

Indications and Outcome of lumbar Epidural Steroid Injection in Low Back Pain

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Abstract

Background and objectives: Epidural steroid injection is used to treat low back pain. The aim of this study was to know indications and outcome of Epidural steroid injection in patients with low back pain. **Methods:** We retrospectively observed the effect of interlaminar epidural steroid injection (80 mg of Depo-Medrol®) performed by other doctors for treatment of 40 patients who presented with low back pain due to lumbar prolapsed intervertebral disc, stenosis, spondylolysis, or failed back syndrome. The patients were admitted to Shahid Dr. Aso and Shar Hospitals during October 2017 to July 2018 and follow them up for three months. Patients' age, gender, diagnosis and level of pathology recorded and Oswestry Low Back Pain Disability Questionnaire was used to assess the patients' pre/post lumbar epidural steroid. **Results:** The mean $\pm$ SD (Standard deviation) of the patients' age (year) were 48.8 ± 10.8 , female: male ratio was 1.9:1. There were insignificant associations between the outcome and age, gender, diagnosis, and level of pathology. The mean $\pm$ SD of pre-treatment questionnaire decreased significantly from 38.1 ± 12.4 (ranged from 10 to 78) to 33.3 ± 15.5 (4 to 90). The improvement rate was 57.5% and the duration for it was mean $\pm$ SD of 11.9 ± 5.6 (ranged from 1 to 30) days, and 42.5% of patients underwent surgery. **Conclusions:** There were no statistically significant association between the outcome and age, gender, diagnosis, and level of pathology, but lumbar epidural steroid injection is good to treat acute phase of low back pain.

Keywords: Epidural steroid injection; Low back pain; Lumbar stenosis; Prolapsed intervertebral disc.

Introduction

Low back pain (LBP) is a second common cause of doctor visit and the leading cause of disability¹⁻⁴. Although about 70% of the individuals suffer from LBP with or without sciatica at some point of their life, the majority will subside during the first 12 weeks and about 6-30% of them continue to suffer beyond three months^{1,2,5}.

Due to the disabilities caused by LBP, there is an increasing rate of disabled patient who do not return back to their work².

Irritation of epidural nociceptors will lead to the release of neurochemical mediators which in turn leads to the activation of pain fibers that ultimately causes pain⁶. There are many causes for such irritation which causes low back pain, in which prolapsed intervertebral disc (PID) is the most common cause⁶. Other cause includes spinal canal Stenosis⁷⁻⁸.

Before performing ESI it is important to certainly diagnose the cause of such LBP. Although lumbar plain and dynam-

ic X-rays and computed tomography (CT) scan show the bony details of the vertebrae and their relation to each other, magnetic resonance imaging (MRI) is needed to confirm the PID and spinal canal stenosis⁷⁻⁸.

There are many modalities to treat LBP but before the treatment, it is important to assess the patients and search for the cause(s) of the pain. Non-surgical treatments include physiotherapy, medications and pain modulation devices; among them, epidural steroid injection (ESI) has been relied on^{1-5,9-11}.

The acceptable hypothesis for the mechanism of action of ESI is that it will alter and interrupts the nociceptor inputs to the spinal cord by decreasing the inflammatory processes and in turn it will decrease pain⁶⁻⁷. Therefore, we tried to find out the risks for this irritation that cause LBP. Moreover, in our study we wanted to know the indications for ESI in patients with LBP specifically due to PID, spinal canal stenosis, failed back syndrome (FBS) and spondylolysis and evaluate its outcome.

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Patients and methods

A retrospective observational design was used for the study by collecting the patients retrospectively and followed them up to three months. Forty nine patients were collected who were admitted to Shahid Dr. Aso and Shar Hospitals during October 2017 to July 2018 after taking consents from the patients. The study was accepted by the ethical committee of Kurdistan Board for Medical Specialties (KBMS). Furthermore, we lost contact of nine patients to know their outcome; therefore, we excluded them from our study.

