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OBSERVATIONAL EVALUATION OF THE EFFECTIVENESS OF CAUDAL EPIDURAL STEROID INJECTION IN THE MANAGEMENT OF PERSISTENT LOWER BACK PAIN

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ABSTRACT

Background: In addition to being less invasive than surgery, caudal epidural steroid injections also had lower rates of morbidity and death. Arachnoiditis and meningitis are among the worst adverse effects that have been documented in the literature.

The purpose of this study was to evaluate the effectiveness of caudal epidural steroid injections in treating patients with persistent lower back pain.

Methods: 240 participants with persistent lower back pain and sensory complaints who did not improve with conservative therapy were evaluated for this research. The Oswestry disability index and visual analog scale were used to clinically evaluate the included participants' pain, work performance, and unrestricted daily activities before and after steroids.

Results: 240 patients received a total of 330 epidural steroid injections, whereas 170, 50, and 20 subjects had single, two, and three injections, respectively. One hundred female individuals and 140 male subjects participated. Lumbar canal stenosis, lumbar disc herniation, non-specific LBP, and degenerative disc disease were seen in 100, 44, 22, and 74 individuals, respectively. Check-ins at one week, one, three, and twelve months. The mean VAS was 7.09 prior to ESI and 4.84 at one year. Prior to ESI, ODI scores were 59.14, and after a year, they were 44.66. 27.5%, 38.33%, 21.67%, and 12.5% of the outcomes were excellent, good, fair, and bad, respectively.

Conclusion: For patients with persistent and function-limiting lower back pain, epidural steroid injections are quite successful in reducing pain.

Keywords: backache, epidural steroid injection, injection, lower back pain, steroids

INTRODUCTION

The community is greatly impacted by chronic lower back pain, which has a negative impact on daily life and activities and lowers labor force participation. According to statistics from the literature currently in publication, around 10% of all patients with lower back pain develop chronic pain after 4–6 weeks. The most common complaint reported in general neurosurgical practice is radicular and chronic axial low back pain. There are several ways to relieve this discomfort. Lumbar epidural

steroid injections and other surgical techniques can be used if the conservative approach is unsuccessful. Both the inflammatory and mechanical processes are now thought to have a major impact on the development of discopathy-related pain.¹

Thanks to advancements in imaging quality and increased accessibility to these procedures, lumbar degenerative diseases have recently been evaluated prior to the development of significant brain compression. Lumbar steroid treatment can be used to reduce inflammation in these people, allowing them to return to their previous daily habits.² According to statistics from the literature, those with chronic lower back pain who have epidural injections—steroids included or not—see a notable improvement. In several therapies used to treat chronic spinal pain, lumbar epidural injections are frequently utilized to alleviate lumbar radicular pain. Epidural steroid injections (ESIs) are a common treatment option for a variety of lower back and leg symptoms.²

ESIs have been used to treat lower back pain since 1952 and are still an essential part of non-surgical therapy for sciatica and lower back pain. The primary goal of ESI therapy is pain relief, which can sometimes be accomplished with injections alone. However, in order to get an additional benefit, ESIs are typically utilized in conjunction with comprehensive rehabilitation programs.³

Cocaine was previously utilized in the caudal approach to treat patients with radiculopathy and lower back pain, which resulted in the first recorded epidural injection in human history. In 1953, the first epidural steroid injection was used for therapeutic purposes. By stabilizing hyperexcitable neuronal membranes and inhibiting proinflammatory mediators like histamine, phospholipase A2, and others, steroids aid in the suppression of inflammation.⁴

In addition to being less invasive than surgery, caudal epidural steroid injections also had lower rates of morbidity and death. Arachnoiditis and meningitis are among the worst adverse effects that have been documented in the literature.⁴

The objective of the current study was to evaluate the functional results of participants who had been receiving caudal epidural steroid injections for persistent low back pain for more than three months.

MATERIALS AND METHODS

Assessing the functional results of participants treated with caudal epidural steroid injections for persistent low back pain that had persisted for longer than three months was the goal of the current prospective observational research. The study was conducted at the Institute's outpatient department. Prior to participation, all individuals gave their written and verbal informed permission.

A total of 240 subjects, both male and female, who had lower back pain for longer than three months and who met the inclusion criteria and did not improve with other conservative management were evaluated for the study. They received caudal epidural steroids in an operating room under strict aseptic and sterile conditions under the guidance of fluoroscopic control. Participants having a history of lumbar disc surgery or any motor impairment were excluded from the research.

