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SURGICAL MANAGEMENT OF PROLAPSE INTERVERTEBRAL DISC LUMBARSPINE - A STUDY OF 30 CASES

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ABSTRACT

BACKGROUND: Low back pain is a wide spread problem and is one of the leading causes of morbidity. PIVD is the most common cause of low back pain. Various modalities are used in the management of PIVD. The aim of our study was to evaluate the outcome of surgical management of PIVD and to analyze the effect on outcome variables using Japanese Orthopaedic Association (JOA) score. **MATERIAL AND METHODS:** Open laminectomy and discectomy was performed on thirty patients in Maharishi Markandeshwar Institute of Medical Sciences and Research, Mullana, Ambala from September 2014 to may 2016 and patients were assessed pre and post operatively using JOA score. **RESULTS:** Analyses was done according to JOA score. We found that 83.3% patients showed good to excellent result. Marked improvement was noticed in low back pain, leg pain, straight leg rising test and work status of the patients. On comparing certain parameters of the pre-operative status of the patients, marked improvement was noted with other study groups operated with laminectomy and discectomy. We also found that our results were comparable to other surgical techniques including minimally invasive surgeries.

KEYWORDS : PIVD-Prolapse intervertebral disc, L&D open laminectomy and discectomy, JOA-Japanese orthopaedic association score.

INTRODUCTION

Low back pain is a very common condition. About 90% of people suffer from it at some point in their lives1.It represents the second cause for a medical consultation in primary care setting and a leading cause of disability worldwide.[2]

80-90% of the patients with low back pain usually fully recover within 3 months3, 4. Amongst the remaining 10-20% of the patients, less than 50% patients return to their work3,5 however when the symptoms persist for more than 2 years, the probability of returning to work declines to almost zero[3,5.]

Intervertebral disc (IVD) degeneration is the most common cause of chronic back pain6-9 PIVD usually occurs dorsally or dorsolaterally in the back, between the fourth and fifth lumbar vertebrae, or between the fifth vertebra and the sacrum[10.]

In order to make an appropriate clinical diagnosis of PIVD, North American Spine Society has given a working definition of disc herniation. PIVD is thus defined as localized displacement of disc material beyond the normal margins of the intervertebral disc space resulting in pain, weakness or numbness in a myotomal or dermatomal distribution[11.]

Clinically, a patient with PIVD usually presents with radiating sciatic pain and back pain10, 12. The distribution of leg pain usually follows the affected nerve root leaving the spinal canal one vertebral level caudal to the herniation[13.]

MATERIAL AND METHODS

This prospective study was conducted at our hospital between September 2014 to May 2016 after obtaining clearance from the institutional ethical committee. During this period, 30 patients of PIVD were deemed eligible for operative treatment based on the inclusion and exclusion criteria.Patients who had back pain associated with claudication distance less than 100 m and who could not carry out their routine daily activities were assessed with magnetic resonance imaging (MRI). Surgery was performed if the central canal diameter on MRI was found to be less than or equal to 10 mm. Patients with primary bony canal stenosis, traumatic lumbar canal stenosis, stenosis due to tumors and infection, and patients not medically fit for surgery due to comorbidities were excluded from the study. Patients were managed with four different surgical techniques according to pre-formulated indications. Laminectomy with decompression was done in all cases. All procedures were performedby senior orthopaedic surgeon. Follow up period of all patients was 6 months. Pre and posttreatment assessment of the patients was done according to JOA evaluation system for low back pain. The JOA score was determined by direct questioning to assess subjective symptoms, clinical signs, and restriction of activities of daily living. The recovery rate of the patients following treatment was calculated by using the description of Hirabayashi et al. (1981): Recovery rate (%)=(Postoperative score – Preoperative score)/ (15 – Preoperative score)×100. Recovery rate was classified using a four-grade scale: Excellent, >90%; good, 75–89%; fair, 50–74%; and poor, below 49%.[14]

Results

Most of the patients were in the age group of 31-40 years. There were 17 males and 30 females. All the patients had symptoms for more than 3 months duration at presentation. Complete data of all the 30 patients along with their JOA scores are presented [Table 1].

Distribution of patients in all the variables of JOA scoring system was assessed before and after treatment reoperatively, 23.3% of patients (n=7) with continuous severe low backache, 53.3% (n=16) with occasional severe low backache, and 23.3% (n=7) presented with occasional mild low backache. one month postoperatively, 43.3% patients (n=13) had no back pain and 53.3% (n=16) had occasional mild low back pain. No patient had occasional severe or continuous severe low back pain.

