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EFFECT OF SINGLE DOSE EPIDURAL STEROID + LOCAL ANAESTHETIC INJECTION ON PAIN FREE WALKING DISTANCE IN PATIENTS OF LUMBAR CANAL STENOSIS WITH NEUROLOGICAL CLAUDICATION

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ABSTRACT

Background: Many patients who genuinely require spine decompression remain afraid or reluctant to undergo operation due to expected cost and complications. Analgesics can not be given for prolonged period. In between surgery and analgesics comes the option of epidural steroid + local anaesthetic injection which was evaluated in this study.

Methods: Twenty patients of lumbar canal stenosis with neurological claudication were given Methyl-prednisolone + Bupivacaine injection in epidural space under image intensifier guidance. Pain-free walking distances were measured as number of steps using smart watch before giving injection, 10 days after injection and 90 days after injection.

Result: Mean pain-free walking distance increased by 121% from 265.5 at pre-injection state to 589.1 at ten days after injection, and by 104% at 90 days after injection. No complication was observed.

Conclusion: Epidural steroid + LA injection may be used to avoid or postpone the spine surgery in some patients especially if patient if reluctant or afraid to surgery. The procedure is safe without major complications.

Key words- lumbar or spinal stenosis, epidural steroid & LA injection, neurological claudication.

INTRODUCTION

Lumbar canal stenosis is narrowing of spinal canal and subsequent compression of neural tissue i.e. spinal cord &/or nerves. Usually, it is multifactorial caused by multiple aetiologies in various combinations like disc bulge/ herniation/ protrusion, thickened ligamentum flavum, arthropathy of facet joints, bony spur etc. Lumbar canal stenosis can cause radicular symptoms like pain, paraesthesia or neurological claudication in which pain and tingling/ tightness are felt behind lower limbs on walking and relieves with rest.

Surgical neural decompression is gold standard for this condition but it is expensive and has various complications. Many times, surgery fails to relieve all the symptoms completely leading to patient unsatisfaction. It is the high level of unsatisfaction in patients undergoing spine surgery which lead to additions of the peculiar topic like “failed spine surgery” in the orthopaedic textbooks.

Even after proper advice to underdo spine decompression, many patients remain fearful or reluctant to undergo spine surgery. The purpose of this study was to evaluate the efficacy of epidural steroid and local anaesthetic injection (ESI) in cases of neurological claudication caused by lumbar canal stenosis.

MATERIAL & METHOD

Patients aged between 30 to 60 years, 16 male & 4 females having neurological claudication of 1 to 6 months of duration and central lumbar canal stenosis in MRI were included in this study. Patients with purely radicular symptoms like pain & tingling at rest, isolated disc prolapse in MRI and those with diabetes or osteoporotic wedging were excluded. Pain free walking distance i.e., number of steps walked between the start of walking and appearance of pain compelling to stop walking was recorded by the smart watch applied over the wrist of the patient.

With patient in sitting position, back was cleaned with antiseptic solutions and sterile draping were applied. Skin and subcutaneous tissue between spinous processes of L-4 & L5 were infiltrated with 0.5 % Bupivacaine. Under fluoroscopic (C-Arm) control, epidural Tuohy needle was inserted and advanced between spinous processes of L-4 & L-5. A 10-cc syringe filled with air was attached to the Tuohy needle and it`s plunger was pushed in rapidly. If plunger bounced back equally rapidly indicating the epidural space has not been reached, the Tuohy needle was advanced further deep until the pushed air failed to bounce back the plunger indicating that the tip of the needle is in the epidural space. A mix of 3 ml or 120 mg Methyl Prednisolone acetate & 2 ml 0.5 % Bupivacaine was injected through the Tuohy needle, and sterile pad was applied after withdrawing the needle. Patient was kept for 4 hours for observation and normal activities were allowed thereafter. Pain free walking distances were measured 10 days after the injection and 90 days after the injection using smart watch.

RESULT

The mean pain-free walking distance in this study was 265.5 steps with a standard deviation of 32.44 before epidural injection. The mean pain-free walking distance was observed to be 589.10 steps with a standard deviation of 111, ten days after epidural steroid + LA injection (ESI). Three months after ESI, mean pain-free walking distance was found to be 542.60 steps with a standard deviation of 90.40.

Patient	Pre-injection pain-free walking distance (No of steps)	Pain -free walking distance after 10 days (No of steps)	Pain-free walking distance after 90 days (No of steps)
1.	270	488	462
2.	232	511	514
3.	**324**	**349**	**318**
4.	291	605	571
5.	285	568	540
6.	212	614	605
7.	236	621	512
8.	324	592	563
9.	267	693	614
10.	288	587	556
11.	277	582	551
12.	293	715	622
13.	234	666	603
14.	**292**	**282**	**287**
15.	241	711	594
16.	285	643	653
17.	217	719	577
18.	224	656	568
19.	265	593	590
20.	253	584	552

Table 1

Eighteen patients had significant improvement if pain-free walking distance (p =0.01) both 10 days after ESI and 90 days after ESI. Two patients had nil/ negligible improvements. Complications like allergic reaction or infection did not occur in any of the patients.

DISCUSSION

Several previous studies as well as this study have shown the effectiveness of epidural steroid + LA injections (ESI). Available evidences suggest that ESI with local anaesthetic offers short term and long-term relief of low back and lower extremity pain in patients with lumbar canal (spinal) stenosis [1,2]. Among the causes of lumbar canal stenosis, thickened ligamentum flavum is a predominant cause, probably due to aseptic inflammation or degeneration. Neovascularization and presence of inflammatory infiltrates was noted in samples of ligamentum flavum obtained perioperatively from patients of lumbar canal stenosis [3]. It may be safe to assume that the beneficial effects of ESI may be through reducing the aseptic inflammation, but further study is needed to prove this fact.

Several studies have shown that addition of hyaluronidase to epidural steroid injection further improves the benefits of ESI [4,5]. Sang Beom Kim et al have shown that epidural injection of steroid + hyaluronidase is more effective in reducing pain than steroid alone or hyaluronidase alone.

Riew & colleagues have shown that surgery is more likely to be delayed or avoided in case of ESI in comparison to epidural bupivacaine injection alone[6]. In prospective randomized double blinded controlled clinical trial, 67% of patients having epidural injection of bupivacaine alone undergone spine surgery in contrast to 23% of patients in whom epidural injection of steroid + bupivacaine was given. The spine patient outcomes research trial (SPORT) demonstrated that ESI can delay and even avoid surgery[7]. Surgery was required in 19% cases with ESI in comparison to 56% in non-ESI group.

Studies have shown that ESI has no deleterious effects on discectomy if it is done after ESI[8]. Thus, there seems no harm in trying ESI in selected cases before planning surgery. Many authors prefer two injections, but in this study, single injection was given with the logic that the depot preparation of Methylprednisolone is long acting and if it is not effective in single dose, no miracle is likely to happen even after second dose. Effectiveness of ESI has encouraged for further studies with more doses and even addition of hyaluronidase in next study.

CONCLUSION

This study as well as available literature indicate that although ESI is not comparable to spine decompression surgery for neurological claudication due to lumbar canal stenosis, it may be worth trying before spine surgery for two reasons in patients reluctant to undergo surgery.

1. It is often effective in reducing symptoms although the extent of benefit varies from patient to patient, from one study to another study.
2. It is cheap & harmless. The cost of ESI is only a fraction of spine surgery. Besides that, no major complications are observed, and it does not affect future spine surgery adversely if done later.

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