Original Article

Postoperative analgesia for hemorrhoidectomy with bilateral pudendal blockade on an ambulatory patient: a controlled clinical study

Luiz Eduardo Imbelloni[1], Eneida Maria Vieira[2], Antonio Fernando Carneiro[3]

[1]Professor of Anesthesiology at the Faculdade de Medicina Nova Esperança (FAMENE) – João Pessoa (PB), Brazil; Director of the Instituto de Anestesia Regional, at the Complexo Hospitalar de Mangabeira Gov. Tarcisio Burity – João Pessoa (PB), Brazil. [2]Professor at the School of Medicine at the Base Hospital of the Faculdade de Medicina de São José do Rio Preto (FAMERP) – São José do Rio Preto (SP), Brazil. [3]Doctor of Medicine, Santa Casa de São Paulo – São Paulo (SP), Brazil; Head of the Department of Surgery at the Universidade Federal de Goiás (UFG) – Goiânia (GO), Brazil; Director of Professional Defense at the Sociedade Brasileira de Anestesiologia (SBA).

ABSTRACT: Background and objectives: Reducing postoperative pain in hemorrhoidectomy is still a challenge. This prospective, randomized, double-blind study was conducted to compare bilateral pudendal blockade with peripheral nerve stimulator to relieve postoperative pain with the method commonly used. **Method**: 200 patients scheduled for hemorrhoidectomy were randomly divided into Control Group and Pudendal Group. Bilateral pudendal block was performed with levobupivacaine enantiomeric excess (S75:R25) after location with a peripheral nerve stimulator. The parameters evaluated were pain intensity, duration of analgesia, rescue analgesia, complications, patient satisfaction and pain at first defecation. Data were recorded at 6, 12, 18 and 24 hours after the surgery. **Results**: Bilateral pudendal nerves with mean 23.4±4.4 hours provided better relief of postoperative pain (p<0.001), reducing the need for analgesics and residual analgesia for more than 24 hours in 41% of patients. All patients in Pudental Group had spontaneous micturition *versus* 96 in the control group. There was no local or systemic complications. **Conclusions:** Bilateral blockade of the pudendal nerve using a neurostimulator provided better pain relief with less need for rescue dose and no local or systemic complications.

Keywords: colorectal surgery; ambulatory surgical procedures; anesthetic, local; pudendal nerve.

RESUMO: Justificativa e objetivos: A dor pós-operatória em hemorroidectomia ainda é um problema desafiador. Este estudo prospectivo, aleatório, duplamente encoberto, foi realizado para comparar o bloqueio bilateral do pudendo com estimulador de nervos periféricos para alívio da dor pós-operatória ao método habitualmente utilizado. **Método:** 200 pacientes escalados para hemorroidectomia foram aleatoriamente separados em Grupo Controle e Grupo Pudendo. O bloqueio bilateral do Grupo Pudendo foi realizado com levobupivacaína em excesso enantiomérico (S75:R25) após localização com estimulador de nervo periférico. Os parâmetros avaliados foram: intensidade da dor, duração da analgesia, resgate de analgésico, complicações, satisfação dos pacientes e dor à primeira defecação. Os dados foram anotados as 6, 12, 18 e 24 horas após a cirurgia. **Resultados:** O bloqueio bilateral dos pudendos, com média de 23,4±4,4 horas proporcionou um melhor alívio da dor pós-operatória (p<0,001), reduzindo a necessidade de analgésicos e com analgesia residual maior de 24 horas em 41% dos pacientes. Todos do Grupo Pudendo tiveram micção espontânea contra 96 do Grupo Controle. Não se observaram complicações locais ou sistêmicas. **Conclusões:** O bloqueio bilateral dos nervos pudendos com neuroestimulador proporcionou melhor alívio da dor, com menor necessidade de dose de resgate e sem complicações locais ou sistêmicas.

Palavras-chave: cirurgia colorretal; procedimentos cirúrgicos ambulatórios; anestésicos locais; nervo pudendo.

J Coloproctol
July/September, 2012

Postoperative analgesia for hemorrhoidectomy with bilateral pudendal blockade on an ambulatory patient: a controlled clinical study
Luiz Eduardo Imbelloni et al.

