

## Caudal Epidural Steroid Injections in Discojenic Pain: Review Article

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### Abstract

**Introduction:** Epidural steroid injections (ESIs) have been widely used for over 50 years in the treatment of back pain with or without radiculopathy. In this study we aimed to evaluate the effects of caudal epidural steroid injections (CESIs) in patients suffering from discogenic pain, resistant to conservative medical therapy.

**Methods:** Systematic review of 270 CESIs performed patients data 'suffering from discogenic pain from January to December 2016 were evaluated. The pain's exact region was marked as left, right, and bilateral. Patients who had operated before were recorded. According to the source of the discogenic pain, patients were divided into two like; upper lumbar pain (L1-4), lower lumbar pain (L4-S1). Visual analogue scale (VAS) values were recorded before the injection, after the injection and at 1, 3, 6<sup>th</sup> months during the control visits.

**Results:** A total of 270 patients with discogenic pain were included in the study. 172 of them were male (63.7 %), while 98 of them female (36.3%). VAS scores in all recorded times after injection were found significantly lower compared the values of preinjection ( $p < 0.05$ ). VAS values in Pain Group L4-S1 were found lower than Pain Group L1-4 for all recorded times. According to the regions of pain, VAS values didn't differ.

VAS scores compared between the patients operated before and the nonoperated patients didn't differ significantly.

**Discussions:** CESIs are effective in patients suffering from discogenic back pain resistant to conservative and medical therapy. It is a safe and effective method with low complication rates.

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**Keywords:** Discogenic Pain; Caudal epidural steroid injections; Conservative therapy



### Introduction

Chronic low back pain due to prolapsed lumbar intervertebral disc is a serious problem limiting the daily activity<sup>[1]</sup>. This is an alternative treatment for the cases resistant to medical and conservative treatment approaches<sup>[2]</sup>. There are some arguments about CESIs for disc herniation and radiculopathies<sup>[3,4]</sup>. The volume of steroids and local anaesthetics can differ. The approach for the physician reaching to the interlaminar space can be via transforaminal (TF) or caudal (C) way<sup>[5]</sup>. CESIs are safe and minimize the dural puncture risk. Besides compared to the interlaminar injections, it is effective. For caudal and interlaminar injections the needle's incorrect placement might be seen as a problem<sup>[6]</sup>. Cause it prevents the solution to reach the target. But this is not a problem due to the guidance of the fluoroscopy,

or with the existence of contrast solution for transforaminal injections<sup>[7]</sup>. In this review, we aimed to evaluate the effectiveness of CESIs for lower and upper discal lumbar pain.

### Methods

The data were collected from the patients aged between 18 - 78 during the period January-December 2016 who consulted to our algology department with back pain. Patients resistant to medical and conservative treatments, at least 3 months duration of discogenic back pain, the existence of discopathies included in this study. The exclusion criteria's were the indication for surgery due to discal herniation, secestrated image on MR, coagulation disorders, allergy to local anaesthetics and steroids, infection at the injection site, obesity, and pregnancy. Patients



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were evaluated for gender, age, height, weight. The severity of pain, distribution like right, left or bilateral was recorded. The MR images were utilized carefully. After obtaining written consent, patients were taken to the operation room. 18 G cannula was accessed. Isotonic saline solution 500 ml infusion was administered before the injection. Monitorization routine was performed. Atropine sulfate and ephedrine were ready for the urgent complications such as bradycardia, hypotension. For the CESI procedure, the patient was placed in a prone position on the operating table. Following skin preparation, the sacral hiatus was identified and both the skin overlying the sacral hiatus and the underlying ligaments were infiltrated with 2 ml of 2% lidocaine without epinephrine. A 22 gauge spinal needle was placed between the sacral cornu at about 45, with the level of the spinal needle facing ventrally until contact with the sacrum was made in the sacral triangle. The needle was then redirected more cephalad, horizontal, and parallel to the table, advancing it into the sacral canal through the sacrococcygeal ligament and into the epidural space. This was followed by an aspiration test, and then the whoosh test was performed. Totally 20 ml of drug mixture of celestone 6 mg (1cc) and bupivacaine 15 mgr (3cc) and 16 ml saline solution carefully infused. Following the injection, the patient was taken to the recovery room during 30 min for hemodynamic monitoring. Patients with severe paresis in legs, severe pain in legs, function loss, offered to stay in the hospital for 2 days. In the case of the failure of the injection, CESI repeated in two weeks. Pain assessment was made as VAS scores, using visual analogue score (VAS) (0 = no pain and 100 = worst possible pain). Vas scores were measured before injection, after the injection at 1, 3, 6<sup>th</sup> month's intervals.

