

Original article:

Study of Comparison of Functional Outcome in Single Level Lumbar Canal Stenosis of Fluorotic and Non Fluorotic patients Treated with Decompressive Laminectomy

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Abstract:

Introduction: The classic symptom of Central Canal Stenosis is Pseudoclaudication, also known as neurogenic claudication. Patients typically complain of pain, paraesthesia, weakness, or heaviness in the buttocks radiating into the lower extremities with walking or prolonged standing, relieved with flexion or sitting. Though many patients have significant lumbar pain due to degenerative joint and disc changes, most have lower extremity discomfort rather than spinal pain.

Material and methods: The present study was conducted in Department of Orthopaedics, Kamineni Institute of Medical Sciences Hospital, Narketpally on the patients who presented with single level Lumbar Canal Stenosis and required surgical intervention and satisfied the Inclusion Criteria.

Results: The visual analog scale shows improvement from pre operative status to post operative condition where the mean pain scale decreased from 7.5 to 2.6 in fluorotic and 7.4 to 2.2 in non fluorotic patients .This shows significant positive outcome after surgical decompression in both groups and found to be statistically significant

Conclusion: From this study of surgical decompression in single level lumbar canal stenosis In fluorotic and non fluorotic patients it can be concluded that this is a safe procedure which gives good results in terms of improvement in claudication distance and relief in pain.

Keywords: Central Canal Stenosis , claudication distance

Introduction:

The classic symptom of Central Canal Stenosis is Pseudoclaudication, also known as neurogenic claudication. Patients typically complain of pain, paraesthesia, weakness, or heaviness in the buttocks radiating into the lower extremities with walking or prolonged standing, relieved with flexion or sitting. Though many patients have significant lumbar pain due to degenerative joint and disc changes, most have lower extremity discomfort rather than spinal pain.¹

Treatment is aimed at not only obtaining immediate pain relief but also to prevent long term disabling sequelae such as chronic backache and spinal instability. With advances in our understanding of Pathoanatomic and the Clinicopathological correlation, the treatment has changed from various non-operative modalities to decompression

and subsequently to decompression and fusion with or without instrumentation. The current evidence suggests that surgery for spinal stenosis is more effective than conservative treatment.²

The effect of fluoride concentration on lumbar spine have received scant attention and we became interested in this aspect while investigating obscure cases of single level Lumbar Spinal Stenosis, associated with high levels of fluoride, in Nalgonda District -an endemic region for fluorosis.³

In this study, done in the Department of Orthopaedics at Kamineni Institute of Medical Sciences, Narketpally. Ten cases of fluorotic single level Lumbar Canal Stenosis treated with Decompressive Laminectomy were compared for functional outcome with similar number of cases of non-fluorotic single level LCS who also underwent Decompressive Laminectomy.

Material and methods:

The present study was conducted in Department of Orthopaedics, Kamineni Institute Of Medical Sciences Hospital, Narketpally on the patients who presented with single level Lumbar Canal Stenosis and required surgical intervention and satisfied the Inclusion Criteria. It was Comparative Prospective Non-Randomised study. All patients who presented to the Hospital for back ache were evaluated clinically and MRI was done to identify the pathology and level of lesion. All patients identified as single level LCS were further investigated for serum and urinary Fluoride and then dividing the patients into two groups

Fluorotic Group (10 cases)

Non-Fluorotic Group (10 cases)

Inclusion criteria

- Age between 20yrs and 70 yrs.
- All cases diagnosed with single level Lumbar Canal Stenosis
- Patients who were fit to undergo Decompressive Laminectomy under general anaesthesia.
- NASS (North American Spine Society) score of more than 7

Exclusion criteria

- Age below 20yrs and above 70 yrs.
- Cases of LCS involving multiple levels.
- All cases with spinal deformity and skeletal dysplasia.
- Fracture spine, tumours or infection of spine
- Cases associated with spondylolisthesis and disc Herniation
- Prior surgery at same level
- Cases with renal failure

Results

The minimum age is 37 and the maximum age is 60 yrs. 5 out of 10 cases are seen between 51-60yrs which are 50%. The mean average is 50.7 yrs. In Non-fluorotic(N=10) the minimum age is 35 and the maximum age is 70 yrs.

4 out of 10 are seen between 41-50yrs which are 40%. The mean average is 47.9yrs.

The type of pain observed in our study is mostly lower back with radiation to legs.70% in fluorotic and 60% in non fluorotic presented with pain in lower back with involvement of legs. 20% in each group presented with pain only in lower back without radiation to lower limbs. 10% in fluorotic and than 20% in non fluorotic presented with pain more in legs compared to back.

TABLE NO:1 MRI CANAL ANTERO POSTERIOR DIAMETER IN PRESENT STUDY (based on MRI):

MRI canal Diameter(AP) (mm)	No of patients FLUOROTIC (N=10)	No of patients NONFLUOROTIC (N=10)
11.9-11	5 (50%)	7 (70%)
10.9-10	4 (40%)	2 (20%)
9.9-9	1 (10%)	1 (10%)

The anteroposterior diameter of spinal canal in sagittal view is less than 12 mm in both the groups subjected to surgical intervention. In both the groups, 90% of the cases are above 10 mm anteroposterior diameter. Only 10% of cases are Less than 10 mm which is considered to be absolute stenosis. In our study patients below 10 mm of anteroposterior are only 2 cases (10%), one in each group.

