



Effects of epidural injection of glucocorticoid and its combination with Bupivacaine in palliating chronic low back pain due to discopathy

Mohammad Taghi Mortazavi¹, Naghi Abedini¹, Iraj Lotfinia², Abdorrahim Afkhamzadeh³, Ali Delpisheh⁴, Reza Janmardi^{1*}, Samad EJ Golzari^{5,6}, Farhad Mirzaei², Majed Mashhour¹

1. Anesthesiology Dept. Tabriz University of Medical Sciences, Tabriz, Iran
 2. Neurosurgery Dept. Tabriz University of Medical Sciences, Tabriz, Iran
 3. Community Medicine Dept. Kurdistan University of Medical Sciences, Kurdistan Social Determinants of Health Research Center, Sanandaj, Iran
 4. Clinical Epidemiology Dept. Ilam University of Medical Sciences, Ilam, Iran
 5. Cardiovascular Research Center, Tabriz University of Medical Sciences, Tabriz, Iran
 6. Students Research Committee, Tabriz University of Medical Sciences, Tabriz, Iran
- Reza_janmardi@yahoo.com

Abstract: Background and Objectives: Chronic low back pain is defined as consistent or pendulous pain over 3 months. Epidural steroid injections (ESI) are common in treatment of chronic back pain. The present study was aimed to investigate the effects of epidural injection of glucocorticoid and bupivacaine compared to glucocorticoid alone in relieving chronic back pain due to discopathy. Materials and Methods: A randomized clinical trial was performed in the Shohada Medical Educational Center, Tabriz, Iran. Patients with chronic back pain who were candidates for epidural drug injection were recruited. They were divided into two groups of steroids or steroid and bupivacaine. Pain intensity, Oswestry Disability Index (ODI), Straight Leg Rising (SLR) test as well as clinical variables were evaluated before treatment and 3th month thereafter. Results: Overall, 17 males and 23 females with a mean age \pm SD of 47.54 ± 12.11 years were enrolled in two equal groups. No significant difference was observed between two groups in terms of gender and body mass index. In both groups, a significant relationship was observed for ODI ($p = 0.001$), pain intensity ($p = 0.001$), and SLR test ($p = 0.001$) before and after treatment. However, the corresponding association was not observed for ODI, pain intensity and SLR test ($p > 0.05$). Conclusions: Epidural steroid injections either alone or combined with Bupivacaine with no priority are effectively relief chronic low back pain due to discopathy.

[Mortazavi M, Abedini N, Lotfinia I, Afkhamzadeh A, Delpisheh A, Janmardi R, Mirzaei F, Mashhour M. **Effects of epidural injection of glucocorticoid and its combination with Bupivacaine in palliating chronic low back pain due to discopathy.** *Life Sci J* 2022;19(4):27-33]. ISSN 1097-8135 (print); ISSN 2372-613X (online). <http://www.lifesciencesite.com>. 5.doi: [10.7537/marslsj190422.05](https://doi.org/10.7537/marslsj190422.05).

Keywords: Steroids, Bupivacaine, chronic low back pain

1. Introduction

Chronic LBP is the most common cause of disability in adults lower than 45 years. It is also the second leading cause of doctor visits and the fourth leading cause of hospitalization. There are many social and economic impacts of chronic LBP. Degenerative process in the lumbar spine is a common source of chronic LBP [1].

Incidence of LBP in lifetime is between 60-90% and almost 15% of those referred to physicians are patients with LBP annually [2]. The main characteristic of acute or chronic LBP is due to the pressure on the nerve root that is willing to distribute the dermatomes involved [3]. Acute low

back pain is common because of the sciatic nerve [4]. Sciatica pain radiculopathy is caused by pressure on the posterior roots [5]. Pressure on the spinal cord or nerve roots in the spinal canal stenosis can cause lower back pain [6]. Process of degeneration changes in the lumbar region is gradually anatomical, biomechanical, radiological and clinical changes, and ultimately, is shown degenerative disease of lumbar discs [7].

