RESEARCH

EFFICACY OF EPIDURAL STEROID INJECTION IN ELDERLY PATIENTS: DOES DIAGNOSIS AFFECT TREATMENT SUCCESS?

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Abstract

Introduction: Epidural steroid injections are a preferred interventional pain treatment for patients with low back pain. Our aim was to investigate the effectiveness of epidural steroid injections treatment in elderly patients and to examine the effect of patients' diagnosis on the treatment success.

Materials and Methods: Patients over the age of 65 who underwent epidural injections between January 2020 and January 2022 were retrospectively screened. The patients were divided into three groups according to their diagnosis: disc herniation, spinal stenosis, and failed back surgery syndrome. Numeric rating scale scores of all patients before the procedure, at three weeks, and at three months were noted.

Results: A total of 234 patients were included in the study. Of these, 89 had disc herniation, 98 had spinal stenosis, and 47 had a history of failed back surgery. There were no significant differences between the groups in terms of age, gender, symptom duration, pre-procedural pain score, medical treatment, radiation dose, and procedure duration. Although a significant improvement was detected in pain scores at all follow-ups in all groups, these scores were found to be significantly lower in the disc herniation group than the spinal stenosis and failed back surgery groups at the three-week and month follow-ups.

Conclusions: Epidural steroid injections has been found to be effective in back pain in elderly. In addition, elderly patients with disc herniation had a better response to treatment than those with spinal stenosis and failed back surgery. Further prospective and long-term follow-up studies are needed to support these results.

Keywords: Aged; Low Back Pain; Injections, Epidural; Spinal Stenosis; Failed Back Surgery Syndrome.

INTRODUCTION

Low back pain (LBP) is a common health problem in elderly patients, and its prevalence varies between 21% and 75% (1). LBP causes difficulties in performing daily activities in elderly patients and is responsible for a high rate of functional limitations (1,2). Lumbar spinal stenosis (LSS) and disc herniation (LDH) are common causes of LBP in elderly patients (3). Treatment options for LBP include conservative treatment, interventional pain procedures, and surgery (4).

Lumbar epidural steroid injections (ESIs) are a preferred interventional pain procedure for patients with LBP who do not respond to conservative treatment (5). It is performed using a caudal, interlaminar, or transforaminal approach. ESI is an effective treatment option in the short and medium term in selected cases evaluated clinically and radiologically (6). However, there are few studies on the efficacy of ESIs in elderly patients (7,8). Curatolo et al. showed that ESIs are effective in the long term in patients over 65 years of age (7). In another study, it was shown that ESIs improved pain and functionality for three months in patients over 65 years of age with LSS (8). To the best of our knowledge, the effect of the cause of LBP (failed back surgery, disc herniation, or spinal stenosis) on treatment success in elderly patients has not been investigated. Accordingly, our aim was to investigate the effectiveness of ESI treatment in patients over 65 years of age and to examine the effect of patients' diagnosis on the treatment success.

MATERIALS AND METHODS

Design and study population

The study was conducted in accordance with the principles of the Declaration of Helsinki. Written informed consent was obtained from all participants. After receiving approval from the institutional ethics committee (Ethic approval: 02.09.2022/1151), a retrospective evaluation of patients who received fluoroscopy-guided ESI between January 2020 and January 2022 was conducted in a tertiary hospital pain management center.

The data on all patients were collected from hospital medical documents (demographic data, numeric rating scale (NRS) scores, type of procedure, and medical treatment). The inclusion criteria were individuals aged > 65 years who had an ESI (lumbar interlaminar, lumbar transforaminal, or caudal approaches). Patients with a history of major psychiatric disorders, a diagnosis of malignancy, missing three-week and three-month follow-ups, and without demographic or clinical data were excluded from the study. The patients were divided into three groups according to their diagnosis as LDH, LSS, and failed back surgery syndrome (FBSS). The NRS scores of all patients before the procedure, at the third week, and at the third month were noted. A 50% or more reduction in NRS score at follow-up was accepted as treatment success (9).

Statistical analysis

Statistical analyses were performed using SPSS version 22.0 software (IBM Corp., Armonk, NY). Continuous variables were expressed as means (standard deviation) and medians (interquartile range), while categorical variables were expressed as numbers and frequencies. The chi-square test was used to compare categorical variables. The Shapiro–Wilk test was used to analyze the normal distribution of quantitative data. A repeated measure analysis of variance (ANOVA) was used to analyze changes over time with treatment, and Bonferroni correction was employed for multiple comparisons. Statistical significance was accepted at a p-value <.017 for Bonferroni correction; and otherwise, a p-value <.05 was considered statistically significant.

