, Sievers K, Melkas T, Knekt P, Korpi J, et al. Lumbar disc syndrome in Finland. *J of Epidemiology and Community Health*, 1987; 41: 251-8.
2. Stafford MA¹, Peng P, Hill DA. Sciatica: a review of history, epidemiology, pathogenesis, and the role of epidural steroid injection in management. *Br J Anaesth*. 2007 Oct; 99 (4): 461-73.
3. Malik KM, M Nelson A, J Avram M, Lee Robak S, T Benzon H. Efficacy of Pregabalin in the Treatment of Radicular Pain: Results of a Controlled Trial. *Anesth Pain Med*. 2015 Aug 22; 5 (4): e28110.
4. Xie P, Liu B, Chen R, Yang B, Dong J, Rong L. Comparative analysis of serum proteomes: Identification of proteins associated with sciatica due to lumbar intervertebral disc herniation. *Biomed Rep*. 2014 Sep; 2 (5): 693-8.
5. Ji M, Wang X, Chen M, Shen Y, Zhang X, Yang J. The Efficacy of Acupuncture for the Treatment of Sciatica: A Systematic Review and Meta – Analysis. *Evid Based Complement Alternat Med*. 2015; 2015: 192808.
6. Rezende R, Jacob Júnior C, da Silva CK, de Barcellos Zanon I, Cardoso IM, Batista Júnior JL. Comparison of the efficacy of transforaminal and interlaminar radicular block techniques for treating lumbar disk hernia. *Rev Bras Ortop*. 2015 Mar 10; 50 (2): 220-5.
7. Van Tulder M, Peul W, Koes B. Sciatica: what the rheumatologist needs to know. *Nat Rev Rheumatol*. 2010; 6 (3): 139-45.
8. Candido KD¹, Rana MV, Sauer R, Chupatanakul L, Tharian A, Vasic V, et al. Concordant pressure paresthesia during interlaminar lumbar epidural steroid injections correlates with pain relief in patients with unilateral radicular pain. *Pain Physician*, 2013 Sep – Oct; 16 (5): 497-511.
9. Awad JN, Moskovich R. Lumbar disc herniation: Surgical versus nonsurgical treatment. *Clin Orthop Relat Res*. 2006; 443: 183-97.
10. Al-Khodairy AT, Bovay P, Gobelet C. Sciatica in the female patient: anatomical considerations, aetiology and review of the literature. *Eur Spine J*. 2007; 16 (6): 721-31.
11. Ghai B¹, Vadaje KS, Wig J, Dhillon MS. Lateral parasagittal versus midline interlaminar lumbar epidural steroid injection for management of low back pain with lumbosacral radicular pain: a double – blind, randomized study. *Anesth Analg*. 2013 Jul; 117 (1): 219-27.
12. Candido KD¹, Rana MV, Sauer R, Chupatanakul L, Tharian A, Vasic V, et al. Concordant pressure paresthesia during interlaminar lumbar epidural steroid injections correlates with pain relief in patients with unilateral radicular pain. *Pain Physician*, 2013 Sep – Oct; 16 (5): 497-511.
13. Abdi S¹, Datta S, Trescot AM, Schultz DM, Adlaka R, Atluri SL, et al. Epidural steroids in the management of chronic spinal pain: a systematic review. *Pain Physician*, 2007 Jan; 10 (1): 185-212.
14. Shehzad Y, Mehmood A, Akhtar N, Malik MA. Leg pain relief after fenestration and Microdiscectomy in patients having sciatica due to lumbar intervertebral disc prolapsed. *J Rawal Med Coll*. 2012; 16 (2): 123-5.
15. Dewing CB, Provencher MT, Riffenburgh RH, Kerrs, Manos RE. Outcomes of lumbar Microdiscectomy in a young, active population: correlation by herniation type and level. *Spine*, 2008; 1: 33-8.
16. Sangwan SS, Kundu ZS, Singh R, Kamboj P, Siwach RC, Aggarwal P. Lumbar disc excision through fenestration. *Spine*, 2006; 2: 86-9.

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