History and physical examination in patients with chronic low back pain might be done to put the patient in one of following four groups: non-specific low back pain, low back pain due to radiculopathy or spinal stenosis, referral low back

pain from nonspinal source and pain from other causes [8].

Positive SLR test can be suggested for lumbar disc herniation [9]. Routine laboratory examinations are not necessary in all patients with chronic low back pain [10]. Imaging techniques such as CT scan and MRI are recommended in patients whom do not improve symptoms during 6 weeks. MRI has the highest sensitivity in the diagnosis of lumbar disc herniation and it is selective for nerve root lesions [11].

Treatment goal for chronic low back pain in patients, viewpoint often is complete recovery and full return to previous levels of activity. It often has a large gap from the percentage of recovery is expected to have therapeutic value [12].

Epidural steroid injection has been recommended and approved as a non-surgical treatment for radiculopathy pain of lumbar spine by the America Spine Society [13]. It has been reported for the first time in 1952 along with diagnostic and therapeutic benefits [14].

Due to some controversies in publications [15], the present study was conducted to compare the effects of epidural injection of glucocorticoid alone and its combination with bupivacaine in relieving chronic back pain.

2. Material and Methods

Study design:

The study was designed as a double-blind randomized clinical trial and was conducted from Jan 2011 till Jul 2012. A written consent was obtained from all subjects. Examination and follow-up visits were free of charge. Participants and the individuals who evaluate and record the variables were not aware of any grouping.

Setting:

The Shohada Medical Educational Center affiliated to the Tabriz University of Medical Sciences, Tabriz, Iran.

Patients:

The study population was patients diagnosed with chronic back pain undergoing epidural injection of drugs. Routine conservative treatments were previously applied and have not responded. All 40 participants were divided into two equal groups based on random numbers table. Inclusion criteria included chronic back pain more than 3 months due to pure discogenic pain, disc herniation or degeneration signs on MRI, bulging or protrusion without motor involvement and deep tendon reflexes (DTR) and an indication for ESI.

Exclusion criteria were previous surgery on the spine, Cuda-aquina symptoms, spinal stenosis, psychosomatic illness and drug addiction.

Injection method: All un-stability items were evaluated by a neurosurgeon. Patients were transferred to the operating room. After preparation in the sitting position, the physician injected into epidural space following local anesthesia using Touhy needle grades 19 to 20 (per patient) via the intermediate space of vertebrae L3-4 or L4-5. After aspiration and assurance of needle correctly located, the injection was performed in the epidural space. After the needle exiting, the area was dressed under sterilization condition, the patient was lie down in supine position, supervised for 30 minutes and vital signs were checked. If there are no changes in vital signs and stability, the patient was discharged. Before treatment (baseline) and the intervals of one week, two weeks, one month and three months after the injection the variables were evaluated and recorded.

Pain intensity classifications (no pain, low, medium, high), ODI at the baseline and at the end of the third month, SLR as positive (less than 60°) and negative (greater than 60°) and clinical variables such as the ability to flexion, extension, lumbar bending and Torso rotation were checked baseline and the end of the third month. The time of return to normal activity, possible side effects, need to re-injection or receiving any other treatments were recorded till 6 months after injection.

Statistical analysis: Using SPSS statistical software version 16, data were analyzed as descriptive statistics (frequency, percentage, mean and standard deviation) and univariate analysis (Chi square, Fisher exact test). Probability values less than 0.05 were considered statistically significant.

3. Results

Overall, 40 patients including 17 males and 23 females with a mean age \pm SD of 47.54 ± 12.11 years were enrolled in two equal groups. No significant difference was observed between two groups in terms of gender and body mass index (Table 1).

In both groups, a significant relationship was observed for ODI ($p = 0.001$), pain intensity ($p = 0.001$), and SLR test ($p = 0.001$) before and after treatment. However, the corresponding association was not observed for ODI, pain intensity and SLR test ($p > 0.05$), (Table 2). A comparison of pain between two groups before and after treatment and return to usual activity time at the baseline and after treatment have been illustrated in tables 3 and 4.