RESULTS

A total of 234 patients were included in the study. Of these patients, 89 had LDH, 98 had LSS, and 47 had a history of FBSS. The average age of the patients in the LDH and FBSS groups was 72, while the average age of the patients in the LSS group was 74. There was no significant difference between the three groups in terms of age, symptom duration, BMI, gender, medical treatment, pre-procedural NRS, radiation dose, and procedure duration (Table 1).

The mean pre-procedural NRS score of all patients was 8.24, and the NRS scores of the patients at the third week and third month were 4.20 and 4.51, respectively (Table 2). In all groups, a significant improvement was found in NRS scores in the first hour, third week, and the third month compared to the pre-procedural NRS ($p<0.001$). Although significant improvements were detected in NRS scores at all follow-ups in all three groups, the scores were found to be significantly lower in the LDH group than in the LSS and FBSS groups

Table 1. Demographic and clinical data between the groups

Variable value	LDH (n:89)	LSS (n:98)	FBSS (n:47)	p
Age (years)	72.21± 5.61	74.02 ± 6.57	72.44 ± 6.65	0.113
BMI (kg/m^2)	29.91 ± 5.89	30.56 ± 6.24	29.72 ± 4.57	0.603
Pre NRS	8.08 ± 1.24	8.18 ± 1.15	8.55 ± 0.921	0.156
Symptom duration (m)	17.72 ± 5.44	18.95 ± 5.65	20.10 ± 6.05	0.245
Procedure time	47.63 (13-197)	41.46 (17-150)	52.56 (17-186)	0.142
Radiation dose	8.22 ± (0.38-37.6)	8.71 ± (0.48-96.5)	13.14 ± (0.15-65.4)	0.095
Gender (n / %)				
Male	28 (31.5)	25 (25.5)	14 (29.6)	0.299
Female	61 (68.5)	73 (74.5)	33 (70.4)	
Neuropathic pain medications (n)				
Pregabalin	11	24	10	0.098
Gabapentin	23	31	14	0.102
Duloksetin	8	11	8	0.370
Opioid	12	14	7	0.405

Lumbar Disc Herniation (LDH), Lumbar Spinal Stenosis (LSS) and Failed Back Surgery Syndrome (FBSS)

Table 2. Time Changes of NRS Scores LDH, LSS and FBSS Group

	Mean ± Std. Deviation	p
LDH.NRS.Pre[1]	8.09 ± 1.25	<0.001[a]
LDH.NRS.Post[2]	0.79 ± 0.34	
LDH.NRS3.week[3]	3.15 ± 2.55	
LDH.NRS3.month[4]	3.36 ± 3.02	
LSS.NRSPre[1]	8.17 ± 1.20	<0.001[b]
LSS.NRSPost[2]	0.55 ± 0.23	
LSS.NRS3.week[3]	4.60 ± 3.11	
LSS.NRS3.month[4]	4.95 ± 3.16	
FBSS.NRSPre[1]	8.49 ± 0.89	<0.001[c]
FBSS.NRSPost[2]	1.17 ± 0.90	
FBSS.NRS3.week[3]	4.83 ± 3.01	
FBSS.RS3.month[4]	5.07 ± 3.30	
Total.NRSPre[1]	8.24 ± 1.15	0.001[d]
Total.NRSPost[2]	0.71 ± 0.34	
Total.NRS3.week[3]	4.20 ± 2.95	
Total.NRS3.month[4]	4.51 ± 3.25	

[a]Post hoc tests: 1-2, 1-3, 1-4 significant ;[b]Post hoc tests: 1-2, 1-3, 1-4 significant ;[c]Post hoc tests: 1-2, 1-3, 1-4 significant; [d]Post hoc tests: 1-2, 1-3, 1-4 significant; Pre:Before ESI ; Post: 1. Hour after ESI

Table 3. NRS change between groups at 3.th week and 3.th month follow-up

	Group 1	Group 2	Mean (SD)	Mean (SD)	p
NRS.Pre	LDH	LSS	8.09 ± 1.25	8.17± 1.20	1.000
	LDH	FBSS	8.09 ± 1.25	8.49± 0.86	0.175
	LSS	FBSS	8.17 ± 1.20	8.49± 0.86	0.383
NRS3.Week	LDH	LSS	3.15 ± 2.55	4.60 ± 3.11	**0.007**
	LDH	FBSS	3.15 ± 2.55	4.83 ± 3.01	**0.009**
	LSS	FBSS	4.60 ± 3.11	4.83 ± 3.01	1.000
NRS3.Month	LDH	LSS	3.36 ± 3.02	4.95 ± 3.16	**0.007**
	LDH	FBSS	3.36 ± 3.02	5.07 ± 3.30	**0.014**
	LSS	FBSS	4.95 ± 3.16	5.07 ± 3.30	1.000

Lumbar Disc Herniation (LDH), Lumbar Spinal Stenosis (LSS) and Failed Back Surgery Syndrome (FBSS)

at the three-week and three-month follow-ups (Table 3). No major complications were detected during the procedures. There were two minor complications in the LDH and LSS groups and one minor complication in the FBSS group.

