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Original Research Paper

Medical Science

MANAGEMENT OF LUMBOSACRAL PAIN WITH RADICULOPATHY BY EPIDURAL STEROID INJECTION IN TERTIARY CARE HOSPITAL IN DAR ES SALAAM, TANZANIA

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ABSTRACT

Introduction:- The aim of this retrospective observational study was to compare the potential efficacy of epidural steroid injection along with other conservative measures for relieving pain and improving function in patients with lumbosacral pain with radiculopathy caused by lumbar disc herniation. The route of administration (transforaminal, caudal or translaminar) were chosen on basis of pattern of radiculopathy and mri findings of disc herniation. **Methods:-** This study included 131 patients who presented with low back pain and radiculopathy due to lumbar disc herniation(at levels of L4–L5 or L5–S1) diagnosed clinically and confirmed by means of MRI. 4 patients were lost to follow up remainig 127 patients at final follow up.(127 patients)All patients were given fair trial of conservative treatment with drugs and physiotherapy. All patients were assessed at presentation and after starting the treatment at the second week and then third and sixth month using the visual analogue scale (VAS) for pain and the Oswestry Disability Index (ODI) for function status. **Results:-** In the transforaminal group (45 patients), there was a statistically significant improvement in the ODI scores from before the injection (ODI mean 62.4) to 2 weeks after the injection (ODI mean 24.4, $P < 0.01$), and upon follow-up at 3 months. (ODI mean 20.8, $P < 0.01$). 21 patients (16.5%) required 1 or 2 repeated injections, 4 (3.1%) patients underwent surgery. In the interlaminar group (19 patients), there was a statistically significant improvement in the ODI scores from before the injection (ODI mean 60.7) to 2 weeks after the injection (ODI mean 30.1, $P < 0.01$), but not upon follow-up (ODI mean 43.2, $P = 0.09$).5 (26.3%) patients required 1 or 2 repeated injection, 2 (10.5%) patients underwent surgery and 4(21%) patients developed transient paraparesis.In caudal group(63 patients) there was statistically significant improvement in ODI SCROES from before the injection (ODI mean 39.6) to 2 weeks after the injection (ODI mean 29.6) which deteriorate at 3 months(ODI mean 31.8).There was an insignificant difference ($P > 0.05$) between the transformainal and caudal groups in the VAS, except at the third month ($P < 0.05$). **Conclusion:-** Epidural steroid injection could be a preferable choice in chronic lowback and radicular pain due to LDH. It has shown good short term outcomes and can be safe, cost effective and minimally invasive treatment and alternative to surgery.

KEYWORDS : conservative treatment, epidural steroid injection, lumber disc herniation

INTRODUCTION

Low back pain (LBP), one of the most common sources of pain from musculoskeletal disorders and a major public health problem that influences the functional status and quality of life in elderly people, is reported in 7–80% of the general population at least once in their lifetime [1,2,3,4]. Patients with LBP may recover spontaneously, but some LBP patients will develop chronic LBP (CLBP) [5]. The vast majority of patients with LBP suffer from some mechanical disorder of the disc, ligaments, facet, or nerve root complex. The majority of these problems resolve with conservative treatment [2]. Radicular pain has been attributed to both mechanical deformation as well as to the effect of inflammatory cytokines on the dorsal root ganglion. For this reason, the local delivery of steroids through epidural injection seems to be a rational option [3,4].

The treatment of sciatica by epidural steroid injection was reported in 1953 by Lievre[30] It has since been used widely in many countries. Nonsurgical treatment of lumbar radicular pain includes NSAIDs, analgesics, oral or parenteral steroids, therapeutic exercises, and the epidural injections [1]. Epidural injections are performed through translaminar, transforaminal or caudal approaches. The treatment options are considerable and yet the outcomes associated with many treatments are either questionable or not well investigated [5]. The goal of this treatment is to reduce pain, improve functions and to reduce surgical intervention.[5,9,18] Many studies[19–23] have demonstrated the efficacy and methods of ESI. These studies have not been conclusive on the overall benefit over long-term and its cost-effectiveness.

AIM

The aim of this study was to study short term outcomes of epidural steroid injection (caudal, translaminar and transforaminal approach) along with other conservative measures for relieving pain and improving function in patients with lumbar disc herniation (LDH) in resource challenged tertiary center of dar es salaam, Tanzania.