Table 1. Intergroup comparison of tests for two groups (Steroid and Steroid + Bupivacaine)

Test	Test time	Test result	F*	P*	F**	P**
SLR	Baseline	Normal	10	0.01	9	0.004
		Abnormal	10		11	
	3 th month	Normal	17		19	
		Abnormal	3		1	
Flexion	Baseline	Normal	3	0.001	3	0.001
		Low Limitation	12		14	
		Moderate Limitation	1		1	
		Severe Limitation	4		2	
	3 th month	Normal	16		17	
		Low Limitation	4		3	
		Moderate Limitation	0		0	
		Severe Limitation	0		0	
Extension	Baseline	Normal	5	0.002	2	0.001
		Low Limitation	12		15	
		Moderate Limitation	1		2	
		Severe Limitation	2		1	
	3 th month	Normal	17		17	
		Low Limitation	3		3	
		Moderate Limitation	0		0	
		Severe Limitation	0		0	

Table 2 Comparison between two groups of Low Back Pain patients after treatment

Test	Test time	Test result	F*	P*	F**	P**
Lumbar Bending	Baseline	Normal	10	0.008	6	0.005
		Low Limitation	8		11	
		Moderate Limitation	1		2	
		Severe Limitation	1		1	
	3 th month	Normal	19		17	
		Low Limitation	1		3	
		Moderate Limitation	0		0	
		Severe Limitation	0		0	
Torso Rotation	Baseline	Normal	12	0.04	8	0.001
		Low Limitation	6		11	
		Moderate Limitation	1		0	
		Severe Limitation	1		1	
	3 th month	Normal	19		17	
		Low Limitation	1		3	
		Moderate Limitation	0		0	
		Severe Limitation	0		0	

Test, n (%)	Steroid + Bupivacaine	Steroid	p value
SLR			0.29
Negative	19 (52.8)	17 (47.2)	
Positive	1 (25.0)	3 (75.0)	
Flexion			0.67
Normal	17 (51.5)	16 (48.5)	
Limitation	3 (42.9)	4 (57.1)	
Extension			1.0
Normal	17 (50.0)	17 (50.0)	
Limitation	3 (50.0)	3 (50.0)	
Lumbar bending			0.29
Normal	17 (47.2)	19 (52.8)	
Limitation	3 (75.0)	1 (25.0)	
Torso rotation			0.29
Normal	17 (47.2)	19 (52.8)	
Limitation	3 (75.0)	1 (25.0)	

Table 3 . Pain comparison between two groups of Low Back Pain patients before and after treatment

Test, n (%)	Steroid + Bupivacaine	Steroid	p value
Pain (baseline)			1
Low - moderate	14 (50.0)	14 (50.0)	
Severe	6 (50.0)	6 (50.0)	
Pain (1 week)			1
No	19 (50.0)	19 (50.0)	
Moderate - severe	1 (50)	1 (50)	
Pain (2 week)			0.3
Normal	0 (0)	1 (100.0)	
Low - moderate	20 (51.3)	19 (48.7)	
Pain (1 month)			0.04
Normal	1 (14.3)	6 (85.7)	
Low - moderate	19 (57.6)	14 (42.4)	
Pain (3 th months)			1
Normal	14 (50.0)	14 (50.0)	
Low - moderate	6 (50.0)	6 (50.0)	

Table 4. Comparison of return to usual activity time between two groups

Group Return to usual activity time	Steroid	Steroid + Bupivacaine	P value
1 week	2 (28.6)	5 (71.4)	0.5
2 week	6 (66.7)	3 (33.3)	
3 week	10 (50.0)	10 (50.0)	
4 week	2 (50.0)	2 (50.0)	

4. Discussion

Using Epidural steroid for an inhibitory effect on inflammation, inhibiting the transmission of nerve fibers C and reduce the capacity of permeability has reported to be useful [14]. The proper selection of patients, duration of symptoms and underlying pathophysiology are also important factors affecting treatment outcome. Patients without history of surgical treatment, nonsmokers and in patients less than 60 years old would have a better outcome [16].