DISCUSSION

ESIs have been found to be an effective and safe treatment option for LBP in elderly patients (7,8,10). In particularly, elderly patients with LBP due to LDH or LSS have been shown to benefit from ESI (7,8). The present study investigated the effectiveness of ESI treatment in patients over 65 years of age and examined the effect of patients' diagnosis on treatment. It was found that ESI resulted in a statistically significant pain improvement in elderly patients at the three-month follow-up. In addition, the NRS pain scores of the patients with LDH at the third week and third month after treatment were significantly lower than those in the LSS and FBSS groups.

Curatolo et al. showed that pain and functionality were better in the group that underwent ESI compared to the control group at the 24-month follow-up in elderly patients (7). Tasdogan et al. reported that ESI was effective based on a three-month follow-up of 44 elderly patients with LSS (8). Similarly, ESI was found to be effective in a one-month follow-up of 16 elderly patients with LSS (10). In the current study, the three-month pain scores of 234 patients with LBP after ESI were evaluated retrospectively. The three-week and three-month pain scores were significantly lower than the preprocedural pain scores. This result supports other studies on ESI in elderly patients (8,10). In addition, no major complications were detected, and only five patients (2.1%) had minor complications. In this respect, ESIs may be beneficial for patients of advanced age, as they are an effective treatment option with a low complication rate (11).

Manchikanti et al. published a systematic review of transforaminal ESI for LBP and lower extremity pain. The study examined lumbar disc herniation, spinal stenosis, discogenic pain, and FBSS. Strong evidence of the efficacy of ESI was found in the disc herniation group, moderate evidence in the spinal stenosis group, and poor evidence in the postsurgery syndrome group (12). Smith et al. presented a systematic review of ESI as a treatment for lumbar radicular pain. They found strong evidence that ESI is effective in treating lumbar radicular pain due to disc herniation. Low-quality evidence has been found for ESI treatment for radicular pain due to spinal stenosis (13). Rivest et al. also investigated the effect of ESI treatment on LDH and LSS and found that the treatment success of the LDH group was better than that of the LSS group (14). In the present study, although a significant improvement was detected in all patient groups over 65 years of age with lumbar ESI, a significant difference was found between the LDH group and the LSS and FBSS groups at the third month. The LDH patients benefited most from lumbar ESI, followed by LSS patients and then the FBSS group. While this study supports the data in the literature, it also provides information about the success of the treatment based on the diagnosis. The better ESI response in patients with LDH may be due to different pain mechanisms in the pathologies of these diseases. In patients with LSS, steroid injection provides membrane stabilization and pain relief (15), but mechanical and vascular compression does not improve with steroid injection (16). Meanwhile, in FBSS, multiple mechanisms, such as inflammation, mechanical compression, fibrosis, and arachnoiditis cause pain (17), and ESI is especially effective for relieving pain due to inflammation. As inflammation is the main cause of LDH-induced pain, steroid injection, which suppresses inflammation, is effective (18). Therefore, better results may be obtained with ESI in patients with LDH compared to those with LSS and FBSS.

The prevalence of LBP in the elderly is 21%–75% (1), and it is more common in women than in men. Similarly, in the present study, most of the patients who applied to the outpatient clinic and underwent ESI were women. The patients mostly received gabapentin, pregabalin, opioids, and duloxetine, and the rates of drug use were similar in all groups. The rate of opioid use was found to be 8% in elderly patients who underwent ESI for LSS (8), which supports our results. It has been observed that amitriptyline treatment is not desirable in the elderly because of its cardiac and antimuscarinic side effects (19,20).

This study has a number of limitations. First, it is a retrospective study with short-term results. Second, the grades of disc herniation and spinal stenosis were not measured. Further, differences between ESI types in the patient groups were not evaluated. Finally, patients' comorbidities were not evaluated. Conversely, the strength of the study is the large number of patients, and to the best of our knowledge, it is the first study to evaluate ESI treatment success according to diagnosis in elderly patients.

CONCLUSION

ESI is a preferred treatment for LBP in elderly patients because of its effectiveness and low complication rate. In this study, elderly patients with LDH showed a better response to treatment than those with LSS and FBSS. Further prospective and long-term follow-up studies are needed to support these results.

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