All of the patients (100%, n=30) had presented to us with severe or occasionally severe leg pain, but postoperatively 60% patients (n=18) had no leg pain. Most of the patients (63.3%)n=19 had preoperative claudication distance 500m or less, but 96.6% patients (n=29) had normal gait with walking distance more than 500 m and no claudication symptoms postoperatively. The most common level of involvement was L4-L5 (46.67% patients, n=14) followed by L5-S1 (43.33% patients, n=13).

100% patients (n=30) had abnormal straight leg raising test [23.3% patients (n=7) had straight leg raising positive below 30° and 76.6% patients (n=23) had between 30° and 70°], but postoperatively most of the patientsn=24(80%) had normal straight leg raising test. Sensations were diminished in L4 dermatome in 3 patients, L5 dermatome in L4 patients and S1dermatome in 8 patients. More than one dermatome was involved in 5 patients. All the patients had shown sensory disturbance preoperatively, but postoperatively 21 of these patients recovered normal sensory function. Motor weakness was present in 29 patients (96.6%) preoperatively, but postoperatively only 5 patients (16%) showed motor deficit. Overall, 93.75% patients (n=28) in our study showed improvement in all variables of the JOA scoring system postoperatively.

At 1 month followup, 66.6% (n=20) patients showed excellent togood outcome and 30% (n=9) patients showed fair outcome. At 6 month followup, 83.3% patients (n=25) showed excellent to good outcome. No patient had poor outcome. Outcome of the patients improved as the time after surgery increased till 1 year and was sustained thereafter till the last followup.

On comparison of preoperative and three months postoperative JOA scores using Wilcoxon's test for nonparametric data, P value is <0.001 which meant that outcomes were extremely significant postoperatively. Further, JOA scores significantly improved even postoperatively till 1 year (P<0.05). After 1 year, the JOA scores did not change significantly with time till the last followup.

Evaluation criteria:

Pre-operatively and post-operatively patients were evaluated by Japanese Orthopaedic Association Backache (JOA) Score. We have taken only the subjective symptoms and clinical signs of JOA score in your study85.

Japanese Orthopaedic Association low backache score

1. Subjective symptoms

Score

A. Low Back pain (3 points)
a. No Low back pain 3
b. Occasional mild low back pain 2
c. Low back pain always present / severe low back pain occurs occasionally
1
d. Severe low back pain always present 0

B. Leg pain and / or tingling (3 points)
a. No lower extremity pain or numbness 3
b. Occasional mild lower extremity pain and numbness 2
c. Lower extremities pain and numbness always present / severe lower extremities pain and numbness occur occasionally
1
d. Severe lower extremities pain and numbness 0

C. Ability to walk (3 points)
a. Normal walking 3
b. Walking at least 500m is possible, but pain, numbness & weakness are felt. 2
c. In walking 500m or less, pain, numbness and weakness occur, and walking becomes impossible. 1
d. In walking at most 100m, pain, numbness and weakness occur, and walking become impossible. 0

2. Clinical Findings

A. SLRT (2 points)
a. Normal 2
b. 30 degree – 70 degree 1
c. Less than 30 degree 0

B. Sensory Abnormality (2 points)
a. Normal 2
b. Mild sensory disturbance (Hypo-aesthesia) 1
c. Distinct sensory symptoms (Anaesthesia) 0

C. Motor Abnormality (2 points)
a. Normal 2
b. Slightly decreased muscle strength 1
c. Markedly decreased muscle strength 0

Total score 15

Rate of Improvement = post-treatment score – pre-treatment score / 15 – pre
treatment score x 100

Results after treatment are assessed according to the rate of improvement.

