

## Epidural anesthesia using a 0,75% ropivacaine and subarachnoid anesthesia with a 0,5% bupivacaine associated or not with clonidine in hemorrhoidectomies<sup>1</sup>

Anestesia peridural com ropivacaína a 0,75% e anestesia subaracnóidea com bupivacaína a 0,5% associadas ou não à clonidina em hemorroidectomias

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### ABSTRACT

**Purpose:** To study the safety and efficiency of two anesthetic blockages in hemorrhoidectomy and the effect of clonidine on analgesia.

**Methods:** 80 patients were studied, randomly divided into four groups: 1 (n=19)- peridural with a 0,75% ropivacaine; 2 (n=21)-peridural with a 0,75% ropivacaine and 150 µg of clonidine; 3 (n=19)- subarachnoid with a 0,5% bupivacaine; 4 (n=21)- subarachnoid with a 0,5% bupivacaine and 50 µg of clonidine. The intensity of pain was evaluated by the visual analogical scale 8, 12 and 24 hours after surgery. The use of vasoconstrictors on the transoperatory and the amount of analgesics within the 24 hours were registered.

**Results:** The intensity of pain, 8 hours after surgery, was lesser on group 4, and much lesser on group 4 comparing with groups 1 and 2, 12 hours (p=0,022; p=0,001) and 24 hours (p=0,03; p=0,003). The frequency of vasoconstrictors usage on the transoperatory and the analgesics on the post-operative showed no difference among the groups. There were no anesthetic complications.

**Conclusions:** The subarachnoid anesthesia with a 0,5% bupivacaine with clonidine, showed better analgesia comparing with the peridural anesthesia with a 0,75% ropivacaine with or without clonidine, however all were safe and efficient. The clonidine aided on the decreasing of pain when subarachnoid anesthesia was used.

**Key words:** Anesthesia, Epidural. Anesthesia, Spinal. Hemorrhoids. Pain. Clonidine.

### RESUMO

**Objetivo:** Verificar a segurança e a eficácia de dois bloqueios anestésicos na hemorroidectomia e o efeito da clonidina na analgesia.

**Métodos:** Foram estudados oitenta pacientes, distribuídos aleatoriamente em quatro grupos: 1 (n=19)- peridural com ropivacaína a 0,75%; 2 (n=21)-peridural com ropivacaína a 0,75% e 150 µg de clonidina; 3 (n=19)-subaracnóidea com bupivacaína a 0,5%; 4 (n=21)- subaracnóidea com bupivacaína a 0,5% e 50 µg de clonidina. A intensidade da dor foi avaliada pela escala analógica visual 8, 12 e 24 horas após a cirurgia. O uso de vasoconstritores no transoperatório, o consumo de analgésicos em 24 horas foram anotados.

**Resultados:** A intensidade da dor, 8 horas após a cirurgia, foi menor no grupo 4, e significativamente menor no grupo 4 em relação aos grupos 1 e 2, 12 horas (p=0,022; p=0,001) e 24 horas (p=0,03; p=0,003). A frequência do uso de vasoconstritores no transoperatório e de analgésicos no pós-operatório não diferiu entre os grupos. Não houve complicações anestésicas. **Conclusões:** A anestesia subaracnóidea com bupivacaína a 0,5%, com clonidina, apresentou melhor analgesia que a anestesia peridural com ropivacaína a 0,75% com ou sem clonidina, porém todas foram seguras e eficazes. A clonidina contribuiu para diminuir a dor na anestesia subaracnóidea.

**Descritores:** Anestesia Eperidural. Raquianestesia. Hemorróidas. Dor. Clonidina.

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### Introduction

The pain after hemorrhoidectomy, despite the advance on the analgesia field, is a reality. It can vary from intensity and

frequency. Many surgical and anesthetic measures have been used to avoid or to lessen such. It is up to the anesthesiologist to adopt some measures recommending the use of certain medicaments<sup>1-10</sup>, preemptive analgesia<sup>11-15</sup>. Botulinic toxin injection can also be used

in the internal sphincter<sup>16</sup> micronized fractions of flavonoids<sup>17</sup> and the transcutaneous electrical stimulation<sup>18</sup>.