Vol. 32
Nº 3

INTRODUCTION

Hemorrhoids are veins around the anus or rectum that dilate, become inflamed and cause pain, itch and bleeding in 4.4% of the population[1]. Hemorrhoidal disease is the disease of highest prevalence in the anorectal region. Some hemorrhoids have surgical indication, which can be performed with local, regional or general anesthesia. Surgical resection seems to be the treatment that best eliminates the symptoms, providing good quality of life[2]. Patients submitted to hemorrhoidectomy can receive different anesthetic techniques, including: general anesthesia, spinal anesthesia, anesthesia with laryngeal mask, local anesthesia and sedation or infiltration with perineal anesthetics. However, reducing postoperative pain is still a challenge, and it makes many hemorrhoid patients prefer the disease symptoms to the surgery.

Postoperative pain is one of the greatest problems in ambulatory patients[3]. A retrospective study with 1,100 patients submitted to the ambulatory hemorrhoidectomy showed that 35% experienced moderate to severe pain at their homes, even in analgesic therapy[4].

The pudendal nerve derives from sacral nerves S_2, S_3 and S_4. In theory, pudental blockage enables analgesia or anesthesia of perineal region, which is frequently performed by surgeons or obstetricians.

Local levogyre anesthetics are less toxic to the central nervous system and cardiovascular system than the racemic or dextrogyre solution and offers vasoconstrictor and lower motor block properties[5,6]. In brachial plexus block, the enantiometric mixture (S75:R25) is a safer alternative if compared to racemic bupivacaine, due to its lower toxicity[7].

Based on a pilot study that reported reduction of postoperative pain with average analgesia of 24 hours[8], this prospective, randomized, double-blind study was conducted to investigate the analgesia produced with bilateral pudendal blockade using levobupivacaine enantiomeric excess (S75:R25), compared to the method commonly used.

METHOD

After the approval of the Ethics Committee of the School of Medicine of São José do Rio Preto (SP) and informed consent of the participants, this prospective study evaluated 200 patients, of ASA physical status I and II, from 20 to 70 years of age, submitted to hemorrhoidectomy, who were randomly divided into two groups.

All patients received spinal anesthesia with 4.5 mg hypobaric 0.15% bupivacaine or 18 mg hypobaric 0.6% lidocaine for the surgery in ventral decubitus position and 5 mg hyperbaric 0.5% bupivacaine or 20 mg hyperbaric 2% lidocaine, when the surgery was performed in lithotomy position, provided at the ambulatory service. Before the blockade, all patients received venous fentanyl 1 µg.kg⁻¹ and 1 mg midazolam. Spinal anesthesia was provided in ventral decubitus position, using an abdominal pad when the patients were in ventral decubitus position, or in left lateral decubitus, when the patients were in lithotomy position, in the space L_3-L_4, using the paramedian or median via with a 27G Quincke (B. Braun Melsungen AG) needle. The arterial pressure was monitored through a non-invasive evaluation, heart rate and pulse oximetry. No pre-anesthesia medication was administered. After entering the operating room, venoclysis was installed with lactated Ringer's solution. Minimum quantities of fluid were infused during the surgery – always less than 500 mL.

After the spinal anesthesia, the patients were randomly separated by a computer-generated list into Control Group and Pudendal Group. At the end of the surgery, the Control Group patients received venous ketoprofen (100 mg) and dipyrone (30 mg.kg⁻¹) in 100 mL lactated Ringer's solution. The Pudendal Group patients received 20 mL levobupivacaine enantiomeric excess (S75:R25), at 0.25% at each side after stimulation of pudendal nerves. Bilateral blockade of pudendal nerves was performed with the patient in lithotomy or ventral decubitus position, still under the effect of spinal anesthesia. The procedure used transperineal access, and the puncture site was medial to ischial tuberosity at each side, using one isolated needle of 100 mm (21G, 0.8x100 mm, B. Braun Melsungen AG), connected to a peripheral nerve stimulator (Stimuplex®, B. Braun Melsungen AG), adjusted to release square pulse current of 0.5 mA at 2 Hz frequency, perpendicularly inserted, seeking to have anal sphincter contraction; after peri-

J Coloproctol
July/September, 2012

Postoperative analgesia for hemorrhoidectomy with bilateral pudendal blockade on an ambulatory patient: a controlled clinical study
Luiz Eduardo Imbelloni et al.

