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Dr. Abhay Vikram Singh
2nd Year Postgraduate, Department of Orthopaedics, Sri Lakshmi Narayana institute of Medical Sciences, Puducherry, India

Dr. Navneet Krishna Saxena
2nd Year Postgraduate, Department of Orthopaedics, Sri Lakshmi Narayana institute of Medical Sciences, Puducherry, India

Dr. T Shankar Lal
H.O.D, Department of Orthopaedics, Sri Lakshmi Narayana Institute of Medical Sciences, Puducherry, India

Corresponding Author:
Dr. Abhay Vikram Singh
2nd Year Postgraduate, Department of Orthopaedics, Sri Lakshmi Narayana institute of Medical Sciences, Puducherry, India

Chronic low back ache and its management by means of caudal epidural steroid injections: A prospective study

Dr. Abhay Vikram Singh, Dr. Navneet Krishna Saxena and Dr. T Shankar Lal

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Abstract
Introduction: Lumbar epidural steroid injections can be accomplished by one of three methods: caudal, interlaminar, or transforaminal. In this study we sought to conclude the efficacy of caudal epidural steroid injections for the managing of chronic low back ache.
Material and Methods: A prospective study was conducted in the department of orthopedists Lakshmi Narayana institute of medical sciences, Puducherry from august 2020 to august 2021. Total 40 patients with chronic low back pain not responding to conservative management were involved in the study. They were assessed clinically before and after epidural steroid on the basis of pain, unrestricted activities of day-to-day life and work performance on the basis of visual analogue scale.
Result: Total 40 ESI were given to 40 patients. We included total 40 cases in this study, 25 were females and 15 were males with chronic low back pain. Patient follow up was done at one week, one month, and then every three months respectively up to twelve months of treatment. Mean pre ESI, VAS was 7.11 and while 4.83 at the end of one year of treatment. We obtained excellent results in 10 percent, well in 13 percent, fair in 12 percent while poor in 5 percent patients.
Conclusion: ESIs are very effective and significantly reduce pain in patients with chronic low back pain.

Keywords: Low back pain, epidural steroid injections

Introduction
Chronic low back pain, which has negative effects on life and which causes labor force loss, is an important community health issue. As per the data, 10% of all low back pains continue for 4-6 weeks, are then referred as chronic low back pain. Lumbar epidural steroid applications and surgical methods can be used when conservative methods are insufficient[1]. LBP is as common as the common cold as a cause of lost work time; it is the fifth most frequent cause for hospitalization and the third most common reason to undergo surgical procedure. LBP is defined as chronic after 3 months because most normal connective tissue heal within 6 - 12 weeks unless pathoanatomic instability persists.
A slowed rate of tissue repair in the avascular intervertebral disc may impair the resolution of chronic LBP. The most common causes of chronic LBP are traumatic or degenerative conditions of the spine. A number of anatomic structures of the lumbar spine have been considered as the main origin of LBP [2-6]. Several studies have shown significant improvement with epidural injections with or without steroids in patients having chronic LBP. Among the different interventions used in managing chronic spinal pain; lumbar epidural injections have been used immensely for treating lumbar radicular pain. Epidural steroid injections (ESIs) are one of the most common treatment options for many forms of LBP and leg pain. They have been used for low back problems since 1950s and still is a crucial part of the non-surgical management of sciatica and LBP. The goal of the injection is pain relief; at times the injection alone is sufficient to provide relief, but commonly ESIs is used in combination with a comprehensive rehabilitation program to provide additional benefits [7-8]. However, there is a paucity of studies exploring the prediction of the therapeutic efficacy of epidural injections being administered by accessing the lumbar epidural space by multiple routes including transforaminal, caudal, and interlaminar.

Substantial differences have been described among these 3 approaches, with the transforaminal approach having the following advantages of being target-specific and using the smallest volume, fulfilling the aim of reaching the primary pathologic site, namely the ventral lateral epidural space [9-11]. In our study, ESIs are routinely used to support non-operative treatment for chronic LBP and our anecdotal perception is that a considerable proportion of patients report significant amount of pain relief after this procedure and save health care costs.

Materials and Methods

A prospective study was conducted in the Department of Orthopaedics, Sri Lakshmi Narayana institute of Medical Sciences, Puducherry, India from august 2020 to august 2021, after taking the approval of the protocol review committee and institutional ethics committee.