Other analgesia trials have been made with the adding of morphine<sup>19,20</sup> and clonidine on anesthetic blockages. In hemorrhoidectomy, under caudal blockage, the clonidine, mixed with bupivacaine, lidocaine and epinefrine, increased the time of analgesia, more than the saline solution added to the same mixture<sup>21</sup>. In proctologic surgeries, especially hemorrhoidectomy, the clonidine associated with lidocaine and fentanyl, in subarachnoid anesthesia, prolonged the time of analgesia, lessened the intensity of pain, with minimum side effects<sup>22</sup>. The clonidine associated with ropivacaine, improved the post-operative analgesia when epidural anesthesia was used in surgeries performed on the lower part of abdomen<sup>23</sup>. Though, clonidine did not improve the analgesia when used: a- by a catheter near the infraclavicular nerve, in orthopedic surgery of upper limb<sup>24</sup>; b- on intratecal space in surgeries to remove hip and knee<sup>25</sup>; c- on interescalenic space, in shoulder surgeries<sup>26</sup>.

Considering that the analgesic efficiency of clonidine is contradictory, and that peridural anesthesia with a 0,75% ropivacaine

and that subarachnoid anesthesia with a 0,5% bupivacaine have often been used by our anesthesiologists, and that there are no studies that compare these two anesthetic techniques, we put together this paper with the following objectives: Identify on the immediate post-operative of patients undergone hemorrhoidectomy, the analgesic efficiency and the safety of peridural with a 0,75% ropivacaine, associated or not with clonidine and subarachnoid anesthesia with a 0,5% hyperbaric bupivacaine associated or not with clonidine, and to compare the results from these anesthetic techniques.

### Methods

This paper was approved by the Committee of Research Ethics of the Federal University of Minas Gerais, as per document number ETIC 0478/05. All the patients involved, signed a Term of Previous Informed Consent.

80 patients both men and women, were operated, ages between 20 and 70, ASA 1 or 2, with hemorrhoids of third and fourth degrees (Table 1).

**TABLE 1** – Data from patient undergone hemorrhoidectomy under peridural anesthesia with 0,75% ropivacaine associated or not with clonidine, and the subarachnoid anesthesia with a 0,5% bupivacaine associated or not with clonidine

Types of anesthesia	Gender		Age(years)		BMI(Kg/m2)	
	Male	Female	A.A	S.D	A.A	S.D
Peridural with 0,75% ropivacaine	6	13	50,0± 7,3		24,36± 4,12	
Peridural with 0,75% ropivacaine Associated with clonidine	9	12	46,3±10,3		24,86± 5,96	
subarachnoid with a 0,5% bupivacaine	6	13	43,1±14,1		23,59± 2,65	
subarachnoid with a 0,5% bupivacaine Associated with clonidine	9	12	49,8±11,6		25,21±4,92	

A.A- Arithmetical average S.D- Standard Deviation BMI- Body Mass Index

The following criteria were adopted to select the patients:

1- Exclusion Criterion: patients suffering from lesion or fistula, with serious heart and respiratory disease, diabetes, with alter psquism, chronic and painful disorder; frequent users of analgesics; and the ones allergic to any analgesic drug;

2- Inclusion Criterion: patients with no surgical counter-indication, with hemorrhoids of third and fourth degrees.

The patients were randomly divided into four groups according with the type of anesthesia dispensed: group 1 (n= 19):- peridural anesthesia with 14 mL of 0,75% ropivacaine (Cristalia – Itapira- São Paulo- Brazil), plus 1mL saline solution; group 2 (n= 21):- peridural anesthesia with 14 mL of 0,75% ropivacaine added with 1mL of clonidine (Cristalia); group 3 (n= 19):- rachianesthesia with 2,0 mL of 0,5% weighted

bupivacaine (Cristalia); group 4 (n= 21) - rachianesthesia with 2,0 mL of hyperbaric bupivacaine (Cristalia) plus 0,33mL of clonidine.