ESI studies have conflicting results. In a meta-analysis, the results of 12 studies on the effect of ESI for chronic low back pain showed that 6 studies the benefit and 6 the harm of treatment [15]. Based on the results of another meta-analysis study,

the final decision in this regard is not possible [17]. Others have recommended ESI only in acute back pain [18]. Runu and colleagues have implied ESI a safe and effective method [19]. However, Argoff and colleagues have suspected in the efficiency of ESI treatment for chronic low back pain [20].

In the present study, significant differences were observed before and after treatment confirming studies that have reported the efficacy of ESI treatment [19, 21,22].

In the present study, ESI was the most effective method in acute radiculopathy and no long-term benefits for chronic patients. On the other hand, the majority of patients with acute LBP and legs pain did not respond to treatment better than chronic LBP without legs pain. Finally, researchers

concluded that the results of ESI are not predictable [23]. The present study showed that although the initial state of each of the groups had significant improvement in pain but there were not significantly differences between two groups. This finding is consistent with previous reports [24].

Other studies in different countries, have confirmed the efficacy of ESI in treatment of LBP, but similar to our results, no significant differences have reported between two groups [18,25-28].

As conclusion, Epidural steroid injections either alone or combined with Bupivacaine with no priority are effectively relief chronic low back pain due to discopathy.

Acknowledgements

The present study was derived from an anesthesiology assistant thesis which was funded by the Tabriz University of Medical Sciences. The cooperation of patients and officials are gratefully appreciated.

Corresponding Author:

Dr. Reza Janmardi
Department of Anesthesiology,
Tabriz University of Medical Sciences,
Tabriz, Iran
E-mail: reza_janmardi@yahoo.com

References

- [1]. Rowlingson JC, Kirschenbaum LP. Epidural analgesic techniques in the management of cervical pain. *Anesth Analg* 1986;65:938-42.
- [2]. Rhee JM, Schaufele M, Abdu WA. Radiculopathy and the herniated lumbar disc. Controversies regarding pathophysiology and management. *J Bone Joint Surg Am* 2006;88; 2070-80.
- [3]. Katz V, Schofferman J, Reynolds J. The sacroiliac joint: a potential cause of pain after lumbar fusion to the sacrum. *J Spinal Disord* 2003;16:96-9.
- [4]. Maugars Y, Mathis C, Berthelot JM. Assessment of the efficacy of sacroiliac corticosteroid injections in spondylarthropathies: a double-blind study. *Br J Rheumatol* 1999;35: 767-70.
- [5]. Botwin KP, Gruber RD, Bouchlas CG. Fluoroscopically guided lumbar transformational epidural steroid injections in degenerative lumbar stenosis: an outcome study. *Am J Phys Med Rehabil* 2011;81:898-905.
- [6]. Riew KD, Yin Y, Gilula L. The effect of nerve-root injections on the need for operative treatment of lumbar radicular pain. A prospective, randomized, controlled, double-blind study. *J Bone Joint Surg Am* 2009;82:1589-93.
- [7]. Buttermann GR. Treatment of lumbar disc herniation: epidural steroid injection compared with discectomy. A prospective, randomized study. *J Bone Joint Surg* 2004;86:670-9.
- [8]. Last AR, Hulbert K. Chronic low back pain: evaluation and management. *Am Fam Physici* 2009;79:1067-74.
- [9]. Devillé WL, van der Windt DA, Dzaferagic A, Bezemer PD, Bouter LM. The test of Lasègue: systematic review of the accuracy in diagnosing herniated discs. *Spine* 2008;25:1140-1147.
- [10]. Kinkade S. Evaluation and treatment of acute low back pain. *Am Fam Physician* 2007;75:1181-1188.
- [11]. Don AS, Carragee E. A brief overview of evidence-informed management of chronic low back pain with surgery. *Spine J* 2008;8:258-265.
- [12]. Yelland MJ, Schluter PJ. Defining worthwhile and desired responses to treatment of chronic low back pain. *Pain Med* 2008;7:38-45.
- [13]. Benyamin RM, Singh V, Parr AT. Systematic review of the effectiveness of cervical epidurals in the management of chronic neck pain. *Pain Physician* 2010;12:137-57.
- [14]. Furman MB, O'Brien EM, Zgleszewski TM. Incidence of intravascular penetration in transforaminal lumbosacral epidural steroid injections. *Spine* 2010;25:2628-32.
- [15]. Koes BW, Scholten RJ, Mens JM, Bouter LM. Efficacy of epidural steroid injections for low-back pain and sciatica: a systematic review of randomized clinical trials. *Pain* 2010;63:279-88.
- [16]. Smuck M, Fuller BJ, Yoder B. Incidence of simultaneous epidural and vascular injection during lumbosacral transforaminal epidural injections. *Spine J* 2009;7:79-82.
- [17]. Rozenberg S, Dubourg G, Khalifa P, Paolozzi L, Maheu E, Ravaud P. Efficacy of epidural steroids in low back pain and sciatica. A critical appraisal by a French Task Force of randomized trials. *Critical Analysis Group of the French Society for Rheumatology. Rev Rhum Engl Ed* 1999;66:79-85.
- [18]. Sethee J, Rathmell JP. Epidural steroid injections are useful for the treatment of

