

Pregabalin preoperative single dose for pain control after lumbar videoendoscopic discectomy: A Prospective study

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ABSTRACT

Objective: To evaluate the effectiveness of the multimodal analgesia scheme, which includes preemptive administration of gabapentinoids before lumbar videoendoscopic discectomy.

Material and Method: Twenty patients with lumbar disc hernia and indication of surgical treatment were randomly allocated into two groups. The first group received 150 mg of pregabalin one hour before the anesthetic indication, the second group received conventional treatment without pregabalin. After the surgeries, the patient was asked to identify the intensity of his pain on a visual scale. The pain assessment occurred 24 hours and 7 days after the procedure.

Results: Group A reported an average pain of 3.08, ranging from 2 to 4 in pain EVA. All patients in Group A used dipyron every 6 hours. Two patients associated with tramadol every 6 hours. Patients in Group B used dipyron and tramadol at the recommended maximum doses in four daily doses (50 mg of tramadol every 6 hours and 1 g of dipyron every 6 hours). The mean perception of pain was 7.41 in the visual analogue scale, ranging from 6 to 9.

Conclusion: The patients who used preemptive multimodal analgesia before surgery presented lower pain 24 hours and seven days after the procedure.

Key Words: Pain, Analgesia, Pregabalin, Disc Hernia, Spine

Introduction

Orthopedic surgery is among the most painful and induces chronic pain, with perpetuation of the stimulus [1-5]. Surgery for lumbar discectomy, either by traditional open route or under videoendoscopic visualization, is known to cause moderate to severe pain [3][6]. The use of the infused serum in the lumbar space under pressure, the manipulation of an area full of nerve endings, manipulation of the nerve root and the dural sac are some of the factors that enhance the pain sensation in the postoperative period, making lumbar spine surgery a of the most uncomfortable orthopedic procedures [3,6]. The mechanisms of pain memory, potentiation or inhibition of painful sensation and physiology of pain stimulus are complex and multifactorial [1]. The potentiation of post-surgery pain and its perpetuation even after cessation of the nociceptive stimulus is shown as a challenge to be overcome in the search for the patient's well-being [1-3]. Multimodal analgesia, which involves the use of different classes of drugs in order to enhance pain control, has been shown to be the best treatment option for chronic pain [1-5]. Several studies have been published showing the efficacy of pregabalin to control post-surgical pain if used before anesthetic induction. Pregabalin has also been shown to be effective in controlling myoclonus and fasciculation, since it also acts as a muscle relaxant [2][3]. Pregabalin is an analogue of gamma-aminocyclohexane carboxylic acid (GABA), an inhibitory neurotransmitter in the vertebrate central nervous system [7]. GABA acts on pre- and postsynaptic receptors causing the opening of ion channels thus allowing the influx of negatively charged ions such as chloride ions into the cell or positively charged potassium ions outside the cell. This action results in a negative change in the transmembrane potential, usually causing hyperpolarization [8][9]. Gabapentinoid, analogous to GABA, produces long-lasting analgesia by leading to membrane hyperpolarization, being used to control neuropathic pain and chronic pain [7][8][10]. Our objective in the present study was to evaluate the effectiveness of the multimodal analgesia regimen that includes the administration of gabapentinoids before the surgical procedure, aiming at better post-surgical pain control.