On patients ready for surgery, the colon was prepared using a bottle of enema (sodium phosphate monobasic H<sub>2</sub>O 16 g, and sodium phosphate dibasic H<sub>2</sub>O 6g), administered via rectum 10 hours before surgery. Midazolam, 7,5 mg was used as pre-anesthetic sublingual medication one hour before surgery. A vein was punched from the upper limb (back of hand or anterior of forearm), using an I.V catheter 20 to infuse saline solution and medicaments. All the patients were monitored using ECG, oximetry of pulse and non-invasive arterial pressure, with values written down on anesthetic file.

The epidural puncture was performed using a Tuohy 15G needle, on the space between L3-L4, with patients sitting down. The drugs were injected in the peridural space, volume of 15 mL, and velocity of approximately 1 mL/second. The unilateral spinal puncture was performed with a 27 G needle on the space between L3- L4, using an injector to make the puncture easier and to injection of medication, proved to be efficient against the risk of headache after surgery. The velocity of solution injection was about 1mL/15 second. After about 5 minutes, a rectum touch was performed by the surgeon in order to evaluate the degree of sphincter relaxing. A value was attributed from 0-10 according with the degree of relaxing (Table 2).

**TABLE 2** - Degree of sphincter relaxing in patients undergone hemorrhoidectomy under peridural anesthesia with 0,75% ropivacaine associated or not with clonidine, and the subarachnoid anesthesia with 0,5% bupivacaine associated or not with clonidine

Groups	Types of anesthesia	Sphincter Relaxing				
		A.A	S.D	p	p1	p2
1-	Peridural with 0,75% ropivacaine	6,69	1,96			
2-	Peridural with 0,75% ropivacaine associated with clonidine	6,76	1,92	NS		
3-	subarachnoid with a 0,5% bupivacaine	8,00	1,37	<0,05	<0,05	
4-	subarachnoid with a 0,5% bupivacaine associated with clonidine	8,00	1,55	<0,05	<0,05	NS

A.A- Arithmetical Average S.D- standard deviation

Kruskal Wallis. p- comparing the groups 2, 3 and 4 with group 1. p1- comparing groups 3 and 4 with group 2. p2- comparing between group 3 and 4. NS- non significant. p, p1,p2 < 0.05- significant

The hemorrhoidectomy technique was performed only by the surgeon on duty, the semiclosed technique was used (Milligan Morgan technique associated with Ferguson).

The safety of anesthetic techniques was evaluated by monitoring the transoperative arterial pressure, pulse, SatO<sub>2</sub> and breathing, besides the electrocardiographic tracing. Each patient whose blood pressure dropped beyond 20% from the initial value, were treated with vasoconstrictors. The vital signals were also evaluated 20 minutes after surgery, four hours, eight hours, 12 hours, and the usual 24 hours and/or in other situations when necessary.

The analgesic efficiency of anesthetic techniques was evaluated by intensity of pain and by consumption of analgesics. The intensity of post-operative pain was evaluated by a scale of visual analogy (EAV) 8, 12 and 24 hours after beginning the

anesthesia, or at other time when it was necessary. On this scale, zero represents the absence of pain, and 10, the presence of intense pain (unbearable). The frequency of analgesic usage within 24 hours was also calculated. All patients had their data written down on a special file.

After hemorrhoidectomy, the patients received endovenous, 100 mg cetoprofene and 1g dipirone and were strictly observed on post-anesthetic recovery by a professional that didn't participate on the procedure, however, accompanied them during a 24-hour period, after surgery was finished.