- low back pain and radicular symptoms: pro. Curr Pain Headache Rep 2009;1:31-4.
- [19]. Runu R, Sinha NK, Pai R, Shankar PR, Vijayabhaskar P. Our experience with epidural steroid injections in management of low backpain and sciatica. Kathmandu Univ Med J 2008;3:349-54.
- [20]. Argoff CE, Sims-O'Neill C. Epidural steroid injections are useful for the treatment of low back pain and radicular symptoms: Curr Pain Headache Rep 2009;13:35-8.
- [21]. Breivik H, Hesla PE, Molnar I. Treatment of chronic low back pain and sciatica: Comparison of caudal epidural injections of bupivacaine and methylprednisolone with bupivacaine followed by saline. Adv Pain Res 2009;1:927-32.
- [22]. Lierz P, Gustorff B, Markow G, Felleiter P. Comparison between bupivacaine 0.125% and ropivacaine 0.2% for epidural administration to outpatients with chronic low back pain. Eur J Anaesthesiol 2009;21:32-7.
- [23]. Banaszkiwicz PA; Kader D; Wardlaw D. The role of caudal epidural injections in the management of low back pain. Bull Hosp Jt Dis 2003;61:127-31.
- [24]. Atım A; Deniz S; Kılıçkaya O; Orhan ME; Purtuloğlu T; Kurt E. Assessment of the effectiveness of lumbar transforaminal epidural steroid injection for low back pain. Agri 2011;23:114-8.
- [25]. Makki D; Nawabi DH; Francis R; Hamed AR; Hussein AA. Is the outcome of caudal epidural injections affected by patient positioning? Spine 2010;35:687-90.
- [26]. Conn A; Buenaventura RM; Datta S; Abdi S; Diwan S. Systematic review of caudal epidural injections in the management of chronic low back pain. Pain Physician 2009;12:109-35 .
- [27]. Culafić S; Stefanović D; Dulović D; Minić L; Culafić A. Treatment of degenerative chronic low back pain with fluoroscopically guided epidural procaine-corticosteroid injection. Vojnosanit Pregl 2008;65:507-11.
- [28]. Manchikanti L; Manchikanti KN; Manchukonda R; Cash KA; Damron KS; Pampati V; McManus CD. Evaluation of lumbar facet joint nerve blocks in the management of chronic low back pain: preliminary report of a randomized, double-blind controlled trial: clinical trial .Pain Physician 2007;10:425-40.

1/2/2022