Methodology

Total 40 patients of LBP with caudal epidural steroids under sterile conditions in operating room under guidance of fluoroscopic control that fulfilled the required inclusion criteria and was not responding to other non-surgical and non-invasive methods. Patients with chronic low back pain and sensory symptoms not responding to conservative management were include in this study. Exclusion criteria included patients with prior lumbar disc surgery and any motor deficits. Injection Triamcinolone10mg/1ml, bupivacaine 0.5% (6ml), normal saline 32 ml was prepared for the patients. Patient was put in prone position with a pillow kept under pubic symphysis.1% lignocaine infiltration was done on the area of skin over sacral hiatus. After piercing sacrococcygeal ligament, an 18 gauge Tuohy needle was introduced into sacral canal through sacral hiatus route. Accurate placement of epidural injection needle was confirmed by lateral view of c arm image intensifier and ESI dose was administered. We observed the pain scores on visual analogue scale (VAS) and Oswestry disability index (ODI) to evaluate the results after caudal ESI. Positive effect of ESIs were evaluated as per the ability of the patients to perform routine activities and their ability to return to work before and after the administration of ESI. Further follow up included evaluation of VAS and ODI after a periodical gap of three months regularly up to one year. Cases were categorized as excellent, good, fair and poor depending upon pre decided criteria of pain relief and activity levels as per VAS and ODI scores.

Table 1: Showing number of epidural doses given

Number of Patients (40)	Number of ESI doses	Total Doses (70)
20	1	20
10	2	20
10	3	30

Table 2: Showing sex distribution of cases of ESI

Gender	Number of Cases	Percentage
Males	15	37
Females	25	63

Table 3: Showing causes of LBP

Cause	Cases	Percentage
Non specific	16	40
Lumbar disc herniation	15	37
Lumbar canal stenosis	4	10
Degenerative disc disease	5	13
	40	100

Table 4: Showing mean VAS score

Time Interval	Mean
Pre injection	7.11
At one week	3.83
At one month	3.52
At 3 months	4.16
At 6 months	4.25
At 9 months	4.51
One years	4.83

Table 5: Showing results after intervention by ESI

Results	Number of Patients (40)	Percentage
Excellent	10	25
Good	13	33
Fair	12	30
Poor	5	12

