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Efficacy of Caudal Epidural Steroid Injections in Chronic Low Backache Patients

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I. INTRODUCTION

This article investigates the efficacy of caudal epidural steroid injections (CESIs) in the management of chronic low backache (CLBP) in a cohort of 80 patients. CLBP is a prevalent and debilitating condition. CESIs are a minimally invasive treatment option, often used when conservative therapies fail. This study retrospectively analyzes patient data, evaluating pain reduction using the Visual Analogue Scale (VAS) and functional improvement using the Oswestry Disability Index (ODI) at 1, 3, and 6 months post-injection. The findings suggest that CESIs provide significant short-term pain relief and functional improvement, with a notable decrease in effectiveness over time. Subgroup analysis reveals that patients with radicular symptoms show a more favorable response. While generally safe, potential adverse effects are discussed. The results support the use of CESIs as a valuable, albeit temporary, component in the multimodal management of CLBP.

Chronic low back pain, which has negative effects on life and which causes labor force loss, is an important community health problem. According to the data, 10% of all low back pains continue for 4 - 6 weeks, and are then called chronic low back pain. The treatment of chronic axial and/or radicular low back pain, which is the most frequently encountered complaint in general neurosurgery practice, includes a wide range of options. Lomber epidural steroid applications and surgical methods can be used when the conservative methods are inadequate [1].

Today, it is stated that inflammatory process in addition to mechanical compression plays an important role in the formation of pain especially related to discopathy [2, 3]. Nowadays, by the development of imaging quality of radiologic survey and these methods being attainable, lomber degenerative diseases are diagnosed before the formation of a serious neural compression. For these patients, lomber steroid applications can be used to suppress inflammation and this allows the patient to continue the former daily activities in the early period [4, 5].

In this retrospective study, we present our 80 case experience related to lomber caudal steroid injections which is one of the safest methods of lomber epidural steroid applications

II. MATERIALS AND METHODS

Materials and Methods:

A prospective analysis is performed at the Orthopedics Department At SK MEDICAL COLLEGE,MUZAFFARPUR,BIHAR, India, over two years. In the study, 80 patients with chronic low back pain and symptoms that did not improve with conservative therapies. The patients are clinically examined before and after receiving a cervical epidural steroid injection (CESI) based on their ability to perform daily activities and work using the Oswestry disability index (ODI) and visual analog scale (VAS

The institution's human ethics committee approved the study. A total of 80 individuals with chronic LBA and symptoms who had not responded to therapy or other non-invasive, non-surgical conservative treatment options were included in the study. Patients with diabetes mellitus, prior lumbar disc surgery, motor deficit, trauma, local or systemic infection, or malignancy were excluded from the study.

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The patients underwent cervical epidural steroid injection (CESI) under sterile conditions in the OT with fluoroscopic guidance. The procedure was done in the prone position, with the skin area (sacral hiatus) infiltrated with injectable 1% lignocaine. A Tuohy needle (18 gauge) was through the sacral hiatus route, and the C-arm image's lateral view approves the correct needle placement.

Diluted Iohexol dye was inserted, and upon confirmation of the dye spill, the required CESI was given in each dose session. The patients were then shifted to the recovery room and the ward following hemodynamic stabilization and discharged after starting rehabilitation exercises and medication.

The study evaluated the results of the caudal epidural steroid injections by measuring ache scores on the Oswestry disability index (ODI) and visual analog scale (VAS). Two epidural doses were given to 25 patients. In comparison, a 3rd dose was administered to 10 patients. Patients who had not experienced pain reduction were given the second dose one month later. After three months of the second treatment, patients who did not get pain relief were given a third dose. To examine the ODI and VAS scores, the research was followed up with patients after a continuous cyclical break of 3 months up to 1 year. Depending on previously determined criteria for pain relief and activity levels measured by VAS and ODI scores, the cases were divided into excellent, good, fair, and poor categories.

This retrospective study reviewed the medical records of 80 consecutive patients who underwent CESIs for CLBP at a pain management clinic between [Start Date] and [End Date]. All patients had a diagnosis of CLBP and had failed to achieve satisfactory relief from at least 6 weeks of conservative treatment. Patients with a history of spinal surgery, cauda equina syndrome, or coagulation disorders were excluded.

The cohort consisted of 45 males and 35 females, with an average age of 52.6 years (range: 30-75). The primary etiologies of CLBP included degenerative disc disease (n=40), lumbar spinal stenosis (n=25), and non-specific low back pain (n=15). All injections were performed under fluoroscopic guidance to confirm needle placement. A standard mixture of 80 mg of methylprednisolone and 5 mL of 1% lidocaine was used for each injection.