After being put in a prone posture with a pillow beneath the pubic symphysis, the individuals were administered 6 ml of 0.5% bupivacaine and 80 mg of methylprednisolone in 32 ml of normal saline. A 1% lignocaine infusion was applied to the sacral hiatus's skin-over-skin region.

An 18-gauge Tuohy needle was inserted into the sacral canal through the sacral hiatus route after the sacrococcygeal ligament was punctured. The dosage of ESI was administered after the proper positioning of the epidural injection needle was verified using a lateral view of the C arm image intensifier.

After caudal ESI, the outcomes were evaluated using the ODI (Oswestry Disability Index) and the visual analog scale (VAS) for pain. Following the administration of ESI, the subjects' capacity to carry out tasks and resume employment was evaluated. Three epidural dosages were administered in total. The individuals who reported either no pain alleviation or little pain relief received the second dosage one month following the first dose.

Following a three-month break, assessments were conducted using the ODI or VAS on a monthly basis for a year. Based on predetermined criteria of activity levels and pain reduction using the ODI scores and pain scores, subjects were categorized as outstanding, good, fair, and bad.

SPSS (Statistical Package for the Social Sciences) software version 16.0 (SPSS Inc., Chicago, USA) was used to statistically analyze the collected data in order to evaluate descriptive measures and the chi-square test. The findings were presented as frequency, percentages, mean, and standard deviation. Statistical significance was defined as a p-value of less than 0.05.

Findings

RESULTS

Assessing the functional results of participants treated with caudal epidural steroid injections for persistent low back pain that had persisted for longer than three months was the goal of the current prospective observational research. 240 participants with persistent lower back pain and sensory complaints who did not improve with conventional therapy were evaluated for the trial. The research participants' average age was 44.64 ± 8.48 years. In the current study, there were 58.33% (n=140) females and 41.66% (n=100) men. According to Table 1, the most common cause of lower back pain among study participants was degenerative disc disease, which affected 41.66% (n=100) of them. Non-specific lower back pain was experienced by 30.83% (n=74) of them, lumbar canal stenosis by 18.33% (n=44), and lumbar disc herniation by 9.16% (n=22) of them.

According to an analysis of the number of epidural steroid injection doses administered to the research participants, 70.83% (n=170) received a single dosage, for a total of 170 doses, two doses of epidural steroid injections were administered in 20.8% (n=50) participants with total of 100 doses, and three doses were given in 8.33% (n=20) research patients with total of 60 doses as detailed in Table 2.

It was observed that the research participants' mean VAS scores at various time points were 7.13 ± 1.17 before to injection, 3.83 ± 0.83 at one week, and 3.64 ± 0.76 at one month. The mean VAS scores rose to 4.06 ± 0.72 at 3 months, 4.24 ± 0.76 at 6 months, and 4.53 ± 0.85 at 9 months, all of which were non-significant increases. At one year, the greatest increase was seen at 4.84 ± 0.76 (Table 3).

According to the study's findings, the average ODI score (%) among the participants, After injection, the mean score dropped dramatically from 59.14 ± 7.75 to 26.23 ± 4.64 at 1 week, and then to 25.57 ± 3.82 , 24.75 ± 2.86 , and 23.05 ± 4.37 at 1 month, 3 months, and 6 months, respectively. At 9 months and 1 year, however, the mean Oswestry disability index scores increased to 41.13 ± 7.64 and 44.66 ± 7.56 correspondingly (Table 4).

Overall, 27.5% (n=66), 38.33% (n=92), 21.67% (n=52), and 12.5% (n=30) of the research participants had good results, followed by excellent results and fair results. The study subjects' overall outcomes were classified as excellent, good, fair, and bad. A minimum number of patients had poor outcomes (Table 5).

DISCUSSION

240 participants with persistent lower back pain and sensory complaints who did not improve with conservative therapy were evaluated in this research. The research participants were 44.64 ± 8.48 years old on average. In the current study, there were 58.33% (n=140) females and 41.66% (n=100) men. Degenerative disc disease was the most common cause of lower back pain among study participants, accounting for 41.66% (n=100), followed by non-specific lower back pain (30.83%; n=74), lumbar canal stenosis (18.33%; n=44), and lumbar disc herniation (9.16%; n=22) in that order. These findings were consistent with research by Stout A5 (2010) and Panayiotis J6 (2001), in which the authors evaluated participants using demographic information similar to that of the current study.

Regarding the number of epidural steroid injection doses administered to the study participants, 70.83% (n=170) received a single dose, for a total of 170 doses; 20.8% (n=50) received two doses, for a total of 100 doses; and 8.33% (n=20) received three doses, for a total of 60 doses. These findings aligned with those of Papagelopoulos PJ et al7 (2001) and Ackerman WE et al8 (2007), whose authors reported a comparable number of doses relative to the current study.