Excellent: > 90%
Good: 75 % to 89% improvement
Fair: 50 to 74% improvement
Poor: <50%

Figure 1- Surgical instruments used

Figure 2- Position of the patient for performing surgery

Figure 3- Preparation of the surgical site

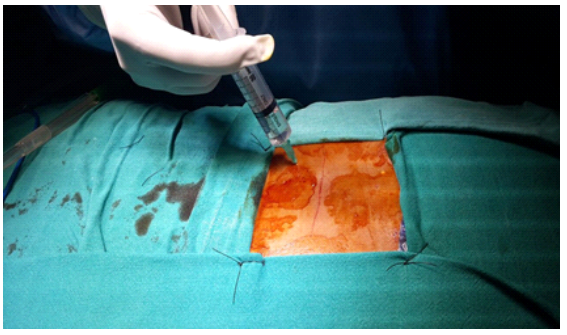

Figure 4- infiltration with epinephrine

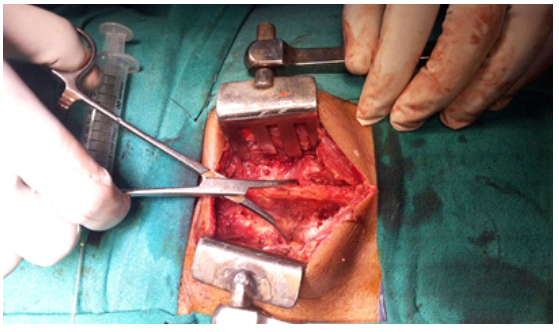

Figure 5- Indentification of spinous process of corresponding level

Figure 6- Excised disc

Discussion

In this study, we have also compared the results of our surgery with laminectomy and discectomy, microdiscectomy and laminotomy described in other studies with respect to pre-operative, per-operative and post-operative variables.

In our study, youngest patient was 20 years old and oldest was 68 years old. Maximum number of patients i.e.13 were in between 31-40 years of age followed by 6 patients in the age group of 41-50 years. The mean age in our study was 42 years. Shareef et al reported mean age of 43.4 years15. Tychotullberg et al reported mean age of 38 years15. Shareef et al reported the mean age of 37.4 years and Tychotullberg et al reported the mean age of 40 years in their patients who were operated with microdiscectomy15. Sangwan et al reported the mean age of 38.22 years and Deepak et al reported the mean age of 39 years in their patients who were operated with laminotomy16,17. This mean age is comparable in all the studies, due to more incidence of prolapse disc in middle age group In the present study, 14 (46.6%) patients were having the L4-L5 disc prolapse followed by L5-S1 disc prolapse in 13 (43.33 %) patients. Spangfort et al reported that the L4-L5 disc was more common compared to L5-S1 disc prolapse in their study of 2509 patients18. Shareef et alreported 54.54 % disc prolapse at L4-L5 followed by 41.81 % disc prolapse at L5-S1 in the patients who were operated with laminectomy and discectomy15. Shareef et alreported L4-L5 disc prolapse in 44.23 % patients and L5-S1 disc prolapse in the 46.15% patients who were operated with microdiscectomy15. Sangwan et al reported 55 % disc prolapse at L4-L5 and Deepak et alreported 34.61% disc prolapse at L4-L5 and 61.53% disc prolapse at L5-S1 in their study who underwent laminotomy16,17. The level of disc prolapse is comparable to other studies because of the more mobility and weight bearing at L4-L5.

In our study, finally, 43.3% patients had no back pain and 53.3% had occasional mild pain, 60% had no leg pain, 93.75% had normal gait, 80% had normal straight leg raising, and 93.75% had sensory improvement. Similar findings were observed in the study of De palma et al. (1991) with average leg pain improvement of 88% and average back pain improvement of 80%.19 In the present study we have used the JOA scoring both pre-operatively and post-operatively for calculating the results. Out of the 30 patients in the present study, the excellent to good outcome was seen in 83.33% patients, fair outcome in 10 % patients and poor outcome in 6.66 % patients. Bhalla et al reported 80.92 % of satisfactory outcome and 19.2 % of the poor outcome in the patients treated with surgery20. Sangwan et al reported good outcome in 90 % patients, moderate outcome in 10 % patients16. Deepak et al reported good outcome in 89 % patients, moderate outcome in 7.70 % patients and poor outcome in 3.30 % patients17.

Only 2 patients in our series had poor result. This could be due to the fact that they got post of complication of dural rupture and rest all patients underwent at least a 12 weeks trial of adequate conservative treatment and were only operated after clinic radiological correlation of their symptoms with imaging was confirmed.

We conclude that the surgical procedure is indicated in the patients failed with conservative management. Surgical outcome depends on the patients selection rather than the type of surgery. On comparing the results, it is found that the outcome of laminectomy and discectomy is comparable to the minimally invasive surgeries. Hence, in our opinion surgery with open laminectomy and discectomy is equally good procedure to other surgical procedures

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