### Statistical analysis

Sample size of 270 patient's data was recorded. Statistical analysis was done using the SPSS software 16.0 (Statistical Package for Social Sciences SPSS Inc. Chicago, IL, USA). The confidence interval was 95 %.  $P < 0.05$  was considered statistically significant.

### Results

270 patients aged between 18 and 78, 172 male (68%), and 98 (32%) female were enrolled in this study. The demographic data summarized in table1. VAS scores recorded at 1, 3, 6<sup>th</sup> months were significantly lower after CSEI's ( $p < 0.005$ ).

**Table 3:** Vas Scores Distribution.

	Pain L4-S1 n=139	Pain L1-4 n=131	Right sided pain with radiculopathy n = 84	Left sided pain with radiculopathy n = 124	Both right and left sided pain n = 62	Patients operated before n = 36	Patients non operated n = 234	Patients with pain less than 6 months n=36	Patients with pain more than 6 months n = 234
<b>Preinjection</b>	8.17±0.86	8.12±0.74	8.21±0.83	8.09±0.75	8.19±0.86	8.50±0.69	8.10±0.81	8.25±1.10	8.14±0.75
<b>1.month</b>	2.87±1.95	3.35±1.96	3.11±1.98	3.14±1.89	3±2.11	3.22±1.72	3.08±2.00	3.25±2.18	3.08±1.93
<b>3.month</b>	3.17±2.02	3.99±2.18	3.61±2.10	3.62±2.05	3.41±2.35	3.69±1.81	3.55±2.18	3.63±2.43	3.56±2.09
<b>6.month</b>	3.80±2.10	4.32±2.06	4.21±2.05	4.13±2.06	3.67±2.21	4.05±1.97	4.05±2.12	4.02±2.41	4.05±2.05

### Discussion

This is a retrospective study done on 270 patients with signs and symptoms of the lumbar disc at least 3 months, in whom conservative treatment had failed. The aim of the present study was to study the effect of caudally administered epidural steroids

VAS scores were shown in table 2. The VAS data of 36 patients; who had operated because of the discal herniation, compared to non-operative patients didn't differ significantly. All recorded VAS scores in two groups were found lower significantly ( $p < 0.005$ ). VAS scores for operated patients before injection was  $8.50 \pm 0.69$  while  $3.22 \pm 1.72$  at 1 Month,  $3.69 \pm 1.81$  at 3<sup>rd</sup>.  $4.05 \pm 1.97$  by the end of 6<sup>th</sup> month. For the patients non-operative VAS scores were;  $8.10 \pm 0.81$  before CESI,  $3.08 \pm 2.00$  at 1<sup>st</sup>,  $3.55 \pm 2.18$  at 3<sup>rd</sup>,  $4.05 \pm 2.12$  at 6<sup>th</sup> month recorded intervals ( $p < 0.05$ ). Shown in table 3. Evaluation of the pain region as right left and bilaterally no difference was observed significantly. For all patients, VAS scores after CESIs were found lower significantly compared to VAS scores before injection ( $p < 0.05$ ). The patients suffering from L4-S1 pain compared to L1-4 pain the decrease in VAS scores were found higher. (Table 3) Besides VAS scores recorded at all times for two groups compared to the values before CESIs were lower significantly. VAS compared between the patients having pain more than 6 months compared to patients suffering less than 6 months no statistically differences were found ( $p > 0.05$ ). Complications were observed in 9 patients. Nausea and vomiting in two patients, headache in three of them, hypotension in four patients. Medical therapy was adequate for nausea and headache, while for hypotension patients were monitored, volume replacement was performed in the hospital. For two of them volume replacement relieved the symptoms but for the other two patients, vasopressor support was needed. After treatment, they were discharged from the hospital without any added complications.