Vol. 32
Nº 3

neal contraction was achieved, the anesthetic solution was injected.

The patients were monitored in the first 6 hours, at the hospital, and then at 12, 18, 24 and 30 hours after the surgery, by telephone contact, in terms of pain intensity – no pain (score 0), mild pain (1), moderate pain (2) and severe pain (3). They were also questioned whether the surgical site was insensitive (presence of anesthesia). Pain at first defecation was also evaluated, using the same pain intensity scoring system, and the time between blockade and defecation was recorded. The patients were asked to give their opinion about postoperative analgesia, by choosing one option among excellent, satisfactory or unsatisfactory.

Tramadol (50 mg) via oral administration was prescribed in case of pain and all rescue doses within the first 24 postoperative hours were recorded. The following was also evaluated: demographic data, pain-free period, degree of pain, frequency of orally administered analgesic, total doses administered and complications, such as urinary retention.

Qualitative variables (gender, nausea or vomiting, spontaneous micturition, pain at first defecation and level of satisfaction) were analyzed, in relation to the groups, using the chi-square test or, when recommended, Fisher's exact test. Quantitative variables (age, weight, height and duration of analgesia) were compared in relation to the groups using the t-test and, when recommended, non-parametric tests: rescue through Mood test for medians and degree of pain, according to progress observed at 6, 12, 18 and 24 hours after the surgery, through sign test with Bonferroni correction. The significance level adopted in this study was $\alpha = 0.05$.

RESULTS

The groups did not present significant difference in relation to demographic data (Table 1). Spinal anesthesia was satisfactory to all patients and did not require complementation with general anesthesia. Both pudendal nerves were easily stimulated in all patients, regardless of the block position. Pudendal nerve block did not cause alteration to arterial pressure or heart rate. No systemic complication related to the use of local anesthetic was reported.

Table 1. *Demographic data of the patients (mean±standard deviation).*

	Control Group n=100	Pudendal Group n=100	p-value
Age (years)	41.7 (12.4)	43.1 (11.3)	0.40
Weight (kg)	69.1 (12.2)	70.3 (10.3	0.45
Height (cm)	166.7 (8.8)	167.3 (8.1)	0.66
Gender: female/male	48/52	52/48	0.57

Pain score was significantly lower (p<0.001) within the first 24 hours in the Pudendal Group when compared to the Control Group (Table 2). Pain intensity within the first 24 hours is indicated in Table 2, and severe pain was reported by only 1 patient from the Pudendal Group during all the studied period, versus 15 patients from the Control Group.

In the Pudendal Group, residual anesthesia was observed in the perineum for 6 hours in all 100 patients, for 12 hours in 98 patients, for 18 hours in 71 patients and for 24 hours in 41 patients and in no patient from the Control Group at all evaluation moments, showing a significant difference in relation to residual perineal anesthesia in the Pudendal Group (all p<0.001).

Analgesia duration was 10 to 15 hours in 2 patients; 16 to 20 hours in 25 patients; 21 to 24 hours in 25 patients and more than 24 hours in 48 patients, with mean duration of 23.4±4.4 hours in the Pudendal Group. Mean analgesia duration in the Control Group was 3.7±0.9 hours, significantly lower (p<0.001). Oral rescue doses were not required in the first 24 postoperative hours in 66 patients from the Pudendal Group, while all patients from the Control Group required one or more oral rescue doses within the first 24 hours (Table 2). The number of rescue doses in the Control Group was significantly higher when compared to the Pudendal Group (p<0.001) (Table 2).

The first defecation occurred approximately 30 hours after the spinal anesthesia in both groups and pain was significantly lower in the Pudendal Group (Table 3). All patients from this group presented spontaneous micturition, while four patients from the Control Group required bladder catheterization, without significant difference. Analgesia in the Pudendal

J Coloproctol
July/September, 2012

Postoperative analgesia for hemorrhoidectomy with bilateral pudendal blockade on an
ambulatory patient: a controlled clinical study
Luiz Eduardo Imbelloni et al.