Methods

After authorization by the Research Ethics Committee of the University, twenty patients to be submitted to discectomy surgery for the treatment of lumbar disc herniation by videoendoscopy were recruited for the study. Inclusion criteria were patients followed at the spine surgery outpatient clinic, with extruded lumbar disc herniation and compressive radiculitis clinically diagnosed and confirmed by Magnetic Resonance and Electroneuromyography, and without segmental instability assessed by lateral inclination, posterior and rotational (dynamic) radiography. These patients were chosen to undergo videoendoscopic discectomy. Age between 20 and 65 years, with no history of trauma, without previous fracture or deformity, without interfacetory arthrosis, canal or foraminal stenosis. Patients who reported chronic use of opioids or gabapentinoids, presence of chronic mixed or neuropathic pain, use of anti-depressants or anxiolytics, previous treatment of fibromyalgia or history of drug allergy were discarded. The patients were randomly divided into two groups, with the first group of 10 patients using pregabalin 150 mg one hour before anesthetic induction and the second group receiving placebo medication. After the patient's consent to participate in the project, the patient was instructed to use 02 (two) 75 mg pregabalin capsules orally one hour before surgery. The patients in the second group received the placebo, which consisted of a vitamin complex, in a white capsule similar to the two drugs. This administration was supervised by the anesthesiologist. Containers were prepared, without identification, filled with 75 mg of pregabalin and the other with placebo. Randomization took place electronically using the coretrial online program (v2.0) produced by coreware. Patient data was entered into the system and the computer program generated a password indicating in which group the patients would be allocated. The patients were then submitted to surgical treatment under videoendoscopic visualization and decompressive discectomy with excision of the herniated disc fragment. During the procedure, neutral monitoring was not used and it was not possible to assess signs of root manipulation or dorsal root ganglion. After the surgery, the patients were evaluated clinically when asked about the sensation of pain, being instructed to locate their pain sensation on a visual analog scale (VAS) of pain. This first assessment took place 24 hours after the procedure, at the time of hospital discharge; the patient was asked to write down the time of taking the oral medication; tramadol hydrochloride 50 mg and dipyrone 1 g was prescribed every 6 h in case of pain.

Seven days after surgery, upon returning to the outpatient clinic, patients were asked again about the intensity of pain, and the visual scale was again presented for identification and measurement of pain sensation. The data were analyzed statistically through the Saint John University (USA) physics online program. The two-tailed paired student t-tests and Kolmogorov-Smirnoff tests were used to determine the statistical correlation. $P < 0.05$ was considered relevant.

Results

In Group A, which received pregabalin 60 minutes before anesthesia, 10 patients were randomly allocated. Of these, 4 were men. The ages ranged from 50 to 67 years (mean 57.4 years). eight patients had disc injuries with irradiation to the right side and two to the left side. All patients had no motor deficit. The average time of surgery was 52.3 minutes, ranging from 40 to 80 minutes. The volume of infused serum was, on average, 12.16 liters, ranging from 10 to 14 liters. In group B, which received the placebo, 10 patients were also allocated, 2 men and 8 women; 6 patients had disc injuries with irradiation to the right side and 4 to the left side. Regarding the lesion, all patients studied had foraminal hernia and all were submitted to surgical treatment through the transforaminal portal: regarding location 9 in the L3-L4 interval and 11 in the L4-L5 interval; Ages ranged from 49 to 68 years old, mean of 56.5 years old. The average time of surgery was 50.1 minutes, ranging from 40 to 70 minutes. The volume of infused serum was, on average, 11.6 liters, ranging from 9 to 15 liters. (Table 1)

Table 1 – Analyzed Data of Both Groups

Group	Gender	Age	Laterality	Injury	Time Surgery	Volume Serum
A	4 male	57.4 years	08 Right Side	L4/L5	52.3 minutes	12.16 liters
10	6 female	average	02 Left Side	L5/S1	average	average
B	2 male	56.5 years	10 left side	4 L4/L5	50.1 minutes	11.6 liters
10	8 female	average		6 L5/S1	average	average

Regarding demographic data, time of surgery and volume of infused serum, there was no statistical difference ($p > 0.5$), therefore the groups were similar and comparable. Regarding the perception of pain assessed one week after the surgery, Group A reported an average pain of 3.08, ranging from 2 to 4 in the VAS of pain. All patients in Group A used dipyrone every 6 hours. Two patients associated tramadol every 6 hours. The other patients did not use tramadol, the pain being controlled with dipyrone and application of local ice. Patients allocated to Group B used dipyrone and tramadol at the maximum recommended doses, in four daily doses (50 mg of tramadol every 6 hours and 1 g of dipyrone every 6 hours). The average pain perception was 7.41 on the visual analogue scale, ranging from 6 to 9. ($P < 0.0001$) (Figure 1, Table 2)

Figure 1: Pain reception after 7 days of surgery. Group A reported an average pain perception of 3.08 ranging from 2 to 4 on the VAS pain scale. Group B reported an average pain perception of 7.41 ranging from 6 to 9 on the VAS pain scale.