The following statistics were used: a- Descriptive Statistics to calculate the arithmetic average (A.A) and (S.D) standard deviation of variables: age, height, weight, BMI, surgical duration, EAV- 8 hours, EAV-12 hours, EAV-24 hours; and the

variable frequency when necessary; b- Correlation test of Spearman to correlate the BMI, age, operation duration with the EAV; c- chi-squared statistic to compare the number of male patients with the female ones; d- Fisher exact statistics to compare the frequency of patients that used analgesic and vasoconstrictor comparing with the ones that didn't use such; e- Kruskal-Wallis test to compare the surgical duration, BMI, age, the EAV (8-12-24 hours) and the sphincter relaxing among the four groups b; f- Doon Multiple comparison (post-hoc) when the Kruskal Wallis test showed significance. A  $p < 0,05$  value was considered statistically significant.

### Results

The hemorrhoidectomy procedures were performed with no difficulties, an average time of  $21 \pm 8,1$  minutes, and there were no post-operative complications related with this operation.

There was no significant difference between the number of male or female patients, average age, BMI and operation average duration on the four groups ( $p > 0,05$ ).

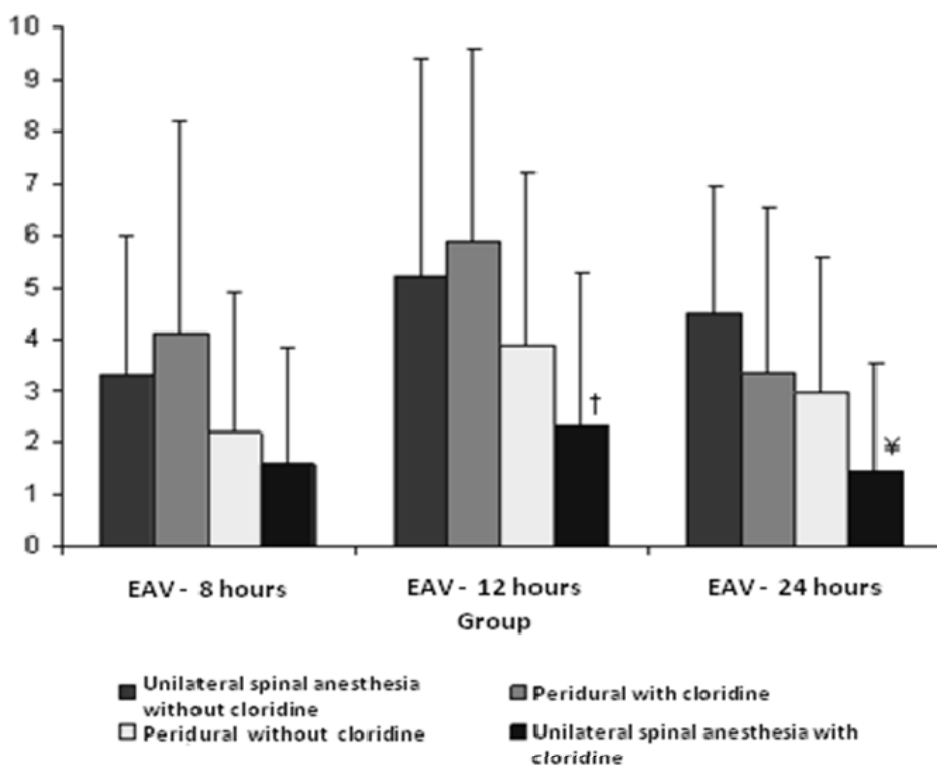
There was no correlation between intensity of pain and BMI ( $p > 0,05$ ).

No correlation between operation duration and intensity

of pain was found, except on patients undergone peridural anesthesia without clonidine, after 8 and 24 hours ( $p < 0,05$ ). The pain was more intense on patients that had a more prolonged surgery period. There was no correlation between intensity of pain at 8, 12 and 24 hours and age of patient ( $p > 0,05$ ).

