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EFFECTIVENESS OF DISC EXCISION IN THE TREATMENT OF HERNIATED LUMBAR INTERVERTEBRAL DISC

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ABSTRACT

Objectives: To know the Effectiveness of disc excision in the treatment of herniated lumbar intervertebral disc.

Material and Methods: This study was conducted at Neurosurgery Department of Hayatabad Medical Complex, Peshawar. Duration of this study was from March 2014 to September 2014. The study design was descriptive case series in which consecutive non probability sampling technique was used.

Results: A total of 62 patients were included with 60% males and 40% females. Mean age was 37 years ± 4.68 SD, 65% patients had L4-L5, 24% patients had L5-S1 and 11% patients had both L4–L5 and L5–S1 level disc herniation. Preoperatively 75% had severe pain, 25% patients had moderate pain. Two weeks postop no pain was found in 85% patients, 12% patients had mild pain while only two patients had moderate pain. No correlation was found between preop pain and postop pain relief.

Conclusion: Limited disc excision either through laminectomy, hemilaminectomy or fenestration is a safe, effective and reliable surgical technique for treating properly selected patients of sciatica. Surgical discectomy provides immediate relief from radicular pain than conservative management. Recovery from sciatica make early surgery likely to be cost effective compared with prolonged conservative care.

Key Words: Sciatica, Prolapsed, intervertebral disc, disc excision.

INTRODUCTION

Low back pain and its radiation to lower limbs due to herniated intervertebral disc is a spinal disorder affecting young adults and is an important cause of patients attending neurosurgical Out Patient Department. Lifetime incidence of low back pain is 50-70% with incidence of sciatica more than 40%. Surgical discectomy for patients with sciatica due to lumbar disc prolapse provides faster relief from pain than conservative treatment. Mixter and Barr presented a classical paper on "Rupture of intervertebral disc with involvement of spinal canal" which opened an era of systematic diagnosis and operative treatment of lumbar disc prolapse. They advised the practice of wide laminectomy.[1]

Lumbar disc herniation is observed in 5-10% patients with backache. Increased morbidity and prolonged hospital stay is described in patients of laminectomy.[2,3] Disc herniation most commonly occur between fourth and fifth or fifth lumbar and first sacral vertebra.[4,5,6,7]

Medical treatment involves bed rest, physical therapy, osteopathic manipulations, massage therapy and non-steroidal anti-inflammatory drugs (NSAIDS), epidural (cortisone) injection, intravenous sedation, and analgesia-assisted traction therapy. Surgical treatment include microdiscectomy, laminectomy or hemilaminectomy, lumbar fusion, and artificial disc replacement.[8,9] The superiority of minimal invasive techniques has been well documented.[10]

There is a wide variability of outcome in patients operated for lumbar disc herniation for which the reasons are still unknown. Research has shown success rates for lumbar discectomy from 46-96%. Surgical discectomy for patients with sciatica due to lumbar disc prolapse provides faster relief from pain than conservative treatment. In General 80% patients reported a decrease of greater than 2 points on Visual Analogue Scale (VAS).[11,12,13,14,15] The objective of this study was to determine the effectiveness of disc excision in the

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treatment of herniated lumbar intervertebral disc and its impact upon the relief of back and leg pain as well relative functional improvement.

MATERIAL AND METHODS

This study was carried out prospectively at Neurosurgery Department of Hayatabad Medical Complex, Peshawar. The duration of the study was from March 2014 to September 2014. Patients of either sex in the age range of 20-50 years, and patients with moderate to severe radicular pain due to Prolapsed intervertebral disc at L4-5 or L5-S1, confirmed by MRI were included in the study.

Those patients with Cauda equina syndrome, presenting as foot drop, saddle anaesthesia or bladder dysfunction due to prolapsed intervertebral disc visible on MRI, failed back syndrome, clinically diagnosed as persistent symptoms of back or leg pain despite surgical therapy due to several different causes including misdiagnosis and inappropriate operation, infection in disc space confirmed by detailed history, clinical examination, laboratory or radiological findings, patients with mild or no radicular pain fitting in grade 1 or 0 respectively, were excluded from the study.

The study was conducted after the approval from hospital research and ethical committee. All patients meeting the inclusion criteria were enrolled into the study through OPD and the diagnosis of herniated disc was based upon patients who presented with moderate to severe radicular pain and MRI results of herniated intervertebral disc. The purpose and benefits of the study were explained to the patients and the patients were assured that the study is conducted purely for data publication and research and from those patients who were willing to participate were enrolled through informed written consent.

Detailed history and clinical examination was performed and followed by routine investigation. This was done to rule out conditions mentioned in the exclusion criteria to control confounders and bias in the study results. On the next operation day, all patients were subjected to disc excision surgery either through fenestration, hemilaminectomy or laminectomy.

