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Research Article

A study of transforaminal epidural steroid injections in patients with lumber disc herniation

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ABSTRACT

Background: Although various studies have evaluated traditional caudal and interlaminar approach for lumbar epidural steroid, I tried to evaluate efficacy of transforaminal approach in this study.
Methods: In twenty five patients with inclusion criteria, I administered periodic injections of methyl prednisolone acetate in combination with 2% xylocaine through transforaminal approach under fluoroscopic guidance. Patients were evaluated and assessed for pain relief, activity level and disability by direct questionnaire before and after the procedure and at final follow up.
Results: Overall Visual numeric score was improved by 60.4%. Overall Roland-Morris score was improved by 73.9%. Average number of injection per patient is 1.7. Three patients required surgery for poor pain relief. Two patients undergone discectomy surgery. One patient opted physiotherapy and refused for surgery.
Conclusion: Transforaminal epidural steroid is a safe, simple, least morbid and cost effective approach for the patients with lumbar disc herniation with radiculopathy.

Keywords: Low back pain, Sciatica, Epidural steroid, Transforaminal epidural steroid

INTRODUCTION

Lumbar radiculopathy commonly known as sciatica is a common medical and socioeconomic problem.[1-3] Although majority of this patients recover with conservative treatment of NSAID, physiotherapy and bed rest, 10-15% of patients eventually requires surgery.[4,7] Epidural steroid has been employed as an adjunctive treatment for sciatica for more than a century but its therapeutic efficacy remains controversial.[5-8] There are different approach for epidural steroid injections. Traditional interlaminar and caudal approach and fluoroscopic guided transforaminal approach. A number of studies have demonstrated that transforaminal epidural steroid under fluoroscopic guidance is an effective treatment for sciatica due to herniated disc.[9-12] There have been reports that even in experienced hands epidural injectate may be misplaced in 30% of cases.[5,13] Transforaminal route allows to administer higher concentration of steroid at targeted site and in the vicinity of herniated disc and inflamed nerve root - the two common pain generators.[14-16] This study evaluated the therapeutic effect of fluoroscopic guided and dye directed epidural steroid injection in these patients.

METHODS

Twenty five patients underwent transforaminal epidural steroid injection (TFESI) for radiculopathy and associated low back pain. All patients had symptoms related to discogenic lumbar nerve root compression.

Inclusion criteria

1. Signs and symptoms consistent with nerve root and radicular pain with a positive sciatic nerve stretch test.
2. Single level lumbar disc herniation as evident by MRI.
3. Chief and primary complain of leg pain that is not resolved by minimum 4 weeks staged treatment consist of NSAID, bed rest, physiotherapy.
4. No history of lumbar surgery.

Exclusion criteria

1. Multiple level herniated disc.
2. Large migrated or extruded disc.
3. Progressive neurological deficit or motor deficit. None of the patients had received oral steroid or epidural steroid before.

After informed consent all patient were assessed for visual numeric score before procedure and standard ADL questionnaire. All procedures were performed in prone position under fluoroscopic guidance. The level and entry point is marked under fluoroscopic guidance in AP and lateral view with disc inclination angle and 10-12 cm from midline. Under aseptic precautions skin is infiltrated with 2% lidocaine at marked site. I have used a specially made spinal needle with 20 gauge and 20 cm of length which is particularly useful in obese patients. This needle advanced to kambin's triangle (safe triangle). Kambin's triangle is composed of a roof made up of pedicle, a base that corresponds to exiting nerve root and side by lateral border of vertebral body.[17] The needle placement was confirmed by injecting 1-2 ml of ioapamidol which visualizes posterior nerve root (Figure 2). Once adequate flow of contrast was achieved 2ml-80 mg (40mg/ml) of methyl prednisolone acetate, 1 ml of 2% xylocaine were injected. Then spinal needle is withdrawn and patient was observed in recovery area for 30-60 minutes.

The patients were evaluated at two, six and nine month after first TFESI for visual numeric score. Overall outcomes were assessed and difference in pain score and difference between pre and post TEFSI were evaluated. The differences between pain scores for all patients were compared with paired t-test at different time interval. Finally patients were asked whether they are satisfied with final outcome.