PATIENTS AND METHODS

This retrospective observational study was carried out on 131 patients with lumbar disc herniation who presented with LBP and sciatica for more than 6 weeks, diagnosed clinically and confirmed by means of recent MRI. These patients attended outpatient department of orthopedics of regency medical centre, dar es salaam, Tanzania from 1st January 2020 to 1st June 2022.Inclusion criteria were:

- Patients with recent magnetic resonance imaging (MRI) films.(<1 month)
- Low back pain with uni or bilateral radicular pain, caused by a lumbar intervertebral disc herniation of not more than 1-year duration.
- Single or multiple level disc herniation with moderate to severe compression on recent MRI corresponding to the patient's clinical symptoms.
- Failure to respond to conservative treatment for at least 3 months.

Exclusion Criteria:

- Known allergy to Anesthetic agents
- Known bleeding disorder, severe diabetes or systemic infectious disease
- Previous lumbar spine surgery or Known spinal deformities
- Patients who decline to participate in the study.

All patients were subjected to the following: full history taking and thorough clinical examination with stress on neurological examination of the back and lower limbs; The patients were given trial of conservative therapy including combination of NSAIDS, muscle relaxant and neurotropic drugs for at least 3 months. Physiotherapy and lumbosacral belt were added when feasible.

Plain radiographs and MRI for all lumbar vertebrae to confirm diagnosis; evaluation of pain using the visual analogue scale (VAS) [6]; evaluation using the Oswestry Disability Index

(ODI), to measure patients' function capacity by evaluating pain intensity, personal care, lifting, walking, sitting, standing, sleeping, sex life, social life, and travelling [7].

The patients included in the study were aware of the side effects and probable complications. Written informed consent was obtained from each participant. The study was approved by the ethical review committee of regency medical centre.

Patients with more bilateral radiculopathy and multi-level disc protrusions were given caudal epidural while single level disc protrusion with bilateral radiculopathy were given translaminar epidural injection. While single level disc protrusion with unilateral radiculopathy were given transforaminal epidural injection.

The procedure was carried out in the operating theater under complete aseptic precautions by the same orthopedic surgeon for all patients in these group. The injection comprised 2 ml of triamcinolone 40 mg/ml, 2 ml of 2% lidocaine, and 6 ml of normal saline, totaling 10 ml whole for caudal epidural injection. Extra 10 ml of 1% lignocaine was added to increase volume for caudal epidural injection. Both translaminar and transforaminal epidural injections were performed using 21 G spinal needle. Location was confirmed using C-Arm[Fig 1] and using 1 cc of iohexol contrast material before injecting drug.[fig 3] Caudal epidural injection was given with 18 G needle which introduced through the sacral hiatus to the epidural space [1] and without fluoroscopic guidance. Patients were observed for 1-2 hours, and then if there were no complications they were allowed to go home.

All patients were assessed at presentation and after treatment at second week, and third and sixth month with the VAS scale and ODI score.

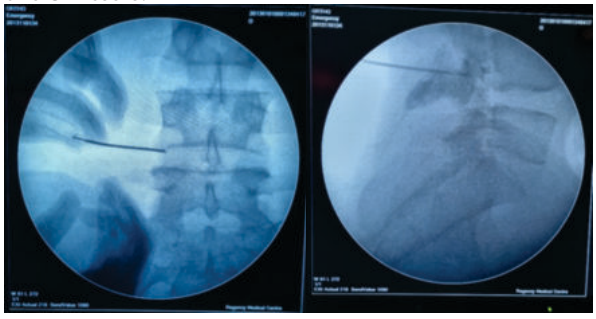

Fig 1 : Needle Introduction For Transforaminal AP view

Fig 2: Lateral View For Transforaminal Injection

Fig 3: Contrast Distribution Along Nerve Root

RESULTS:

This study was carried out on 127 patients with LDH (at levels of L4–L5 or L5–LS1) who presented with LBP and sciatica. There were 71 female (55.9%) and 56 male patients (44.09%), and their ages ranged between 26 to 80 years(mean SD 53 ± 5.12 years).

Out of 131 patients, 127 patients completed the treatment plan and assessments. Transforaminal group included 45 patients, 26 female (57.77%) and 19 male (42.22%) patients between 26 and 67 years of age (mean ± SD 51 ± 4.34 years), with LBP duration ranging between 12 and 67 weeks, with a mean ± SD of 24.26 ± 0.80. Interlaminar group included 19 patients between 30 and 70 years, with a mean ± SD of 55.80 ± 5.48.consists of 9 male and 10 females with LBP ranging from 6 weeks to 52 weeks. While caudal epidural group consists of 28 male and 35 females between age group of 36 to 80 years with symptoms duration of 12 weeks to 72 weeks.