Postoperatively the patients were kept for observation for the next 48 hours and discharged on 2nd post-operative day if indicated. Postoperatively all patients were advised follow up at 2 weeks to determine effectiveness of disc excision surgery in terms of pain relief relied by at least one grade. All above mentioned information were recorded in pre designed pro forma.

Data was analysed by SPSS version 20.0. Mean ± SD was calculated for quantitative variables like age. Frequencies and percentages were calculated for categorical variables like gender, level involved, type of operation, pain at presentation, pain after two weeks and effectiveness. Effectiveness was stratified among age, gender, pain at presentation and level involved to see effect modification.

RESULTS

In this study a total of 62 cases of herniated lumbar intervertebral disc were studied, age distribution of 62 patients was analysed as 44 (71%) were in age group 31-40 years followed by 12(19%) patients were in age group 41-50 years, 6 (10%) patients were in age group 20-30 years. Mean age was 37 years with standard deviation ± 4.68. Gender distribution of 62 patients was analysed. Most of the patients n = 37 (60%) were males while n = 25 (40%) patients were females.

Signs and Symptoms among 62 patients at presentation is shown in Table 1. Table 2 shows lumber disc herniations levels. Side of pain among 62 patients was analysed as 37 (60%) patients had radicular pain on right side while 25 (40%) patients had radicular pain on left side. Type of disc herniation on MRI is shown in Table 3.

Types of operations performed on 62 patients were analysed as laminectomy was performed in 37 (60%) patients, Fenestration was performed in 18 (29%) patients and hemilaminectomy was performed in 7 (11%) patients. Grade of pain at presentation in 62 patients was analysed as 47 (75%) had severe pain of grade 3 with visual analogue scale of (8-10), 15 (25%) patients had moderate pain of grade 2 with visual analogue scale of (4-7). Patients who presented in Grade 0 and 1 were treated medically. Status of pain after two weeks follow-up was analysed as 52 (85%) had no pain,8 (12%) patients had mild pain of grade 1 with visual analogue scale of (1-3) and 2 (3%) patients had moderate pain of grade 2 with visual analogue scale of (4-7) while none of the patients had severe pain.

Effectiveness of disc excision was seen as pre operatively, 47(75%) patients had severe pain, 15 (25%) patients had moderate pain. When this was compared to two weeks follow up after the operation, intensity of pain decreased to no pain which was found in 52 (85%) patients, 8 (12%) patients had mild pain while only two patients had moderate pain. Similarly P value 0.73 shows that the correlation of pre-operative pain is not significant to pain after two weeks follow-up.

Effectiveness of disc excision was also analysed by patients feedback after two weeks of follow-up in which 60 (97%) patients showed positive effectiveness of disc excision (they were either satisfied or partially

Table 1: Most common presenting signs and Symptoms (n=62)

Sign & symptoms	Frequency & Percentage
LBP & Radicular Pain	62(100%)
Positive SLR	62 (100%)
Numbness/ Paraesthesias	40(65%)
Limping gait	15(24%)
Claudication	10(16%)
Abnormal/ decreased reflexes	10 (16%)
Total	62 (100%)

Table 2: Level of Lumbar Disc Herniation (n=62)

Level of lumber disc herniations	Frequency & Percentage
L4 - L5	40(65%)
L5 – S1	15(24%)
L4-L5, L5-S1	7(11%)
Total	62(100%)

Table 3: Type of Herniated Disc on MRI (n=62)

Type of herniated Disc on MRI	Frequency & Percentage
Protruded disc	51(83%)
Extruded disc	7(11%)
Sequestrated disc	4(6%)
Total	62(100%)

Table 4: Patients Satisfaction Regarding Effectiveness (n=62)

Effectiveness of Disc Excision	Frequency & Percentage
Satisfied	52(85%)
Partially Satisfied	8(12^)
Not Satisfied	2(3%)
Total	62(100%)

satisfied), while only two didn't show positive effectiveness of disc excision (not satisfied). (Table 4).

DISCUSSION

In our study all patients were subjected to disc excision surgery either through fenestration, hemilaminectomy or laminectomy. Most of the patients (70%) were in age range 31-40 years, 20% patients were in age range 41-50 years and 10% patients were in age range 20-30 years. It shows that incidence of herniated lumber intervertebral disc is more in age range 31-40 years. Similar results were found in study done by Ahmad N et al[16] in which 62% patients were in age range 31-45 years and 38% patients were in age range 20-30 years. Our study showed that incidence of herniated lumbar intervertebral disc is slightly more in male 60% as compare female 40%. Same results were shown in study done by Ahmad N et al[16] in which 56% patient were male and 44% patients were female.

