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INTERLAMINAR EPIDURAL CORTICOSTEROID INJECTION IN THE TREATMENT OF LUMBOSCIATIC PAIN

A retrospective analysis

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ABSTRACT - Lumbosciatica is a common condition which is associated with significant pain and disability. The aim of the present study was to examine the efficacy of interlaminar epidural corticosteroid infiltration in the treatment of lumbosciatic pain. We evaluated retrospectively sixty patients with lumbosciatic pain that a sequential interlaminar epidural administration of 40 mg methylprednisolone in 7 mL bupivacaine 0.25% was administered. Each patient was interviewed and asked about the pain according to visual analogue scale (VAS) and the level of disability according to World Health Organization previously of the epidural corticosteroid infiltration and, 1 and, 6 months after starting therapy. Independently of the initial VAS value, all patients decreased their pain score after one and six months of follow-up ($p<0.05$). However, only the patients with a low grade of disability showed an improvement after the treatment ($p<0.05$). No side effects were reported after epidural corticosteroid injections. In conclusion, interlaminar epidural corticosteroid injection in association with local anesthetic may be useful, at least for six months, as additional therapy of the conservative management of lumbosciatic pain.

KEY WORDS: epidural corticosteroid, herniated disc, pain, visual analogue scale.

Injeção epidural interlaminar de corticóide no tratamento da dor da lombociatalgia: análise retrospectiva

RESUMO - A lombociatalgia é condição clínica associada à dor intensa e alterações funcionais. O objetivo do presente estudo foi examinar a eficácia da infiltração de corticóide pela via epidural interlaminar no tratamento da dor da lombociatalgia. Foram avaliados, retrospectivamente, sessenta pacientes com lombociatalgia que foram submetidos à administração epidural interlaminar, em sequência, de 40 mg de metilprednisolona e 7 mL de bupivacaína a 0,25%. Os pacientes foram avaliados em relação à dor de acordo com a escala visual analógica (EVA) e o grau de comprometimento funcional de acordo com a Organização Mundial de Saúde antes e, uma e, seis meses após o início do tratamento. Independentemente do valor inicial da EVA, todos os pacientes diminuíram o escore de dor após um e, seis meses de acompanhamento ($p<0.05$). Entretanto, apenas os pacientes com baixo grau de comprometimento funcional apresentaram melhora após o tratamento ($p<0.05$). Não foram observados efeitos colaterais após as injeções de corticóide epidural. Concluindo, a injeção epidural interlaminar de corticóide em associação com anestésico local pode ser benéfico, por pelo menos seis meses, como terapia coadjuvante no tratamento conservador da dor da lombociatalgia.

PALAVRAS-CHAVE: corticóide epidural, hérnia de disco, dor, escala visual analógica.

Lumbosciatica is a common condition frequently caused by disc herniation, which is associated with significant pain and disability leading to enormous socioeconomic impact[1]. The treatment of this entity ranges from conservative therapy to surgery. It was initially attributed as a result of compression of the nerve root causing neural ischemia and edema. However, an inflammatory etiology is also suspected justifying the use of epidural corticosteroids as a treatment[2,3]. Indeed, a steroid epidural injection is a common nonsurgical treatment for lumbosciatic pain which can be accessed by two main approaches: inter-

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laminar or transforaminal. Multiple randomized and non-randomized trials of transforaminal epidural injections provided strong evidence for short-term and long-term relief in managing lumbosciatic pain[4-8].

A systematic review of controlled trials concluded that the efficacy of interlaminar epidural steroid injections has not been established and the benefits of epidural steroid injections, if any, seem to be of short duration only[9]. A second systematic review concluded that the overall effectiveness of interlaminar epidural steroid injections was moderate for short-term relief and limited for long-term relief of pain in patients with lumbosciatic[4].

The current study was performed to examine, retrospectively, the efficacy of interlaminar epidural administration of methylprednisolone and bupivacaine in the treatment of patients with lumbosciatica that did not obtained pain relief with bed rest and adequate pain medication during at least one month. The study was designed to assess whether interlaminar epidural corticosteroid injection appears to have clinical use in decrease the pain level and improve the grade of disability after one and six months of the therapy.