Vol. 32
Nº 3

Table 2. Incidence of pain and rescue doses

	Control Group (n=100)				Pudendal Group (n=100)				p-value
Pain scale	0	1	2	3	0	1	2	3	
6 hours	5	34	46	15	90	10	0	0	<0.001*
12 hours	11	36	50	3	90	10	0	0	<0.001*
18 hours	0	41	43	16	76	22	1	1	<0.001*
24 hours	0	59	33	8	67	21	12	0	<0.001*
Rescue dose					66				<0.001
No	0				18				
1 dose	12				16				
2 doses	17				0				
3 doses	26				0				
4 or + doses	45				0				
Median (iqr1)	3 (iqd=2)				0 (iqd=1)				<0.001**

*Through Bonferroni correction, significant difference when $p \leq 0.0167$;
**iqd: interquartile difference.

Table 3. Pain at defecation, side effects and satisfaction

	Control Group n=100	Pudendal Group n=100	p-value
1st Defecation			<0.001q
With pain	66	24	
Without pain	34	76	
Micturition			0.12F
Spontaneous	96	100	
Catheter	4	0	
Nausea/vomiting			<0.001q
Yes	25	0	
No	75	100	
Satisfaction			<0.001Q
Excellent	17	91	
Satisfactory	57	9	
Unsatisfactory	26	0	

qPearson's chi-square test; FFisher's exact test; Qchi-square test for independent samples.

Group was excellent in 91 patients, satisfactory in 9 patients, while in the Control Group, it was excellent in 17 patients, satisfactory in 57 and unsatisfactory in 26 cases, showing a significant difference in relation to satisfaction between the groups (p<0.001) (Table 3). Twenty-five patients reported nausea and vomiting at home in the Control Group versus no patient in the Pudendal Group – this difference was statistically significant (p<0.001) (Table 3).

DISCUSSION

Bilateral block of pudendal nerves was associated with better relief of postoperative pain, reduced number of rescue analgesic doses, lower pain at the first defecation and patient satisfaction when compared to Control Group. Analgesia due to bilateral block of pudendal nerves lasted, on average, 24 hours without rescue analgesic in 66% of the patients. In the Control Group, analgesia lasted only 3.7 hours and all patients required rescue analgesic.

Hemorrhoid surgery can be performed with the patient in ventral decubitus position, as it offers excellent exposure of the surgical site, more room for the presence of assistants and reduced engorgement of hemorrhoid plexus, or in the jackknife position. Although hemorrhoidectomy can be performed using different methods of anesthesia, local anesthesia with sedation remains the most common in ambulatory practice. However, postoperative pain is still insufficiently treated. Some authors use posterior perineal block for postoperative analgesia.

Several variations have been reported from the initial description[9-11]. The differences refer to technique details, devices and drugs used. Perineal infiltration is a superficial posterior perineal block and usually used as a single technique[12]. The high success rate obtained in this study basically occurred due to the use of a peripheral nerve stimulator to guide the

J Coloproctol

July/September, 2012

Postoperative analgesia for hemorrhoidectomy with bilateral pudendal blockade on an
ambulatory patient: a controlled clinical study
Luiz Eduardo Imbelloni et al.

Vol. 32

Nº 3

approach to nerves with the needle and obtain a quality block. In this study, bilateral block of pudendal nerves was used, guided by a peripheral nerve stimulator, resulting in residual perineal anesthesia for 6 hours in all patients, 12 hours in 98 patients, 18 hours in 71 patients, 24 hours in 41 patients, showing such blockade can be used as a single technique in the proposed procedure, according to the results from the combination of bilateral block of pudendal nerves with general anesthesia[13].