The rachianesthesia and peridural anesthesia were performed without any incident. Both associated or not with clonidine, proved to be safe. The monitoring of non-invasive arterial pressure, determined by Riva-Rocci method, the electrocardioscopy on derivations  $D_{II}$  e  $V_P$ , used also to measure the cardio-frequency, and the pulse oximetry to measure the hemoglobin saturation ( $SpO_2$ ) didn't suffer unexpected alterations. There was no significant statistical difference among the groups on the frequency of vasoconstrictor usage on the transoperatory ( $p > 0,05$ ) (Table 1).

Both analgesic techniques were efficient to treat pain. Though, the intensity of pain 8 hours after hemorrhoidectomy had no difference among the groups (Figure 1). The intensity of pain, 12 hours after hemorrhoidectomy, was lesser on the group of patients submitted to rachianesthesia with clonidine comparing with peridural without clonidine ( $p < 0,05$ ) and peridural with clonidine ( $p < 0,05$ ) and had no difference from rachianesthesia without clonidine ( $p > 0,05$ ) (Figure 1).



**FIGURE 1** - Intensity of pain (EAV) 8, 12 and 24 hours after hemorrhoidectomy among the four groups of patients: 1- Peridural Anesthesia without clonidine, 2- Peridural Anesthesia with clonidine; 3- Rachianesthesia without clonidine; 4- Rachianesthesia with clonidine. The column represents the average of variable; the straight segment over the column represents the standard-deviation.

\* or †- significant between groups 2 and 4 and between groups 1 and 4. Kruskal Wallis

The intensity of pain 24 hours after surgery was lesser on patients submitted to rachianesthesia with clonidine, unlike patients submitted to peridural with clonidine ( $p < 0.05$ ) and peridural without clonidine ( $p < 0.05$ ); there was no difference on the

intensity of pain on groups 3 and 4 (Figure 1). There was no difference on consumption of analgesics among the four groups ( $p > 0.05$ ) on postoperative (Table 3).

**TABLE 3** - Analgesic on Post-operative (8, 12, 24 hours) and vasoconstrictors on transoperatory, in patients undergone hemorrhoidectomy under peridural anesthesia and Rachianesthesia, with or without clonidine

		GROUPS				Total	p
		Peridural no clonidine	Peridural with clonidine	Rachianesthesia no clonidine	Rachianesthesia with clonidine		
Used Analgesic 24 h	No	N 9	17	10	16	52	0,063
		% 47,4	81,0	52,6	76,2	65	
	Yes	N 10	4	9	5	28	
		% 52,6	19,0	47,4	23,8	35,0	
Used vasocons trictor on trans operatory	No	N 19	21	19	21	80	0,26
		% 100,0	100,0	100,0	100,0	100,0	
	Yes	N 13	17	18	16	63	
		% 68,4	81,0	94,7	76,19		
		N 6	4	1	5	17	
		% 31,6	19	5,3	23,81		
		N 19	21	19	21	80	
		% 100,0	100,0	100,0	100,0	100,0	

Exact Fisher Test. N- number of people.  $p > 0.05$ - non significant

The patients submitted to rachianesthesia presented better muscle relaxing, therefore making the surgery easier (Table 2).

### Discussion

The semiclosed hemorrhoidectomy technique was used on all patients; scalpel with removable blades and conventional surgical material (nippers, scissors); electrical scalpel was used to section the anal mucosa, and the surgeries were performed by only one surgeon. It's important to mention that on this experiment,

there was no significant statistical difference in age, gender, and duration of operation on the different groups. This, to a certain extend, allowed the team to control variables that could interfere on the results and make comparisons among the groups, because the intention was to simply verify the effect of variable "anesthesia associated or not with clonidine", on post-operative pain.

The analgesics used were cetoprofene (100 mg) and dipirone (1 g) endovenose right after surgery, and was performed again in case of presence of pain. The local application



medications<sup>1-3</sup>, administered on the muscle<sup>4-7</sup> or other site<sup>8-15</sup>, as well as the approved resources in the literature to treat or avoid pain<sup>16-18</sup> were not used for we wouldn't have a variable that could interfere on the pain process.