According to the study's findings, for the average VAS ratings of the participants at various time points, mean VAS scores before injection was 7.13 ± 1.17 , at 1week, it was 3.83 ± 0.83 , and further decreased to 3.64 ± 0.76 at 1 month. With a non-significant rise, the mean VAS scores rose to 4.06 ± 0.72 at 3 months, 4.24 ± 0.76 at 6 months, and 4.53 ± 0.85 at 9 months. At one year, there was the most rise, 4.84 ± 0.76 . These results were in line with those of Benyamin RM et al. (2012) and Manson NA et al. (2013), whose patients' mean VAS ratings following epidural steroid injections were comparable to those of the current investigation.

The mean ODI score (%) of the research participants was found to be 59.14 ± 7.75 prior to injection, which substantially dropped to 26.23 ± 4.64 at one week, and then to 25.57 ± 3.82 , 24.75 ± 2.86 , and 23.05 ± 4.37 after one, three, and six months, respectively.

At 9 months and 1 year, however, the mean Oswestry disability index scores increased to 41.13±7.64 and 44.66±7.56, respectively. These findings were consistent with research by Parr AT et al. (2012) and Manchikanti L et al. (2009), where the authors reported mean ODI scores (percentages) comparable to the current study.

Overall, 27.5% (n=66), 38.33% (n=92), 21.67% (n=52), and 12.5% (n=30) of the study individuals had good outcomes, followed by excellent results and fair results. These findings were categorized as excellent, good, fair, and bad. A small percentage of patients had poor outcomes. Such results were consistent with those of Manchikanti L et al. (2013) and Manchikanti L et al. (2004), whose authors reported comparable overall outcomes after receiving epidural steroid injections for lower back pain.

CONCLUSION

Taking into account its limitations, the current study comes to the conclusion that epidural steroid injections are very successful in reducing pain in patients with chronic, function-limiting lower back pain. To draw a firm conclusion, more extensive longitudinal research with a longer observation time and a bigger sample size is required.

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| S. No | Characteristics | Number (n) | Percentage (%) |
|-------|---------------------------|------------|----------------|
| 1. | Mean age (years) | 44.64±8.48 | |
| 2. | Gender | | |
| a) | Males | 100 | 41.66 |
| b) | Females | 140 | 58.33 |
| 3. | Cause of LBP | | |
| a) | Degenerative disc disease | 100 | 41.66 |

| | | | |
|----|------------------------|-----|-------|
| b) | Lumbar canal stenosis | 44 | 18.33 |
| c) | Lumbar disc herniation | 22 | 9.16 |
| d) | Non-specific | 74 | 30.83 |
| e) | Total | 240 | 100 |

Table 1: Demographic and disease data in study subjects

| S. No | Number of doses of ESI | Number of subjects n (%) | Total doses |
|-------|------------------------|--------------------------|-------------|
| 1. | 1 | 170 (70.83) | 170 |
| 2. | 2 | 50 (20.8) | 100 |
| 3. | 3 | 20 (8.33) | 60 |

Table 2: Number of epidural doses given in study subjects

| S. No | Time of assessment | Mean ± S. D |
|-------|--------------------|-------------|
| 1. | Before injection | 7.13±1.17 |
| 2. | 1 week | 3.83±0.83 |
| 3. | 1 month | 3.64±0.76 |
| 4. | 3 months | 4.06±0.72 |
| 5. | 6 months | 4.24±0.76 |
| 6. | 9 months | 4.53±0.85 |
| 7. | 1 year | 4.84±0.76 |

Table 3: Mean VAS scores in the study subjects

| S. No | Time of assessment | Mean ± S. D |
|-------|--------------------|-------------|
| 1. | Before injection | 59.14±7.75 |
| 2. | 1 week | 26.23±4.64 |
| 3. | 1 month | 25.57±3.82 |
| 4. | 3 months | 24.75±2.86 |
| 5. | 6 months | 23.05±4.37 |
| 6. | 9 months | 41.13±7.64 |
| 7. | 1 year | 44.66±7.56 |

Table 4: Mean ODI score (percentage) in the study subjects

| S. No | Results | Number (n) | Percentage (%) |
|-------|-----------|------------|----------------|
| 1. | Excellent | 66 | 27.5 |
| 2. | Good | 92 | 38.33 |
| 3. | Fair | 52 | 21.67 |
| 4. | Poor | 30 | 12.5 |

Table 5: Results in study subjects after epidural steroid injections