METHOD

After institutional review board approval, 60 patients were enrolled in the study. Patient meeting the criteria for inclusion was informed about the infiltration procedure and written consent was obtained. Criteria for inclusion were: (1) patients with symptoms and findings characteristic of a herniated lumbar disc that did not obtained pain relief with bed rest and administration of analgesic and anti-inflammatory drug therapy for at least one month; (2) presence of a lumbar nucleus pulposus prolapse confirmed by magnetic resonance imaging or computed tomography; (3) a complete follow-up for at least six months; (4) absence of previous surgery to the lumbar spine.

The patients were admitted to the hospital and received from one to six injections depending on their response within 72 hours following each injection. The sequence of infiltration was stopped when the patient presented with completed pain relief. The interlaminar epidural injection was done by using loss of resistance technique without fluoroscopic guidance. Each patient received 40 mg of methylprednisolone in 7 mL bupivacaine 0.25%. The same person performed all injections.

Patients were evaluated before and 1 month, and 6 months after starting therapy. Subjective pain level or intensity of pain was assessed on horizontal 10-cm visual analogue scale (VAS) rated by the patients, ranging from 0 (no pain) to 10 (most pain possible). The patients were then classified into five groups: no pain (0); mild pain; moderate pain (3-5); severe pain (6-9) and very severe pain (10)[1,2]. We have used the Classification of Impairments, Disabilities and Handicaps (ICIDH) published by the World Health Organization (WHO) to assess the level of restriction or inability of the patient to perform an activity in the manner or within the range considered normal for a human as a consequence of disease[10]. The WHO classification ranges from 0 to 4 (ranging from no restriction on activity to complete inability to do an activity). In order to analyze the results obtained we used a stringent criterion for success. Thus, only the patients who presented VAS= 0-2 or WHO = 0 after the therapy were considered as been obtained success.

Table 1. Distribution of patients in percentages, according to age, gender, duration of pain before the epidural block and nerve-root involved.

	n	%	Statistics
Age (years)			p<0.05
20-29	5	8.3%	
30-39	21	35%	
40-49	13	21.7%	
50-59	6	10%	
60-69	7	11.6%	
70-79	6	10%	
80-90	2	3.4%	
Gender			p>0.05
Male	30	50%	
Female	30	50%	
Duration of pain before the block (months)			p<0.05
< 6	28	46.7%	
6-12	14	23.3%	
>12	18	30%	
Nerve-root involved			p<0.05
L4	8	13.3%	
L5	32	53.4%	
S1	20	33.3%	

Statistical analyses were performed using Wilcoxon signed rank test for non-parametric paired data and, Kruskall-Wallis test for non-parametric independent data. The statistical analysis considered exclusively the therapeutic success previously defined; p<0.05 was considered statistically significant.

RESULTS

Table 1 shows the distribution of patients according to age, gender, duration of pain before the epidural block and nerve-root involved. The mean age was 47±12.5 years (range, 23-84 years). Eighty-two percent of the patients received six injections. Two patients received five injections and five received four. Three patients (7%) received from one to three injections. No complications and side effects were reported after the interlaminar epidural corticosteroid injections.

No patient presented with mild pain before the interlaminar epidural injection according to VAS scale. Seventy-five and sixty-seven percent of the patients with moderate pain presented with VAS=0-2 after the

Table 2. Follow-up of the patients with VAS-moderate.

	Evaluation after the epidural infiltration (n=12)				
Follow-up	No pain (0)	Mild pain (1,2)	Moderate pain (3-5)	Severe pain (6-9)	Very severe pain (10)
1 month*	5 (42%)	4 (33%)	3 (25%)	0 (0%)	0 (0%)
6 months**	5 (42%)	3 (25%)	2 (17%)	1 (8%)	1 (8%)

*p=0.0004; **p=0.0003.

Table 3. Follow-up of the patients with VAS-severe.

	Evaluation after the epidural infiltration (n=30)				
Follow-up	No pain (0)	Mild pain (1,2)	Moderate pain (3-5)	Severe pain (6-9)	Very severe pain (10)
1 month*	5 (17%)	12 (40%)	7 (23%)	5 (17%)	1 (3%)
6 months**	11 (37%)	7 (23%)	3 (10%)	8 (27%)	1 (3%)

*p=0.00001.

Table 4. Follow-up of the patients with VAS-very severe.