RESULTS

The study included patients with low back pain and lower limb radiculopathy treated with TFESI. My study had 16 male and 9 female patients. Almost all patients were on various types of medications including anti-inflammatory drugs, antidepressant medications. There were no reported complications of dural tear, nerve root injury and infection in total 43 injection procedures.

The average duration for symptoms was about 8 months. In my study 56% patients had pathology at L4-5 level, 28% at L5-S1 level, 12% at L3-4 level and 4% (1 patient) at L2-3 level. There was significant decrease in visual numeric pain score (VNS). The average preinjection score was 8.6 which improved to 3.4 after completion of treatment. The average preinjection Roland-Morris score for back disability was 18.8 which improved to 4.9 at final follow up. There was average 73% improvement in Rolland-Morris score at the time of final follow up. 15 patients (60%) reported that they have more than 50% relief at the time of final follow-up (Table 1).

40 % (10) of patient required only one injection, 48 % (12) required two injection and only 12 % (03) required three injections. The average number of injection per patient was 1.7. Three patient required surgeries out of only two had opted for surgery, although all three had more than 50% pain relief. One patient with L4-L5 disc herniation was satisfied with partial pain relief and liked to continue physiotherapy regimen.

DISCUSSION

Corticosteroid have been used for long time in lumbar disc herniations for its nociceptive and nerve membrane stabilizing properties and addition of xylocaine induces 'washout' effect, which will decrease local level of inflammatory mediators.[18-20] Inflammatory response in disc herniation is generated by prolapsed nucleus pulpous and irritated nerve root, both of these pain generators lies at ventral epidural space. Nerve root which lies ventrally and laterally induces inflammatory response and causes chemical neuroradiculitis.[21] Epidural steroid, by any approach, should reach this pain generator site to give maximum anti-inflammatory effect. Translaminar approach delivers steroid at dorsal epidural space which is away from pain generators site, while transforaminal approach delivers steroid in ventral space near nerve root-the pain generator site.

Translaminar approach typically uses 6 to 10cc volume of steroid-anaesthetic combination which dilutes in entire epidural space, limiting efficacy of solution.[22] In contrast, using a transforaminal approach, the volume of injectate is only 3cc (2cc of steroid + 1cc of xylocaine). Epidural steroid injection done without fluoroscopy may fail to reach the target area in 30% of cases, even in experienced hands.[23] The presence of scarring or midline raphe may inhibit the delivery of injectate.[24] This can happen in translaminar approach which uses 'loss of resistance' technique and may complicate in form of dural tears. Transforaminal approach uses fluoroscopy and contrast flow to locate exact level and target tissues, thus avoids these issues. Patient with herniated disc commonly have unilateral radiculopathy. TFESI delivers maximum concentration of steroid by targeting the site and side, right or left.

In my study 40% of patients required only one injection. Average injection per patient is 1.8 to achieve maximum benefit. This is less than the standard 3 to 4 injections in traditional approaches. These 40% of patients had more than 70% pain relief after 1st injection and they were put on structured physiotherapy programme.

Table 1: Patient's demographic data.

No.	age	level	gender	Duration of symptoms (month)	Pre injection VNS	Post injection VNS	Roland Morris score pre injection	Roland Morris score final	Number of injection
1	32	L4-5	Male	6	8	3	20	7	2
2	58	L4-5	Male	6	9	2	19	4	1
3	52	L5-S1	Male	24	8	3	19	6	3
4	47	L3-4	Male	3	10	3	20	3	1
5	29	L4-5	Male	12	8	4	16	4	2
6	44	L4-5	Male	15	9	5	17	5	2
7	40	L3-4	Male	3	9	2	20	4	1
8	31	L4-5	Male	9	8	4	19	7	3
9	23	L4-5	Male	6	8	3	18	5	1
10	46	L5-S1	Male	8	8	2	21	6	2
11	59	L5-S1	Male	15	10	4	22	5	2
12	43	L4-5	Male	2	9	3	17	4	1
13	62	L5-S1	Male	8	8	3	19	5	2
14	37	L4-5	Male	6	8	5	16	5	2
15	49	L2-3	Male	2	9	3	20	3	1
16	26	L4-5	Male	10	8	4	18	6	2
17	37	L4-5	Female	12	8	4	19	5	2
18	60	L5-S1	Female	15	9	5	20	8	3
19	46	L4-5	Female	4	9	3	18	5	1
20	38	L3-4	Female	3	10	3	22	4	1
21	45	L4-5	Female	9	8	4	18	5	2
22	34	L5-S1	Female	12	9	3	17	4	1
23	39	L5-S1	Female	8	8	4	19	5	2
24	42	L4-5	Female	4	9	2	19	3	1
25	58	L4-5	Female	6	9	4	18	5	2

Table 2: Pre-treatment and post treatment comparison of score.