Somatic innervation of the pelvic floor and external sphincters comes from the sacral plexus (segments L_4-L_5 and S_1 to S_4). Knowing the pudendal nerve anatomy is very important to understand the nerve blockade technique. The pudendal nerves originate in the anterior sacral foramina, accompanied by the internal pudendal artery, leaving the pelvis through the greater ischial incisure, posterior to the sacral ligament and next to the ischial spine, providing motor innervation to perineal muscles and external sphincter. The pudendal nerve divides into three main branches: inferior anal nerve, perineal nerve and dorsal nerve of the penis or clitoris[14]. Pudendal nerve block is indicated for perineal surgery, as obstetric procedures and hemorrhoidectomy. Pudendal nerve block may be performed via transperineal or transvaginal approach, and with a peripheral nerve stimulator, leading to contraction of the effector muscle. The best motor responses are: contraction of the vulvar constrictor muscle and/or bulbospongiosus/anal sphincter muscle. In this study, both pudendal nerves were successfully blocked in all patients, with the help of a peripheral nerve stimulator.

Lidocaine or mepivacaine administered to 400 patients produced analgesia for 5 hours in 31.5% of the patients; for more than 10 hours in 48.5% and more than 15 hours in 9.2%, but only 3.2% of the patients did not require analgesics[9]. Doses from 1 to 3 mL of bupivacaine at 0.5% injected into the base of each hemorrhoid about 10 minutes before the incision produced analgesia 10 times longer when compared to the Control Group[15]. The injection of 20 mL of levobupivacaine enantiomeric excess (S75:R25) at 0.25% in each pudendal nerve promoted average 23.4 hours of analgesia, compared to 3.7 hours with the first dose in the Control Group.

Urinary retention is a common complication in anorectal surgery, especially hemorrhoidectomy[16,17]. Spinal anesthesia causes vesical function disorders due to interrupted micturition reflex. Vesical dysfunction remains until blockade is reduced to the third sacral segment in all patients[18]. With long-action anesthetic, the accumulated amount may exceed the cystometric capacity of the bladder[19]. For this reason, spinal anesthesia in this study was induced with low doses of bupivacaine or lidocaine in hypobaric or hyperbaric solutions, in an attempt to prevent urinary retention caused by conventional spinal anesthesia, which was confirmed by spontaneous micturition in 196 patients. It indicates that anesthesia/analgesia due to bilateral block of pudendal nerves for around 24 hours did not affect spontaneous micturition.

Pain is one of the main postoperative complications that extend the patient's period in the postoperative care unit[20]. Pain after discharge from hospital is related to the level of pain immediately after the surgery and, therefore, the target is to eliminate pain in the recovery period. Perineum is an extremely sensitive region and the surgical removal of hemorrhoid causes painful stimuli, which remains for several days, with pain relief bringing evident benefits. Functional disorders of the rectum, bladder and sexual issues are caused not only by the surgery, but also by the insufficient treatment of postoperative pain.

Pudendal block can be performed with ultrasound in the treatment of chronic perineal pain[21], but no practice has been defined for the treatment of post-hemorrhoidectomy pain. In conclusion, in this prospective, randomized and controlled study, levobupivacaine enantiomeric excess (S75:R25) at 0.25% provided considerable reduction of postoperative pain, decrease of analgesic doses, better quality at first defecation and high level of patient satisfaction. The positive results of using the stimulator for pudendal nerve block in this study may encourage wide utilization in patients undergoing hemorrhoidectomy, provided that it involves no local infection.

J Coloproctol
July/September, 2012

Postoperative analgesia for hemorrhoidectomy with bilateral pudendal blockade on an ambulatory patient: a controlled clinical study
Luiz Eduardo Imbelloni et al.

Vol. 32
N° 3

REFERENCES

1. Johanson JF, Sonnenberg A. The prevalence of hemorrhoids and chronic constipation: an epidemiologic study. Gastroenterology 1990;98(2):380-6.

2. Smith LE. Ambulatory surgery for anorectal diseases: an update. South Med J. 1986;79(2):163-6.

3. Macario A, Weinger M, Carney S, Kim A. Which clinical anesthesia outcome are important to avoid? The perspective of patients. Anesth Analg 1999;89(3):652-8.

4. Rawal N, Hylander J, Nydahl PA, Olofsson I, Gupta A. Survey of postoperative analgesia following ambulatory surgery. Acta Anaesthesiol Scand. 1997;41(8):1017-22.