In our study 65% patients had L4-L5 level of herniated disc followed by 24% patients had L5-S1 and 11% patients had L4-L5 and L5-S1 level of herniated disc. Similar results were shown by Ahmad N et al[16] in which 62% had L4-L5, 32% patients had L5-S1 and 6% patients had L4-L5 and L5-S1. The interlaminar approach with hemilaminectomy gives adequate space for disc excision at L4-L5 and L5-S1 levels in the majority of the cases. A few authors have reported a higher level of success, a shorter hospital stay and a quicker return to work with microdiscectomy but that has not been established in well controlled studies.[14,15] In our study 83% cases were with protruded disc followed by 11% patients with extruded disc and 6% patients with sequestrated disc. Similar findings were noted by other study in which 86% were protruded disc followed by 10% patients had extruded disc and 4% patients with sequestrated disc[16].

Our study showed that laminectomy was performed in 60% patients, fenestration was performed in 29% patients and hemilaminectomy was performed in 11% of patients depending upon their clinical presentation and MRI findings. Ahmad et al[16] has detailed similar results. More over Literature review also reveals success rates for lumber discectomy from 46 to 96%. The outcome of lumbar discectomy depends more on patient selection than on surgical technique. On the basis of data from three different studies it was concluded that surgical discectomy provides effective clinical relief for carefully selected patients with sciatica as a result of lumbar disc prolapse that failed to resolve with conservative care.[17,18]

Patients with disc herniation can be grossly divided into two groups based on their pain. The first has primary back pain with little or no component of radicular symptoms due to nerve root irritation. The second has primary radicular pain, which usually has some component of back pain. In contrast to primary lumbar pain, radicular pain syndrome or sciatica, the common clinical perception has been that surgical treatment is more effective.[17] More over those patients who were in grade II and grade III, their pain improved more with surgical treatment as they previously were treated medically but did not improve while patient

who present in grade I were more likely to improve with medical treatment.

Our study shows that preoperatively 75% patients had severe grade III pain with visual analogue scale of (8-10), 25% patients had moderate grade II pain with visual analogue scale of (4-7). But after the operation and two weeks follow up the intensity of pain decreased as 85% patients had no pain, 12% patients had mild pain of grade 1 with visual analogue scale of (1-3) and 3% patients had moderate pain of grade 2 with visual analogue scale of (4-7) while none of the patients had severe pain. Similar results were found in another study[18] in which preoperative pain was analysed as 64% severe pain, 20% moderate pain and 16% had mild pain. But after two weeks follow up after disc excision the intensity of pain decreased as 82% patients didn't had any pain, 14% patients had mild pain and 4% patients had moderate pain and none of the patients had severe pain.

Our study shows that disc surgery is better than conservative care in terms of pain relief when pain at presentation is in grade II or grade III. In another study the same concept was explained as the large spine patient outcomes research trail and related observational cohort study was carried out in the united states.[19] Patients with sciatica for at least six weeks and confirmed disc herniation were invited to participate in either randomized trial or an observational cohort study. Patients in cohort study received disc surgery or conservative care based on their preference. In the randomized trail both groups improved substantially over two years for all primary and secondary outcome measures. Small difference was found in favour of the surgery group, but these were not statistically significant for the primary outcome measures. Patients in both groups improved substantially over time, but the surgery group showed significantly better results for pain and function compared with the conservative group. The authors did mention caution in interpreting the findings because of potential confounding by indication and because outcome measures were self-reported. The results indicated that both conservative care and disc surgery are relevant treatment options for patients with sciatica of at least six weeks duration.[19]

Surgical intervention may have provided quicker relief of pain compared with conservative care, but no large differences has been found in success rate after 4 years of follow up. Patients and doctors may thus weight the benefits and harms of both options to make individual choices. In our study feedback of the patients was taken after two weeks follow up and 97% patients showed positive effectiveness of disc excision surgery (either completely or partially satisfied), while only 3% patients didn't gave a positive response of effectiveness of disc excision (not satisfied). Ahmad N et al[16] has described the same concept as in their study 99% patients preferred disc excision surgery because of immediate pain relief and cost effectiveness.

CONCLUSION

Limited disc excision either through laminectomy, hemilaminectomy or fenestration is a safe, effective and reliable surgical technique for treating properly selected patients of sciatica due to prolapsed intervertebral disc at L4-L5 and L5-S1 level. Surgical discectomy provides immediate relief from radicular pain than conservative management. Surgical discectomy for carefully selected patients with sciatica due to lumbar disc prolapse provides immediate relief from the acute attack than conservative management. Recovery from sciatica make early surgery likely to be cost effective compared with prolonged conservative care.

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AUTHOR'S CONTRIBUTION

Following authors have made substantial contributions to the manuscript as under:

Shah M: Idea and concept.

Khan M: Data collection and typing.

Safi T: Statistics.

Aman A: Follow up.

Ahmad A: Data analysis.

Shah MA: Bibliography.

Ahmed F: Follow up.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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