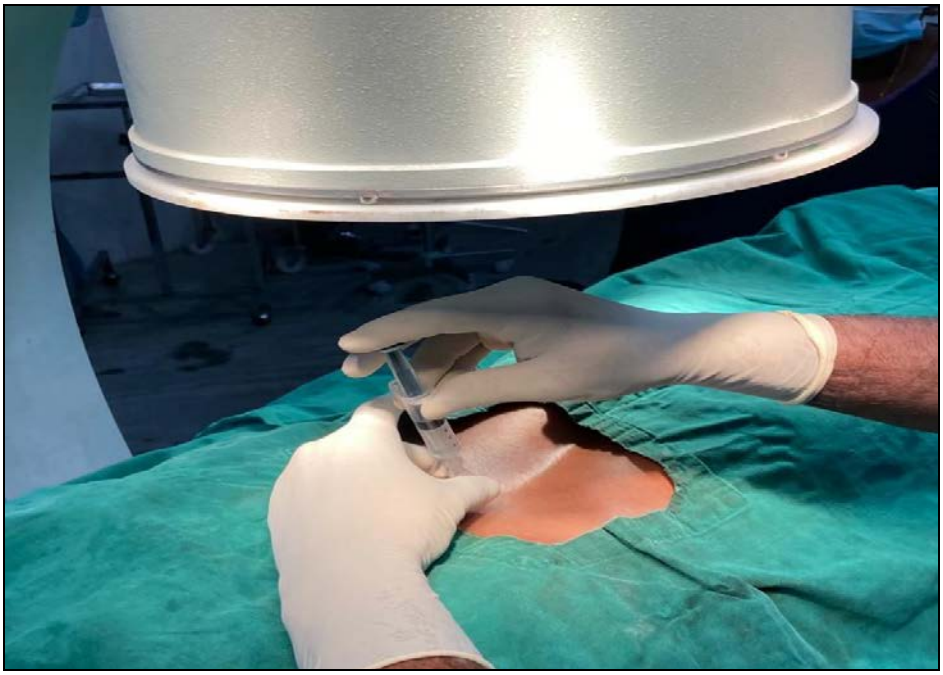

Fig. 1: Showing prone position of patient for caudal ESI

Results

Total 40 ESI were given to 40 patients. We included total 40 cases in this study, 20 patients were given single injection, while 10 had two and 10 received three ESI doses (Table 1). 15 were males and 25 females with chronic LBP (Table 2). Out of 40 cases of LBP, Lumbar disc herniation was seen in 15, lumbar canal stenosis in 4 and degenerative disc disease in 5 cases while 16 cases had non-specific LBP (Table 3). Subsequent follow up was done at one week, one month and then every three months up to twelve months of treatment (post third ESI 9 months). Mean pre ESI, VAS was 7.11 while it was 4.83 at one year of treatment (Table 4). We obtained excellent results in 10 percent, good in 13 percent, fair in 12 percent while poor in 5 percent patients (Table 5).

Discussion

Back pain especially in lumbar region has become a routine problem due to faulty postures, lack of exercises, and excessive burden on spine with or without history of minor to moderate trauma. Prolonged use of analgesics is neither beneficial nor advisable. Several approaches like lumbar tractions, various physiotherapy techniques, manipulations, all have been used for LBP but with inconsistent results. Surgical interventions are recommended for cases with constant pain or with a deteriorating neurological status only. Because of the limited armamentarium, there is a big number of unsatisfied / unrelieved patients of LBP visiting various orthopaedic departments.

Epidural steroid injections can be given by caudal, interlaminar or transforaminal approaches. Robechhi and Capra [12] and Lievre [13] described use of ESI by transforaminal route while use of corticosteroids by caudal epidural space was reported by Cappio [14]. We used caudal epidural technique and found satisfying results. Corticosteroids have anti-inflammatory and immunosuppressive effects. They have various modes of action like membrane stabilization and inhibition of neural peptide synthesis. Panayiotis JP *et al*. [15] conducted a study on treatment of lumbosacral radicular pain with epidural steroid injections. They concluded that 68% of patients were asymptomatic, 20% had no change in pre injection radicular symptoms, and 12% had various degrees of pain relief. Peng *et al*. [16] observed in a study over 42 patients that leakage of chemical mediators or inflammatory cytokines produced in a painful disc into epidural space through annular tear could lead to injury to adjacent nerve roots and might constitute the primary pathophysiological mechanism of radiating leg pain in patients with discogenic low back pain but with no disc herniation. Ackerman *et al.* [17] documented change of pain score and functional score only after 2 weeks of treatment with ESI and followed cases up to 24 weeks. We could obtain comparable results after second ESI at One month. In a meta-analysis study, Choi H J *et al*. [18] studied long term benefits of epidural steroids in LBP in terms of pain, disability and subsequent surgery. Their study suggested benefits for less than six months only. Our study observed short term benefits of pain relief for 9 to 12 months after caudal ESI. In a systemic review by Jun L *et al*. [19] for comparing effectiveness of transforaminal versus caudal ESI for managing lumbosacral radicular pain, the outcomes and clinical significance of 6 prospective studies were summarized. They found both transforaminal and caudal ESI to be equally effective. Transforaminal ESI was better in reducing pain over duration of less than six months and caudal ESI exhibited better impact on both pain and functionality over a longer period (one year). The current study obtained significant pain relief by caudal route in 85 percent cases over a period of three months and moderate relief in 62 percent cases over one year. Only 4 patients required further operative surgeries as they were not relieved of pain and radicular symptoms even after administration of two ESI. Singh H *et al.* [20] concluded that better results can be obtained with caudal ESI in patients presenting earlier. ESI should not be given to antenatal patients (due to fluoroscopy exposure), cases with any bleeding disorder, any local or systemic infections.

These should be contraindicated in patients with allergy to local anaesthetic agents and patients with conditions like congestive cardiac failure and diabetes mellitus. In larger doses, corticosteroids may cause adrenal dysfunction and suppression of hypothalamic pituitary axis suppression. Though Dural puncture (0.5 to 6%), complications like bacterial meningitis, aseptic meningitis and epidural abscess [21, 22] have been reported with use of ESI. In our study ,complication of pain was reported at the ESI site only in 5 patients which was managed with conservative means effectively.

Conclusion

In patients with chronic LBP not responding to other conventional non-surgical methods of treatment, ESI can be used as an alternate method of treatment .They may reduce the need of subsequent invasive surgeries. Caudal ESI can be given fairly easily and is only a day care procedure. When done under strict aseptic conditions and a good quality fluoroscope, administration of caudal ESI is a relatively safe procedure in experienced hands provided with appropriate case selection.

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