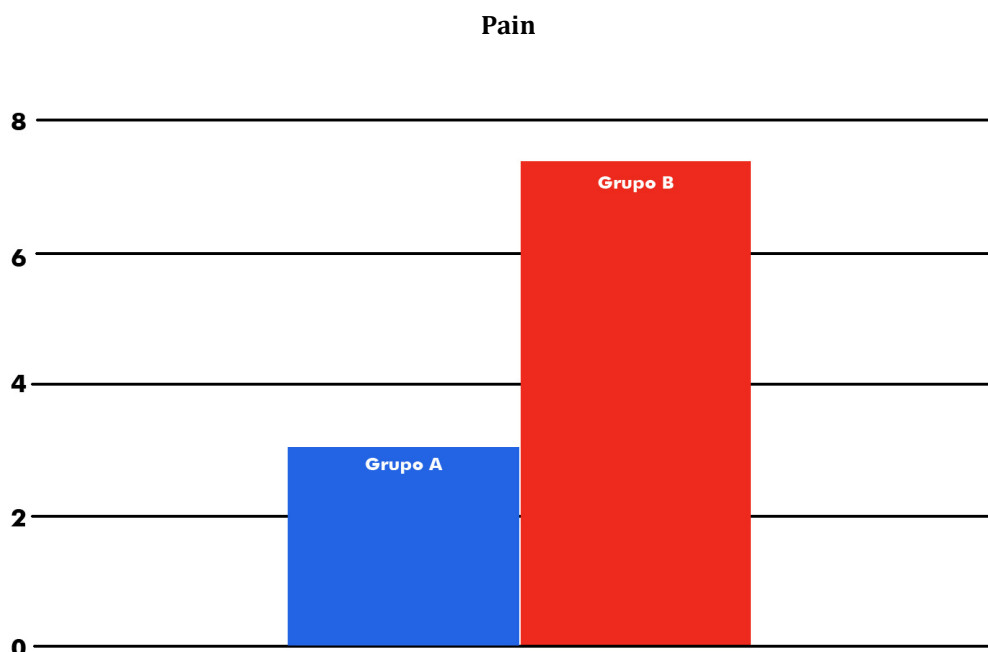


Table 2. Post-operative administration of analgesic drug regimens for pain control.

Group A used analgesic drug regimen more moderately in 80% of cases, when compared to Group B which used analgesic drug regimen more intensely in 100% of cases.

Group	Analgesic Scheme	Number of Patients	VAS
A	Dipyron 1g 6/6 hrs + Tramadol 50mg 6 / 6hs	2	3.08 average
	Dipyron 1g 6 / 6hs (only)	8	
B	Dipyron 1g 6/6 hrs + Tramadol 50mg 6 / 6hs	10	7.41

Discussion

Chronic pain is a relatively frequent complaint and has been intensively studied in recent decades [1][2]. Multimodal analgesia, which involves the use of different classes of drugs in order to enhance pain control, has been shown to be the best treatment option for chronic pain [1-5]. Several studies have been published showing the efficacy of pregabalin to control post-surgical pain if used before anesthetic induction. In bariatric, oncological and uro-gynecological surgeries, in spinal arthrodesis, nephrolithotomies, mastectomies, among others [1-6]. Pregabalin has also been shown to be effective in controlling myoclonus and fasciculation, since it also acts as a muscle relaxant [2][3]. Numerous articles have suggested that acute pain after surgery becomes less and the chronicity of pain occurs to a lesser extent in patients undergoing pregabalin before the surgical procedure. Schemes of seven days, a day or an hour are presented as equally effective [2][5][6]. Orthopedic surgery is among the most painful and induces chronic pain, with perpetuation of the stimulus [1][3][4][5]. Surgery to correct the herniated disc, either through the traditional open route or under videoendoscopic visualization, leads to moderate to severe pain in the immediate postoperative period and moderate after the first week, and the pain directly influences the rehabilitation process. The difficulty in mobilization can lead to moderate degrees of incapacity to walk and daily activities of hygiene hygiene and consequently prolong the time to return to activities [4][5].

In our study, 150 mg of pregabalin was administered one hour before anesthetic induction and we observed objectively less pain intensity after the procedure in patients who received preemptive analgesia in a multimodal regimen than those who received placebo and regular analgesia after the procedure.

Conclusion

Patients who used preemptive multimodal analgesia before surgery had less pain 24 hours and seven days after the procedure.

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