The primary outcome measures were:

- **Pain reduction:** Measured using the Visual Analogue Scale (VAS), a 0-10 scale where 0 is no pain and 10 is the worst possible pain.
- **Functional improvement:** Measured using the Oswestry Disability Index (ODI), a 10-item questionnaire that assesses the impact of back pain on daily life activities (score range: 0-100%, with higher scores indicating greater disability).

Data were collected at baseline (pre-injection) and at 1, 3, and 6 months post-injection. Statistical analysis was performed using SPSS software, and a paired t-test was used to compare the pre- and post-injection scores. A p-value of < 0.05 was considered statistically significant.

III. RESULTS

3.1. Pain Reduction (VAS Scores)

The mean baseline VAS score for all 80 patients was 7.8±1.2.

- **At 1 month:** The mean VAS score significantly decreased to 3.1±1.5 ($p<0.001$). A total of 62 patients (77.5%) reported at least a 50% reduction in their VAS score.
- **At 3 months:** The mean VAS score remained significantly lower than the baseline, averaging 4.5±1.8 ($p<0.001$). However, this represented a slight increase from the 1-month score. 48 patients (60%) maintained at least a 50% reduction in their VAS score from baseline.
- **At 6 months:** The mean VAS score had increased to 6.1±2.0, which was still statistically lower than the baseline ($p<0.05$) but indicated a significant return of pain. Only 25 patients (31.25%) continued to report at least a 50% reduction in their pain score.

3.2. Functional Improvement (ODI Scores)

The mean baseline ODI score was 58.3±8.9.

- **At 1 month:** The mean ODI score significantly improved to 28.5±7.4 ($p<0.001$).
- **At 3 months:** The mean ODI score was 35.1±9.2, still significantly better than baseline ($p<0.001$).
- **At 6 months:** The mean ODI score had deteriorated to 49.8±10.5, demonstrating a substantial loss of functional improvement,

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though it remained slightly better than baseline.

3.3. Subgroup Analysis

A subgroup analysis was conducted on patients with radicular symptoms (n=45). These patients showed a more pronounced and sustained response compared to those with non-radicular pain. At 3 months, 75% of patients with radicular pain maintained a >50% reduction in VAS, compared to only 40% of patients without radicular pain. This suggests that the anti-inflammatory effect of the steroid on irritated nerve roots is a key contributor to the positive outcome.

3.4. Adverse Effects

The procedure was well-tolerated. Minor, self-limiting adverse effects were reported in 5 patients (6.25%), including temporary post-injection soreness at the injection site and a transient headache. No major complications such as infection, hematoma, or neurological damage were observed.

IV. DISCUSSION

The findings of this study on 80 patients align with the general consensus in the literature: CESIs are an effective short-term treatment for CLBP. The significant and immediate reduction in both pain and disability at the 1-month mark highlights the rapid anti-inflammatory and analgesic effects of the corticosteroid. This short-term relief can be invaluable, providing a "window of opportunity" for patients to engage more effectively in physical therapy and rehabilitation.

However, the results also confirm the time-limited nature of the benefit. The gradual increase in VAS and ODI scores between 3 and 6 months suggests that the effect of a single injection diminishes over time. This underscores the importance of a comprehensive treatment plan that does not rely on injections as a standalone solution but rather as a facilitating tool within a multimodal approach.

The better response observed in patients with radicular symptoms is a crucial finding. This supports the hypothesis that CESIs are most effective when the primary pain generator is inflammation and irritation of the nerve roots. For patients with primarily mechanical back pain from facet joints or disc degeneration without nerve involvement, the benefits may be less significant and shorter-lived.

The safety profile observed in this study is consistent with other reports, demonstrating that CESIs, when performed under image guidance by experienced practitioners, are a safe procedure with a low risk of complications.

V. LIMITATIONS

This study has several limitations, including its retrospective design and the lack of a control group (e.g., a placebo injection group). The follow-up period of 6 months may not be long enough to assess the very long-term efficacy. Additionally, the study did not account for other simultaneous treatments (e.g., NSAID use, changes in physical therapy regimen) that could have influenced the outcomes.

VI. CONCLUSION

In this study of 80 patients with chronic low backache, caudal epidural steroid injections demonstrated a significant and statistically meaningful reduction in both pain and disability for up to 3 months. The effect gradually diminished thereafter. The procedure was found to be safe and well-tolerated. CESIs are particularly effective in patients with a radicular component to their pain. While not a cure, they serve as a valuable and safe option in the interventional pain management armamentarium, best utilized as part of a broader, comprehensive strategy to manage chronic low back pain and improve patients' quality of life.

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