The analyses from the results of this work, showed that the subarachnoid anesthesia with a 0,5% bupivacaine and the epidural anesthesia with a 0,75% ropivacaine with or without clonidine were both safe. The hemodynamic alterations that happened during the blockage were absolutely predictable and the use of vasoconstrictors didn't interfere among the groups ( $p > 0.05$ ). It's important to point out that clonidine causes hypotension and bradycardia because it activates the  $\alpha_2$  - pre-synaptic adrenoceptors, on peripheral nerve termination, inhibiting the exocytose of noradrenaline<sup>35</sup>. Besides that, the hypotension is caused by the activation of the center of vasomotor on CNS, with decreasing of sympathetic efflux and reducing the circulating catecholamine with potential parasympath nerve activity, decreasing this way, the arterial pressure<sup>36</sup>. But, clonidine caused vasoconstriction because it activated the post-synaptic receptors on the flat musculature of arteries and veins<sup>36</sup>.

When the intensity of pain was compared among the groups, eight hours after hemorrhoidectomy, we observe that the pain was less intensive when using rachianesthesia with clonidine other than peridural without clonidine and peridural with clonidine. This can be associated with the major muscular relaxing caused by the rachianesthesia and by a possible analgesic effect from clonidine that was present at that period. The pain was also less intense in patients undergone rachianesthesia with clonidine comparing with peridural with clonidine ( $p < 0.05$ ) peridural without clonidine ( $p < 0,05$ ), 12 hours after surgery. This happened 24 hours after hemorrhoidectomy, when this kind of anesthesia was compared with peridural with clonidine ( $p < 0.05$ ), and peridural without clonidine ( $p < 0.05$ ). Although no difference on the intensity of pain between the two kinds of rachianesthesia was shown. Besides that, there was no significant statistical difference on the frequency when using the analgesic among the four groups ( $p > 0,05$ ). This shows that the rachianesthesia is more efficient than the peridural and that clonidine helped decreasing the post-operative pain when associated with rachianesthesia. The fact that rachianesthesia produces good muscular relaxing and consequently making the operation easier, producing less trauma could justify the less intensity of pain. In fact, the subarachnoid anesthesia produced more sphincter relaxing than the peridural anesthesia (Table 2).

We observed that the clonidine associated with ropivacaine on peridural anesthesia, did not interfere on pain, 8 and 12 hours after surgery. On rachianesthesia the clonidine helped reducing pain 8, 12 and 24 hours after surgery. We can observe that when the comparison of value between the groups that used clonidine on rachianesthesia and the ones that didn't was made.

The clonidine used on the blockages, shows controversial results. On hemorrhoidectomy, under caudal blockage, it was associated with a mixture of bupivacaine, lidocaine and epinefrine, caused more prolonged analgesia than the saline solution added to such mixture<sup>21</sup>. On proctologic surgeries, especially hemorrhoidectomy, the clonidine associated with lidocaine and fentanil, on subarachnoid anesthesia, prolonged the time of analgesia, reducing the intensity of pain, with minimum side effects<sup>22</sup>. Both, clonidine and ropivacaine, improved the post-operative analgesia, when used under different blockages and types

of surgery<sup>23-25,32</sup>. Some studies, though, claim that this drug does not improve analgesia when also taken by different ways and in different types of surgery<sup>24-26</sup>. This study showed that clonidine helped decreasing pain when used on rachianesthesia, although on this anesthesia, the dosage had been smaller than on peridural anesthesia. This drug on the subarachnoid space produced more intense and selective effects than the ones observed with similar dosage on epidural space<sup>33</sup>. It's important to emphasize that the dosage and via of administration of clonidine, interfered on its analgesic action<sup>36</sup>.

## Conclusion

The subarachnoid anesthesia with a 0,5% bupivacaine with clonidine, showed better analgesia than epidural anesthesia with a 0,75% ropivacaine with or without clonidine, though all proved to be safe and efficient.

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