	Evaluation after the epidural infiltration (n=18)				
Follow-up	No pain (0)	Mild pain (1,2)	Moderate pain (3-5)	Severe pain (6-9)	Very severe pain (10)
1 month*	2 (11%)	9 (50%)	4 (22%)	3 (17%)	0 (0%)
6 months**	5 (28%)	5 (28%)	2 (11%)	4 (22%)	2 (11%)

*p=0.0001; **p=0.0003.

Table 5. Follow-up of the patients with WHO-Grade 1.

	Evaluation after the epidural injection (n=21)				
Follow-up	Grade 0	Grade 1	Grade 2	Grade 3	Grade 4
1 month*	8 (38%)	10 (48%)	3 (14%)	0 (0%)	0 (0%)
6 months**	10 (47%)	9 (43%)	2 (10%)	0 (0%)	0 (0%)

*p=0.0007; **p=0.0003.

Table 6. Follow-up of the patients with WHO-Grade 2.

	Evaluation after the epidural injection (n=32)				
Follow-up	Grade 0	Grade 1	Grade 2	Grade 3	Grade 4
1 month*	14 (43%)	12 (38%)	6 (19%)	0 (0%)	0 (0%)
6 months**	16 (50%)	7 (22%)	9 (28%)	0 (0%)	0 (0%)

*p=0.7021; **p=0.5000.

Table 7. Follow-up of the patients with WHO-Grade 3.

	Evaluation after the epidural injection (n=7)				
Follow-up	Grade 0	Grade 1	Grade 2	Grade 3	Grade 4
1 month*	1 (14%)	5 (72%)	1 (14%)	0 (0%)	0 (0%)
6 months**	4 (57%)	0 (0%)	1 (14%)	2 (29%)	0 (0%)

*Statistical analysis was not performed due to the low number of patients.

follow-up of one and six months, respectively (Table 2, p<0.05). After a follow-up of 6 months, two patients (16%) had an increase on the pain level (severe and very severe pain). Table 3 shows that the success rate was 57% and 60% in the patients with VAS-severe during the follow-up of one and six months, respectively (p<0.05). Only one (3%) patient had an increase on pain level (very-severe) after one and six months. The patients with VAS-very severe also showed a statistically significant success rate after the follow-up of one and six months (Table 4; p<0.05). Two patients (11%) remained on the group very severe after a follow-up of six months. There was a higher success rate in the patients with mild pain in comparison with the severe and very severe groups after a follow-up of one and six months but with no statistical significance (p=0.4933 and p=0.8014, respectively).

No patient presented with Grade-0 before the interlaminar epidural injection according to WHO classification. Table 5 shows that 38% and 47% of the patients with Grade-1 had an improvement on the level of disability after a follow-up of one and six months, respectively (p<0.05). In addition, only 14% and 10% of the patients had an impairment of the disability after one and six months, respectively, after the treatment. Despite the fact that 43% and 50% of the patients with Grade-2 presented with Grade-0 after the follow-up of one and six months, respectively, the results did not reach statistical significance (Table 6, p>0.05). Forty-seven percent of the patients Grade-3 had a Grade-0 after six months of follow-up (Table 7). However, the statistical analysis was not done due to the low number of patients in this group (7).

DISCUSSION

Lumbosciatic pain is a common and important medical problem that is usually caused by a mechanical abnormality[1]. Several lines of evidence suggest that an inflammatory component may contribute to this entity[2,3]. Indeed, it has been found high levels of inflammatory phospholipase A2 activity in lumbar disc herniation[11]. Magnetic resonance studies have demonstrated postgadolinium enhancement consistent with an inflammatory response in these patients[12]. Inhibition of the synthesis of these inflammatory mediators has stimulated the use of epidural corticosteroids in association with local anesthetics as a treatment of this entity. There is also evidence that this treatment should be started early to prevent peripheral and central sensitization[13]. A systematic review address the results about the treatment of lumbosciatic pain with epidural corticosteroid administrated by two different approaches: interlaminar and transforaminal[4]. The results showed that there was strong evidence to indicate effectiveness of transforaminal epidural injection in patients with lumbosciatic pain. However, the evidence for interlaminar epidural steroid injection was either limited or inconclusive. Indeed, the efficacy of interlaminar epidural corticosteroid for lumbosciatic pain is controversial and is still a matter of controversy[14-22]. Thus, in this study we examined, retrospectively, the efficacy of interlaminar epidural corticosteroid injection associated with local anesthetic in the treatment of lumbosciatica by evaluating the pain level and the patient's disability according to the VAS and WHO classification, respectively.