1. There was no statistical significant difference ($p<0.05$) in age, sex and disease duration in all 3 groups.
2. Interlaminar group shows significant difference in VAS and ODI score in initial follow up at 2 weeks and 1 month($p>0.05$) but no difference at final follow up.
3. There was an insignificant difference($p>0.05$) between caudal and transforaminal group except at 3 months.
4. All 3 groups show significant improvement in VAS and ODI scores beginning from 2 weeks up to 6 months of injection.
5. 5 (3.9%) patients required 1 or 2 repeated injection,all of them belonged to caudal epidural injection group and has severe symptoms at presentation.
6. 2 (1.5%) patients underwent surgery, 1 of them was given transforaminal injection and had no improvement at 2 weeks, developed severe pain during transforaminal injection and operated at 3 weeks after injection. Another patient had severe obesity and caudal epidural injection was given for l5s1 disc protrusion, she developed both lower limb weakness and loss of bladder control. She went for surgery at 2 months after injection.
7. 4(3.1%) patients developed transient paraparesis. All of them were given interlaminar injection and there might be possibility of infiltration of anaesthetic agent into subarachnoid space. These might require additional query and investigations which is out of scope of our present study. All of the patients developed full power of both legs within 2 hours of injection and none of them developed residual weakness.

Table 1 : Clinical Characteristics Of 3 Groups

	Transforamial	Interlaminar	Caudal
Age (YEARS)	51 ± 4.34	55.80 ± 5.48	61.70 ± 6.41
Sex (M:F)	19:26	9:10	28:35
Disease Duration (WEEKS)	24.26 ± 0.80	36.8 ± 1.70	55.20 ± 2.68
Weight	81.40 ± 4.80	83.20 ± 6.40	87.35 ± 8.30
DISC Herniation L4L5 L5S1	 20 25	 5 14	 45 18

Table 2: Mean Follow Up Scores For Each Procedure

Period	Clinical Parameter	Transforaminal	Interlaminar	Caudal
At Presentation	VAS ODI	7.2±1.082 56.133±15.674	7.4±1.6 57.3±13.23	8.0±1.30 60.10±18.4
Second Week	VAS ODI	3.76±0.04 50.3±11.675	3.24±0.08 50.21±10.45	3.9±0.56 52.3±9.78
1 Month	VAS ODI	4.3±1.2 50.8±15.1	4.2±0.9 50.9±10.64	4.7±1.43 53.63±10.67
3 Months	VAS ODI	4.2±1.39 51.33±11.06	4.2±0.091 51.15±13.87	4.6±1.93 53.79±11.421

6 Months	VAS	4.4±1.932	4.6±1.49	5.3±1.781
	ODI	53.53±10.659	52.13±10.31	57.133±10.82

(VAS: Visual Analogue Scale, ODO: Oswestry Disability Score)

Table 3 : Complications In Patients During Procedure

ATTEMPTS REQUIRED DURING STEROID PLACMENT	
ONE	102(80.3%)
TWO	23(18.11%)
THREE	2(1.5%)
DIFFICULTY IN APPROACH	15(11.8%)
DURAL PUNCTURE	NONE
HEADACHE	8(6.2%)
PARAPARESIS	4(3.1%)
REPEAT INJECTIONS	5(3.9%)
SURGERY REQUIRED	2(1.5%)

DISCUSSION

There is high morbidity associated with lower back pain with radiculopathy and its management[18]. The exact mechanism of which still remains unclear[19.20], disc degeneration, inflammation and herniation are possible explanations.

In 1901, sicard introduced the injection of cocaine through the causal epidural space and ever since epidural injections are used for chronic lower back pain and/or radiculopathy.[19]

However it didn't gain much popularity until 1925 when venir popularised its use[20].the first published report by evans suggested good outocme with epidural injection when used along with saline. It was thought that saline displaced nerve roots and prevents adhesions [18]. Since then numerous studies published and literature research revealed only a few randomized, double-blind prospective studies assessing the efficacy of this injection technique [19].

Dansfield et al [20] evaluated caudal epidural injection and root blocks, but concluded that both treatments were effective and had no significant differences. Singh and Manchikanti [19] evaluated caudal epidural injections with limited success. Bush and Hillier [22] evaluated the injections containing steroid and saline and concluded that in the short term they were effective but the long-term potency was variable. Cuckler et al [18] did a similar study with variable results but favored steroid placement.

We assessed the efficacy of epidural steroid injections containing a preparation of local anesthetic and steroid in a group of patients with chronic low back pain and sciatica.