**Table 1:** Demographic data of patients.

MEAN ± Standard deviation (n = 270)	
<b>Year</b>	41.73 ± 13.07
<b>Weight (kg)</b>	74.7 ± 11.5
<b>Height (cm)</b>	1.68 ± 10.2
<b>Gender (%)</b>	270
<b>Female</b>	98 % 36.2
<b>Male</b>	172 % 63.7

**Table 2:** VAS values.

	Preinjection	1.month	3.month	6.month
<b>VAS</b>	8.15 ± 0.80	3.1 ± 1.96	3.5 ± 2.13	4.05 ± 2.09

VAS: Visual analog scala

in the treatment of such patients. Back pain was quantitatively assessed separately using the visual analogue scale and the functional before the procedure and at regular intervals after the procedure for a period of 6 months like 1, 3, 6<sup>th</sup> months. VAS scores were found lower in all recorded times compared to VAS before treatment. Patients demonstrated greater pain relief in L4-S1 group. In addition, VAS scores were found lower in both operated and non-operated group but compared between it didn't differ significantly. No major complications were seen. Epidural injection with corticosteroids is a common treatment option for patients with lower back pain or sciatica. In 1925, Viner from Montreal described the CESI and administered saline with procaine into the epidural space<sup>[8]</sup>. In 1960 Brown used steroids for epidural injections<sup>[9]</sup>. In a case of conservative and medical approaches' failure, CESIs can be effective. Epidural steroid injection relieves pain by reducing the inflammation of nerve roots. In our study, we aimed to evaluate the effect of the solution saline, steroid and local anaesthetic given through the epidural space on back pain due to the disc problems<sup>[4]</sup>. Epidural steroid injections can be performed via transforaminal or interlaminar near to the root or caudally. Several studies have been performed to assess how often and how many times the injections should be done. The results labelled are striking like, patients who received epidural corticosteroids experience less pain in controls and injections can be repeated three times in twenty days intervals with a good outcome. In our study, the injection offered rapid relief from pain and VAS scores were found significantly lower. Similar results were obtained in the repeated measurements for VAS ( $p < 0.05$ ). The volume administered through the caudal epidural space is controversial<sup>[11-13]</sup>. Many studies were done to determine the best volume and concentration<sup>[10]</sup>. In our study we used 20 ml of total volume. Too much volume as we used 20 ml (6mg betamethasone + 0.05% bupivacaine 15 mg + saline solution) might be helpful in order to wash the epidural space<sup>[14]</sup>. Steroids decrease inflammation. Steroids seem to interact with GABA receptors and thus control neural excitability through a stabilising effect on membranes, modification of nervous conduction and membrane hyperpolarization, in supraspinal and spinal site<sup>[15]</sup>. They have been administered alone or in association with local anesthetics and/or saline solution. We used 6 mg betamethasone in our study. Complications associated with epidural steroid injections include an epidural headache, nausea, vomiting, fever, paralysis in legs, motor stiffness, vasovagal reactions, cauda equina syndrome, adhesive arachnoiditis, aseptic meepidural abcess, hematoma<sup>[16-19]</sup>. Kaydu reported persistent hiccups after CESI longed for three days. Hiccups subsided after clorpromazin<sup>[20]</sup>. In our study we observed nausea in two patients, headache in three patients, hypotension in four patients. The epidural administration, a correct dilution of steroid with local anesthetics solution and/or saline solution, and a limited number of injections (no more than three) allows a significant reduction of steroid toxicity.

## Conclusions

It is concluded that caudally administered epidural steroid injections are a safe and effective. It has good results in short term and long term. We believe that it provides pain free period to enable the patient for physiotherapy which helps in early recovery.

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