The patients were already diagnosed and planned for ESI by neurosurgeons; thence, we only assessed the patients before and after the ESI without any interventions. Moreover, the inclusion criteria were patients with chronic low back pain due to prolapsed intervertebral disc (PID), failed back syndrome (FBS), spinal canal stenosis and spondylolysis. Furthermore, exclusion criteria were pregnant patients, patients with bleeding disorder, spinal tumors, spinal fractures, spinal hematomas and local infection.

Thereafter, interlaminar lumbar epidural steroid injection (80 mg of methylprednisolone acetate “Depo-Medrol®” was performed for all the patients.

The patients’ data we collected included: age, gender, diagnosis, level of pathology, and the outcome assessed by pre/post ESI measurement of Oswestry Low Back Pain Disability Questionnaire (OLBDQ).

The IBM SPSS statistics version 25 program was used for the analysis of our data. Moreover, a P-value of ≤ 0.05 was considered statistically significant association and a p-value of <0.001 as statistically highly significant association.

Results

The mean $\pm$ SD (Standard deviation) of the ages (year) of the 40 patients included in the study were 48.8 ± 10.8 (ranged from 30 to 67). In addition, the Female: Male ratio was 1.9:1.

There were statistically negative insignificant relationship between the outcome and gender and there was a 42.5% failure rate that necessitated surgery, Table (1).

Table (1):The statistical relationships between demographic features and the outcome

Demographic features		Outcome		Total	p-value* (Pearson R Correlation)
		Improvement (%)	Operated (%)		
Gender	Female	13 (32.5)	13 (32.5)	26 (65)	0.19 (-0.207)
	Male	10 (25)	4 (10)	14 (35)	
Age Groups	30 to 39	6 (15)	3 (7.5)	9 (22.5)	0.46 (-0.080)
	40 to 49	5 (12.5)	7 (17.5)	12 (30)	
	50 to 59	6 (15)	5 (12.5)	11 (27.5)	
	60 to 69	6 (15)	2 (5)	8 (20)	
Total		23 (57.5)	17 (42.5)	40 (100)	

*Measured by Chi-Square test

There was statistically positive insignificant relationship between the outcome and diagnosis, and level of pathology and there was a 42.5% failure rate, Table (2).

Table (2):The statistical relationships between independent variables and the outcome

Independent variables		Outcome		Total	p-value*
		Improvement (%)	Operated (%)		(Pearson R Correlation)
Diagnosis	FBS	2 (5)	0 (0)	2 (5)	0.26 (0.055)
	FBS and PID	3 (7.5)	2 (5)	5 (12.5)	
	PID	5 (12.5)	8 (20)	13 (32.5)	
	Stenosis	13 (32.5)	7 (17.5)	20 (50)	
Level of pathology	L2/3, L3/4 and L4/5	1 (2.5)	0 (0)	1 (2.5)	0.95 (0.012)
	L3/4	3 (7.5)	2 (5)	5 (12.5)	
	L3/4 and L4/5	3 (7.5)	3 (7.5)	6 (15)	
	L4/5	12 (30)	10 (25)	22 (55)	
	L4/5 and L5/S1	2 (5)	1 (2.5)	3 (7.5)	
	L5/S1	2 (5)	1 (2.5)	3 (7.5)	
	Total	23 (57.5)	17 (42.5)	40 (100)	

*Measured by Chi-Square test; FBS = Failed back syndrome; PID = Prolapsed intervertebral disc

We found that 23 (57.5%) out of 40 of the patients included had significant improvement by the ESI as shown in, Table (3).

Table (3):The patients' assessment before and after the ESI

Outcomes	Mean $\pm$ SD	Range	p-value (Paired-Samples T Test)
Pre-ESI OLBPDQ	38.1 $\pm$ 12.4	10 to 78	0.001
Post-ESI OLBPDQ	33.3 $\pm$ 15.5	4 to 90	
Post-ESI duration (day)	34.5 $\pm$ 46.6	1 to 240	
Duration of Post-ESI improvement in days (57.5% of patients)	11.9 $\pm$ 5.6	1 to 30	—
Duration of ESI to operation in whom not improved by ESI in days (42.5% of patients)	64.9 $\pm$ 59.4	14 to 240	

ESI = Epidural steroid injection; OLBPDQ = Oswestry Low Back Pain Disability Questionnaire; SD = Standard deviation

Discussion

The presence of an inflammatory process around the lumbar nerve roots was considered the cause of sciatica; since then, ESI became a popular route of treatment for LBP and sciatica¹². In some other instances, the cause of inflammation around the nerve root was considered as an external compression on the nerve roots such as PID or stenosis¹².