5. Simonetti MPB, Batista RA, Ferreira FMC. Estereoisomeria: A interface da tecnologia industrial de medicamentos e da racionalização terapêutica. Rev Bras Anestesiol 1998;48:390-9.

6. Cox CR, Checketts MR, Mackenzie N, Bannister J, Scott NB, Morrison LM. Extradural S(-)bupivacaine: Comparison with racemic RS-bupivacaine. Br J Anaesth 1998;80(3):289-93.

7. Sato RT, Porsani DF, Amaral AGV, Amaral AGV, Schulz Jr OV, Carstens AMG. Bupivacaína racêmica a 0,5% e mistura com excesso enantiomérico de 50% (S75:R25) a 0,5% no bloqueio do plexo braquial para cirurgia ortopédica. Estudo comparativo. Rev Bras Anestesiol 2005;55:165-74.

8. Imbelloni LE, Beato L, Beato C, Cordeiro JA, Souza DD. Analgesia pós-operatória com bloqueio bilateral do nervo pudendo com bupivacaína S75:R25 a 0,25%. Estudo piloto em hemorroidectomia sob regime ambulatorial. Rev Bras Anestesiol 2005;55:614-21.

9. Gabrielli F, Cioffi U, Chiarelli M, Guttadauro A, De Simone M. Hemorrhoidectomy with posterior perineal block. Experience with 400 cases. Dis Colon Rectum 2000;43(6):809-12.

10. Nivatvongs S. An improved technique of local anesthesia for anorectal surgery. Dis Colon Rectum 1982;25(3):259-60.

11. Nivatvongs S. Techniques of local anesthesia for anorectal surgery. Dis Colon Rectum 1997;40(9):1128-9.

12. Roswell M, Bello M, Hemingway DM. Circumferential (stapled haemorrhoidectomy) versus conventionnal haemorrhoidectomy: randomized controlled trial. Lancet 2000;355(9206):779-81.

13. Naja Z, Ziade MF, Lönnqvist PA. Nerve stimulator guided pudendal nerve block decreases posthemorrhoidectomy pain. Can J Anesth 2005;52(1):62-8.

14. Sheppard R. Pudendal Nerve. In: Hahnn MB, McQuillan PM, Sheplock GJ. Regional Anesthesia: An Atlas of Anatomy and Techniques. St Louis: Mosby-Year Book, 1996. chap. 38. p. 267-71.

15. Jirasiritham S, Tantivitayatan K, Jirasiritham S. Perianal blockage with 0.5% bupivacaine for postoperative pain relief in hemorrhoidectomy. J Med Assoc Thai 2004;87(6):660-4.

16. McConnell JC, Khubchandani IT. Long-term follow-up of closed haemorrhoidectomy. Dis Colon Rectum 1983;26(12):797-9.

17. Prasad ML, Abearian H. Urinary retention following operation for benign anorectal diseases. Dis Colon Rectum 1978;21(7):490-2.

18. Kamphuis ET, Ionescu TI, Kuipers PW, de Gier J, van Venrooij GE, Boon TA. Recovery of storage and emptying functions of the urinary bladder after spinal anesthesia with lidocaine and with bupivacaine in men. Anesthesiology 1998;88(2):310-6.

19. Møiniche S, Kehlet H, Dahl JB. A qualitative and quantitative systematic review of preemptive analgesia for postoperative pain relief. The role of timing analgesia. Anesthesiology 2002;96:725-41. Comments in: Anesthesiology. 2002 Mar;96(3):526-7; Anesthesiology. 2003 Jan;98(1):280-1; author reply 281.

20. Chauvin M. State of the art or pain treatment following ambulatory surgery. Eur J Anaesthesiol 2003;20:3-6.

21. Rofaeel A, Peng P, Louis I, Chan V. Feasibility of real-time ultrasound for pudendal nerve block in patients with chronic perineal pain. Reg Anesth Pain Med 2008;33(2):139-45.

Correspondence to:
Luiz Eduardo Imbelloni
Rua Francisco Diomedes Cantalice, 21/802 – Cabo Branco
58045-210 – João Pessoa (PB), Brasil
E-mail: dr.imbelloni@terra.com.br