The study by Dilke et al. showed that interlaminar epidural corticosteroid injection decreased the level of pain during a follow-up of 3 months[17]. In a prospective randomized clinical trial using interlaminar epidural corticosteroid injection, it was showed that greatest pain relief could be achieved in the initial 2 weeks with no significant improvement after this period[23]. Indeed, it has been shown by several reports that interlaminar epidural corticosteroid offer benefit in the management of lumbosciatic pain only within a follow-up of three weeks[15,16,18]. However, no significant benefit in outcome was observed by some reports with the use of interlaminar epidural corticosteroid in the treatment of sciatica[14,19,21]. The poor efficacy of interlaminar epidural corticosteroid may be attributable to insufficient penetration of steroids to the locus of nerve irritation[24]. There is also a possibility that interlaminar epidural corticosteroid might have an effectiveness in a subgroup of patients due to differences between the study populations, follow-up times, and intervention methods[5,25]. In addition, lumbosciatic is a heterogeneous condition resulting from diverse pathophysiologic mechanism which could explain why some patients respond while others do not seem to benefit at all from glucocorticoids[25].

We have observed that interlaminar epidural corticosteroid administration decreased the pain level of all groups of VAS analyzed (moderate, severe and very severe). Moreover, the magnitude of the response to the therapy was very similar between these groups in both follow-ups examined (p>0.05). In fact, the patients with very severe pain obtained a success rate of 61% and 56% after one and six months of follow-up, respectively (Table 4), showing that interlaminar epidural corticosteroid injection may be effective even in the patients with high level of pain. Our data correspond with the meta-analysis showing a short (up to 60 days) as well as long-term (up to 12 months) relief

of pain that may be secondary to the number and the interval between the injections[22]. The optimal number of injections has not yet been defined and some patients improve only after two or three injections[20]. In this study most of the patients (93%) received more than three injections and, some negative results observed in the literature may be occurred because the low number of injections or long interval between the epidural corticosteroid administration[21]. It is also noteworthy that in the present study the interlaminar epidural approach was done without fluoroscopic guidance a fact that theoretically might improve the results of the treatment but further investigations are necessary to address this point.

Our data also showed an improvement of 38% and 47% on the level of disability after a follow-up of one and six months, respectively, in the group of patients with Grade-1. This result is very similar with that obtained by Rosen et al where 47% of the patients at 8 week follow-up evaluation are able to return to normal activities[26]. The patients from Grade-2 also presented an improvement of 43% and 50% which was not statistical significant. It is noteworthy to mention that we have used stringent criteria for success. Thus, we only considered the patients with Grade-0 or VAS=0-2 after the therapy as criteria of success. However, we cannot exclude a benefice of the treatment for those patients that were originally from the Grade-2 and moved to Grade-1 and also, for those patients that have reduced the pain level from severe to moderate after a follow-up of one and six months. If we consider this fact, 81% and 72% percent of the patients of Grade-2 had an improvement on the level of disability after one and six months, respectively. Unfortunately, the number of patients on Grade-3 was low limiting any further statistical analysis. The economic consequences of improvement on disability should be considered but further investigations are necessary to explore this point.

The divergent results of epidural corticosteroid injection observed in the reports may occur due to methodological differences such as randomization, double-blind parameters or inadequate follow-up. The present study was retrospective and the disadvantages of this type of evaluation are acknowledged. It is important to mention, however, that the present results are important since we demonstrated a decrease in pain level for at least 6 months differently from another retrospective study by Rosen et al. that only showed transitory effects of interlaminar epidural corticosteroid[26]. In the present study we have used a follow-up of six months but further studies are necessary to investigate the benefice of this approach after a longer period of follow-up.

In conclusion, we have observed that interlaminar epidural corticosteroid injection may be useful, at least for six months, in the treatment of the patients with lumbosciatic pain. The present study is consistent with the concept that an inflammatory etiology is also involved in the lumbosciactic pain due to disc herniation.

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