	VNS	Roland-Morris score	
Pre injection	8.6	18.8	Pre injection
Post injection	3.4	4.9	Post injection

VNS- visual numeric score

Over the period of time patient symptoms may improve due to reduction in size of disc. TFESI does not offer mechanical pain improvement but patient may benefit from gradual regression of disc.[24] All three patients in which satisfactory outcome was not achieved had symptoms duration more than 12 months. Chronic neural compression leads to irreversible changes in neural anatomy which leads to less favourable outcome in patients with more than 12 month symptoms duration. So it is advocated for early start of TFESI in these patients. Patients with satisfactory outcome had major improvement in Roland Morris disability score than VNS, which suggest that sciatica is the principal complaint in herniated disc. Back pain was relieved in majority of patients when they were put on physiotherapy programme. Injection of epidural steroid has role in early stages but this should be followed by progressive lumbar stabilization physiotherapy to treat underlying segmental micro instability resulting from disc disease.[25,26]

The drawback of my study was small patient group (N=25), short term, not controlled and the study was not

blinded. All patients were candidates for surgery and they refused for surgery. These patients may have high expectations from this non-surgical treatment. Although TFESI combined with physiotherapy in these small number of patients had satisfactory outcome in otherwise discectomy candidates. Further long term studies are needed comparing different approach in epidural steroid injection.

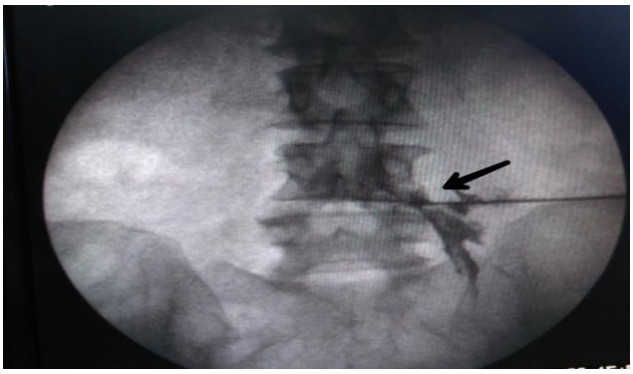

Figure 1: Needle position in AP view.

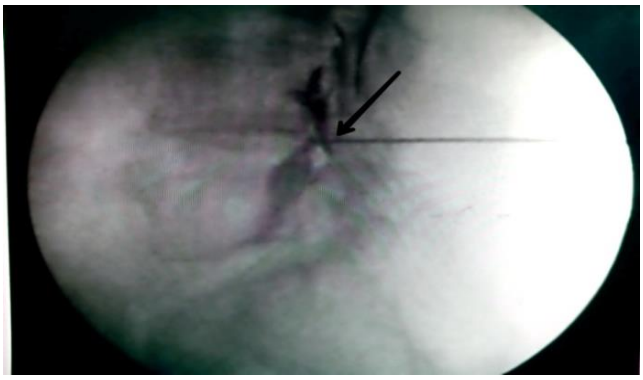

Figure 2: Needle position in lateral view showing needle in ventral epidural space.

In conclusion, TFESI is a simple, targeted, cost effective, least morbid and safe approach for the patients with lumbar disc herniation and radiculopathy.

CONCLUSION

In conclusion, TFESI is a simple, targeted, cost effective, least morbid and safe approach for the patients with lumbar disc herniation and radiculopathy.