The main therapeutic result of the injection appeared during the first week itself, when an immediate decrease in the mean ODI score of the patients was noticed.[TABLE2]

Confirmed by a decrease in the mean VAS value as well as a decrease in the mean ODI score. These results are in agreement with the findings of other two studies [1,11], in which patients on NSAIDs plus exercise showed improvement in VAS value and ODI score.

In our study, we used heat therapy, back supports, and NSAIDS in addition to other treatment measures. All these measures played an important role in the improvement of our patients and can be attributed to the fact that heat therapy reduces pain and improves function [12]. Several studies [13–16] reported that CONSERVATIVE MEASURES can effectively reduce pain intensity in the lower back and legs and improve functional capacity in LDH. This improvement might be attributed to the fact that PHYSIOTHERAPY are designed to improve spinal stability, flexibility, strength deficits of the superficial and deep muscles of the spine, and retain precise neural control of these muscles [17–19].

In contrast, a meta-analysis [20] in chronic LBP patients demonstrated that core stability exercise (LSSE) is effective in the improvement of pain and physical function in the short term, rather than the long term.

We found that there was a significant difference($P < 0.05$) in all groups in the mean VAS and the mean ODI score. The epidural injected group showed a significant improvement, especially within the first weeks after injection ($P < 0.05$).

This is in agreement with the findings of two other studies [1,21], which suggested that the improvement in the epidural steroid injection group was faster and better than that in the NSAIDs group, and there were statistically significant differences between the assessment scores of the groups. Improvement in pain within the first weeks can offset the need for surgery. Most clinicians know that one of the most common indications for surgical interventions is intractable pain within first months after onset of symptoms [22]. This improvement might be attributed to the high volumes that are administered in the epidural space, different mixtures of steroids, local anesthetics, and saline. The injection acts like a hose of water being squirted into a blocked pipe in an effort to shift the blockage, so-called 'volume effect'. Theoretically, local installation of steroid preparation yields higher local concentrations compared with oral dosing. Furthermore, epidural injection of corticosteroids is not dependent on local blood flow, which is frequently impaired with compressive lesions [23].

Epidural steroids can be given either through lumbar or caudal routes. Some studies suggested that patients should receive three injections for more efficacy, whereas others mentioned that only one injection could be enough and effective to avoid more side effects [2].

In the current study we injected through either transforaminal, interlaminar or caudal route. We found that there were insignificant differences ($P > 0.05$) between the lumbar and the caudal group as regards VAS (except at second month) and ODI (except at first week and first month).

Our study is in agreement with the study by Manchikanti *et al.* [24], who showed equal efficacy for caudal and lumber approaches in managing pain and functional disability from disc herniation. Sergio *et al.* [25] reported that lumbar and caudal injections were equivalent, and allowed to decrease surgery in 60% of the cases. Regardless of the technique, 24–28% of the patients required one or two repeated injections within 12 months for the management of their primary complaint. In our study, most of patients were managed with only one injection intended for 3 months and only 5 patients required repeated injections.

In contrast, Singh *et al.* [2] suggested that there was a significant improvement in the subjective and objective criteria in lumbar epidural route injection as compared with caudal route. This difference may be due to differences in the number of patients, selection of patients for each route, and injected solution.Our results did not coincide with the long-term results of Carette *et al.* [26], who found a significant improvement in leg pain in a lumbar epidural injection group after 6 weeks, with no difference after 3 and 12 months. Wilson-MacDonald *et al.* [27] reported pain relief only in the first 5 weeks after lumbar epidural injection, whereas no difference in results was seen after that. Bush and Hillier [28] also confirmed that improvement was significantly greater in the steroid group at the fourth week, but no significant difference in pain was recorded at 1 year thereafter. The difference may be caused by the short-term assessment in our study, selection of patients for the caudal route, or contents of the injected

solution.

In our study, after 3 months, all groups showed improvement, but the interlaminar injection groups were statistically better, with significant differences in all clinical parameters ($P < 0.05$) during the follow-up stages except at the third month, when the differences did not reach statistical significance.

The major limitation of our study was short follow up, subjective pain assessment and cocurrent conservative therapy was given along with epidural steroid injections. Moreover, we did not repeat steroid epidural injections for mild pain. Many studies mentioned that some patients might benefit from repeated injection [10,29].

Further studies are recommended with larger number of patients and long period of assessment to detect patients' need for further injections and to assess whether the injection would offset the need for surgery during this period or patients would need surgical intervention.

CONCLUSION

Epidural steroid injection could be a preferable choice in managing low back and radicular pain due to disc herniation. It was a clinically useful mode of treatment that is cost effective and could offset the need for surgery in short-term events. Transforaminal, interlaminar and caudal all three epidural routes were safe and simple to be used.

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