TABLE NO:2 (a) VISUAL ANALOGUE SCALE IN PRESENT STUDY:

Fluorotic	MEAN	STANDARD DEVIATION	STANDARD ERROR MEAN
PRE-OP	7.5	0.84	0.26
POST-OP	2.6	1.07	0.33

TABLE: 2(b)

Non fluorotic	MEAN	STANDARD DEVIATION	STANDARD ERROR MEAN
PRE-OP	7.4	0.96	0.33
POST-OP	2.2	1.05	0.36

Table 3 a : JAPANESE ORTHOPEDIC ASSOCIATION IN PRESENT STUDY:

Fluorotic	MEAN	STANDARD DEVIATION	STANDARD ERROR MEAN
PRE-OP	15.5	2.46	0.77
POST-OP	24.9	2.20	0.69

TABLE: 3 (b)

Non fluorotic	MEAN	STANDARD DEVIATION	STANDARD ERROR MEAN
PRE-OP	15	2.91	0.92
POST-OP	24.2	2.54	0.80

In JOA, the scores have improved from 15.5 to 24.9 which show a good improvement after surgical decompression in fluorotic patients. In non- fluorotic the mean has increased from 15 to 24.2. In both groups the improvement is seen and statistically significant.

TABLE: 4(a) OSWESTRY DISABILITY INDEX IN PRESENT STUDY

fluorotic	MEAN	STANDARD DEVIATION	STANDARD ERROR MEAN
PRE-OP	45	5.04	1.59
POST-OP	27	4.69	1.48

TABLE: 4 (b)

Non fluorotic	MEAN	STANDARD DEVIATION	STANDARD ERROR MEAN
PRE-OP	47	5.41	1.71
POST-OP	25	4.40	1.39

In ODI, the disability is reduced in all patients in both the groups, the mean ODI was 45 and 47 in fluorotic and non fluorotic respectively pre operatively. There is a significant improvement after surgical decompression in both the groups and found to be statistically significant.

TABLE NO: 5 COMPLICATIONS IN PRESENT STUDY

Complications	No of patients FLUOROTIC (N=10)	No of patients NONFLUOROTIC (N=10)
Infections	0	0
Dural tears	0	0
Neurological deficits	0	0
Implant failure	0	0

No complications reported in our study in both the groups.

Discussion:

Lumbar spinal stenosis is reduction in the dimensions of the spinal canal that results in pressure being applied on the spinal cord and or nerve roots. Although stenosis can develop without symptoms, the most specific symptom being neurogenic claudication producing numbness, tingling, pain and difficulty in walking, with heavy /tired feeling in the legs.

In this study we evaluated all the patients who presented to our hospital for back ache and evaluated clinically according to NASS guide lines and MRI was done to identify the pathology and level of lesion. All patients identified as single level LCS were further investigated for serum and urinary Fluoride and the the patients were divided into two groups.

Japanese Orthopaedic Association scoring system was used to evaluate the outcome of surgical intervention in patients of our study. This scoring was evaluated for 3 months post operatively. The results were excellent in 20% fluorotic patients and 10% Non- fluorotic patients. Good result was observed in 40% each group. Result was fair in 30% cases of fluorotic patients and 40% non-fluorotic patients. Result was poor in 20% cases in each group. The results of surgical outcome are similar in both the groups. The results in both the group were extremely significant statistically, i.e the p value found to be 0.001, which means that the the effect of fluoride has no role in terms of functional outcome.

This is may be due to the fact that the study was conducted in an endemic area and all the patients included in our study have been affected by fluorosis which we were unable to evaluate properly.

Our results are almost similar to the other study groups, where Boghdady et al have reported satisfactory results in 87.5% of cases in his study and poor results in 12.5 % cases. Gelalis et al presented almost half of the cases i.e 46% of his study group patients had excellent outcome and only 18% showed unsatisfactory results. According to Nath et al, there were no poor results and 18.7% showed excellent outcome. The results of our study and Nath et al are similar, where both these study group has higher percentage of results being scored good in terms of JOA i.e 40 % of both groups in our study and 62.5% of Nath et al show good results .This is due to both the results evaluated at the end of 3 months^{4,5,6}

The poor results in our study may be due to the chronic degenerative changes of the whole spine and in our study only one level is addressed. The results of the 10% cases in both the group may improve on a long term follow up.⁷

Oswestry disability index used in our study to evaluate the functional outcome in terms of disability before and after surgical intervention. This index calculated pre operatively and 3 month follow up. The mean ODI in fluorotic group being 45 pre- operatively and the disability index reduced to 27 after surgery. Among non- fluorotic group, the index is 47 before intervention and reduced to 25 after intervention. The outcome is almost similar in both the groups. The results are in par with other study groups where, Weinstein et al presented the mean ODI as 46 pre operatively and 21.4 post operatively. Similarly the mean ODI reduced from 41 to 27 in the study done by Forsth et al. Stromqvist et al reported the mean ODI of their study group as 43 before surgical intervention and 26 after.

Conclusion:

From this study of surgical decompression in single level lumbar canal stenosis In fluorotic and non fluorotic patients it can be concluded that this is a safe procedure which gives good results in terms of improvement in claudication distance and relief in pain.

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