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REFERENCES

1. Frymoyer JW. Back pain and sciatica. N Engl J Med. 1988;318:291-300.
2. Lawrence JS. Disc degeneration: Its frequency and relationship to symptoms. Ann Rheum Dis. 1969;28:121-38.
3. Andersson GB. Epidemiological features of chronic low-back pain. Lancet. 1999;354:581.
4. Bush K, Cowan N, Katz DE. The natural history of sciatica with associated disc pathology: A prospective study with clinical and independent radiologic follow-up. Spine. 1992;17:1205-12.
5. White AH, Derby R, Wynne G. Epidural injections for the diagnosis and treatment of low back pain. Spine. 1980;5:78-86.
6. Bogduk N. Epidural steroids. Spine. 1995;20:845-8.
7. Carrette S, Leclaire R. Epidural corticosteroid injections for sciatica due to herniated nucleus pulposus. N Engl J Med. 1997;336:1634-40.
8. Cuckler JM, Bernini PA, Wiesel SW, Booth RE Jr, Rothman RH, Pickens GT. The use of epidural steroids in the treatment of lumbar radicular pain. A prospective, randomized, double-blind study. J Bone Joint Surg Am. 1985;67:63-6.
9. Buttermann GR. Treatment of lumbar disc herniation: epidural steroid injection compared with discectomy. A prospective randomized study. J Bone Joint Surg Am. 2004;86:670-9.
10. Riew KD, Yin Y, Gilula L, Bridwell KH, Lenke LG, Lauryssen C, Goette K. The effect of nerve-root injections on the need for operative treatment of lumbar radicular pain. A prospective, randomized, controlled, double-blind study. J Bone Joint Surg Am. 2000;82:1589-93.
11. Weiner BK, Fraser RD. Foraminal injection for lateral lumbar disc herniation. J Bone Joint Surg Br. 1997;79:804-7.
12. E1-Khouri Ehara S, Weinstein JN, Montgomery WJ, Kathol MH. Epidural steroid injection: a procedure ideally performed with fluoroscopic control. Radiology. 1988;168:554-7.
13. Stewart HD, Quinnell RC, Dann N. Epidurography in the management of sciatica. Br J Rheumatol. 1987,26:424-29.
14. Manchikanti L. Transforaminal lumbar epidural steroid injections. Pain Physician. 2000;3:374-98.
15. Derby R, Bogduk N, Kine G. Precision percutaneous blocking procedures for localizing spinal pain: Part 2. The lumbar neuraxial compartment. Pain Dig. 1993;3:175-88.
16. Derby R, Kine G, Saal JA, et al. Response to steroid and duration of radicular pain as predictors of surgical outcome. Spine. 1992;17:S176-83.
17. Kambin P, O'Brien E, Zhou L, Schaffer JL. Arthroscopic microdiscectomy and selective fragmentectomy. Clin Orthop. 1998;347:150-67.
18. Dilke TF, Burry HC, Grahame R. Extradural corticosteroid injection in the management of lumbar nerve root compression. BMJ. 1973;2:635-7.
19. Johansson A, Hao J, Sjolund B. Local corticosteroid application blocks transmission in normal nocioceptive C-fibers. Acta Anesthesiol Scand. 1990;34:335-8.

20. Saal JS, Franson RC, Dobrow R, Saal JA, White AH, Goldthwaite N. High levels of inflammatory phospholipase A2 activity in lumbar spinal disc herniations. Spine. 1990;15:674-8.
21. Marshall LL, Trethewie ER, Curtain CC. Chemical radiculitis: A clinical, physiological, and immunological study. Clin Orthop. 1977;129:61-7.
22. Gamburd RS. The use of selective injections in the lumbar spine. Phys Med Rehabil Clin. 1991;2:79-96.
23. Renfrew DL, Moore TE, Kathol MH, et al. Correct placement of epidural steroid injections: Fluoroscopic guidance and contrast administration. Am J Neuroradiol. 1991;12:1003-7.
24. Buttermann GR. Lumbar disc herniation regression after successful epidural steroid injection. J Spinal Disord. 2002;15:469-76.
25. Saal JA, Saal JS. Nonoperative treatment of herniated lumbar intervertebral disc with radiculopathy. An outcome study. Spine. 1989;14:431-7.
26. Lutz GE, Vad VB, Wisneski RJ. Segmental instability: rehabilitation considerations. Semin Spine Surg. 1996;8:1-8.

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