The study of Billy et al.¹ showed no statistically significant association between the outcome of ESI and age and gender of the patients. In our study, we found about the same results; there were no statistically significant relationship

between the outcome and age or gender of the patients Table (1). In contrary, studies showed significant improvement of the immediate (less than two months) outcome after ESI but no significant association afterwards^{4,12}. In addition, the study of Chang et al.⁹ found a significant relationship between transforaminal steroid injection and the severity of foraminal stenosis. The explanation to the results may be due to that; follow up of the patients was for three months then we measured the outcome and inter-laminar route of ESI, but not transforaminal, was used for our patients.

We supposed that the diagnosis or the level of the pathology may have significant relationship with the outcome after the ESI. Conversely, our results showed statistically

insignificant relationships between the outcome and the diagnosis or the level of the pathology, Table (2). Our results are supported by the study of Joo et al.² in which they found no significant association between the level of the pathology and outcome.

There are a lot of differences between the studies for the indications of the use of ESI. The study of Chang et al.⁹ included patients who had foraminal stenosis and they used transforaminal route of ESI; they found good outcome. Moreover, the study of Nandi et al.¹² selected patients with sciatica due to lumbar PID and they found no significant long-term effect. In our study, we selected patients with lumbar PID, spinal canal Stenosis, FBS and spondylolysis and we found no significant association between the diagnosis and outcome on three months follow up period, Table (2).

The OLBPDQ decreased from mean $\pm$ SD of 38.1 ± 12.4 (ranged from 10 to 78) to mean $\pm$ SD of 33.3 ± 15.5 (ranged from 4 to 90) and the change was statistically highly significant, Table (3). The study of Nandi et al.¹² showed statistically significant result of OLBPDQ and the use of ESI. The latter study was used a randomized clinical trial (RTC) design for their study and they compared two groups of patients; they used ESI for one group and only saline injection for the other group and the result was better for the patients who they used ESI for them.

The outcome of our patients after ESI was as follows: 23 (57.5%) of the patients improved following ESI but the other 17 (42.5%) patients failed to improve, therefore, operation had been performed for them to alleviate their pain, Tables (1) and (2). The high failure rate indicates that ESI cannot be used as a definitive measure to treat LBP and it can only be used to alleviate the acute phase of pain. Moreover, the mean $\pm$ SD of the duration of improvement after ESI for the patients who were improved was 11.9 ± 5.6 (ranged from one to 30 days), Table (3). Likewise, a study that followed the patients for three months showed patient improvement of about the same percent — 64.7% improvement after transforaminal ESI for patients with lumbar foraminal spine stenosis⁹. Although there is a significant improvement in the same patients, the RCT of Nandi et al.¹² showed no significant difference on long-term period (12 weeks) for patients whom ESI was used

for as compared to patients (control) whom only isotonic saline was used¹².

In the literature we searched, the complications of lumbar ESI were accounted for 0.15%⁴ including: spinal cord infarction¹³, pneumocephalus^{4,14}, seizure, spinal cord and nerve root compression¹⁴, retroperitoneal air, subcutaneous emphysema, and venous air embolism¹⁴, transient hypokalemic quadriplegia¹⁵, hemorrhage and infection⁴, colloid cyst, cerebrospinal fluid leak⁴.

No complications were faced in our study except of mild pain at the site of the injection for few hours after the procedure.

Conclusions

The study showed no significant association between age and gender of the patients, diagnosis of FBS, PID, or lumbar canal stenosis, and the level of pathology with the outcome. In addition, patients showed significant improvement after ESI in their suffering measured by OLBPDQ after three months.

A Small sample size was used in the study for different lumbar pathological diagnoses in addition to short follow up and loss of contacts due to the lack of databases for the patients' records which are the limitation of our study. Randomized clinical trials were recommended about the same topic to know its effect in our population.

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Conflict of interest

Nothing to declare

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