Effectiveness comparison of transperineal pudendal nerve block as anesthesia method in transrectal ultrasound-guided prostate biopsy

Venegas-Ocampo PJJ,1 Castillo-De Lira HH,1 Robles-Scott MA,1 Landa-Soler M,2 López-Mariscal MC,3 Mendoza-Peña F,2 Velázquez-Macías R.5

ABSTRACT

Introduction: The pudendal nerve is responsible for afferent stimulation of the anorectal region. Knowledge of pudendal nerve anatomy is essential for pudendal nerve block. Transrectal prostate biopsy is the most common procedure used in cancer detection and numerous researchers have reported that from 10-40% of patients experience no pain when it is performed. However, a large number of studies have shown that patients find this procedure extremely painful. In Mexico transrectal biopsy is performed as an outpatient procedure in the majority of urological centers and finding a satisfactory method of pain control for these patients is considered necessary.

Methods: A total of 60 transrectal ultrasound-guided prostate biopsies were carried out on consecutive patients with prostate specific antigen (PSA) above 4 ng/mL, or suspicious digital rectal examination (DRE). From

RESUMEN

Introducción: El nervio pudendo es el encargado de la estimulación aferente de la región anorrectal. El conocimiento de la anatomía del nervio pudendo es esencial para poder aplicar su bloqueo. La biopsia transrectal de próstata es el procedimiento más común para detectar el cáncer y numerosos investigadores han cifrado que entre 10% a 40% de los pacientes no tienen ningún dolor al realizarse el examen, sin embargo, una gran cantidad de estudios han determinado que los pacientes hallan este procedimiento sumamente doloroso, por lo que se considera necesario hallar un método satisfactorio para el control del dolor en dicho procedimiento que la mayoría de los centros de referencia urológica en nuestro país realizan de forma ambulatoria.

Métodos: Se realizaron en nuestro servicio 60 biopsias transrectales de próstata, guiadas por ultrasonido a pacientes consecutivos, con antígeno prostático específico
February first to May thirtieth of 2009, 56 patients were included in the present study based on inclusion criteria. They were randomly distributed into two groups of 29 (n = 29) and 27 (n = 27) patients. The anesthesia method used in the group of 29 patients was bilateral block of the pudendal nerves through perineal approach. Topical rectal anesthesia was applied to the group of 27 patients combined with oral analgesia with paracetamol. All patients were given a prophylactic quinolone antibiotic. Patients completed a visual analogue pain scale from 0 to 10 immediately after biopsy so that later comparison of the different biopsy stages (transrectal transducer introduction and needle punctures of the prostate during biopsy) could be made and the pudendal nerve block could be evaluated.

**Results:** Mean age was 66.93 ± 7.85 years, PSA level was 20.43 ± 35.79 ng/mL and prostate volume was 54.77 ± 21.82 in the pudendal nerve block group. Mean age was 67.33 ± 8.94 years, PSA level was 11.29 ± 5.07 ng/mL and prostate volume was 47.07 ± 18.45 in the topical rectal anesthesia and oral analgesic group. Mean number of core samples was 12 in both groups. Pain upon ultrasound transducer introduction was 1.21 ± 1.47 in the pudendal nerve block group and 3.48 ± 1.89 in the topical rectal anesthesia and oral analgesic group (P ≤ 0.001). Mean pain from needle puncture of the prostate was 1.93 ± 1.39 in the pudendal nerve block group and 3.78 ± 1.28 in the topical rectal anesthesia and oral analgesic group (P ≤ 0.001). Discomfort felt by patients during pudendal nerve block was 1.00 ± 0.96 with a 0-3 range.

**Conclusions:** In the group of patients studied, bilateral pudendal nerve block was shown to be an effective, quick and reliable method to be carried out by the urologist in outpatient transrectal prostate biopsy allowing the procedure to be carried out with ease for both the patient and the physician.

**Key words:** transperineal pudendal nerve block, anesthesia, pudendal nerve, transrectal ultrasound-guided prostate biopsy, prostate cancer, Mexico.
INTRODUCTION

Knowledge of pudendal nerve anatomy is essential for its anesthetic block. This nerve is formed by anterior branches of the second, third and fourth sacral nerve that emerge from the anterior sacral foramen. Accompanied by the internal pudendal artery, the pudendal nerve comes out of the pelvis by way of the large sciatic channel, posterior to the sacrospinous ligament and next to the sciatic spine; it makes a posterior turn and courses through Alcock’s canal, which is the tunnel fascia formed by the duplication of the obturator internus muscle, under the plane of the levator ani muscle on the lateral wall of the ischiorectal fossa. 1

Transrectal prostate biopsy (TRPB) is the most common procedure for detecting cancer in men. Numerous researchers have stated that no pain is manifested during this procedure in 10-40% of cases. However, a large number of studies have shown that patients consider the procedure to be extremely painful. Based on these findings, it is necessary to find a method to alleviate this complaint. The greatest pain has been identified when the transrectal transducer is inserted and needle punctures of the prostate are performed, due to periprostatic nerve stimulation. The pudendal nerve is responsible for afferent stimulation of the anorectal region. 2 In addition, no definitive conclusion has been reached as to which is the best method, given that some physicians prefer periprostatic block. 3 However, this block is not effective in managing pain arising from transrectal transducer insertion. 4 One study proved that the application of transrectal lidocaine combined with dimethyl sulfoxide (DMSO) is highly efficacious in pain management when compared with periprostatic infiltration. 5 Oral analgesia has been widely described and its effectiveness with tramadol was evaluated in a study carried out on 77 patients. 6

There are different anesthesia techniques for the patient with anorectal problems. 7 Patient pain perception per se has been studied prior to biopsy for the purpose of predicting which patients will feel more pain during the procedure. 8

The objective of the present study was to compare bilateral perineal pudendal nerve block effectiveness versus a classic technique applied in many Mexican hospital centers: oral analgesia plus topic rectal application of 10% lidocaine in outpatient ultrasound-guided TRPB (verbal reference). In addition, the best of the two abovementioned techniques was identified with no increase in procedure morbidity and bilateral pudendal nerve block usefulness was determined by putting both the patient and physician at ease to adequately carry out the study.

METHODS

An open experimental study was carried out.

Individuals and interventions: Transrectal ultrasound (TRUS)-guided prostate biopsy was performed on 60 consecutive patients from February 1 to May 30, 2009. Biopsy indication was prostate specific antigen (PSA) ≥ 4 ng/mL or digital rectal examination (DRE) that was suspicious for prostate cancer (CaP). All patients had given their informed consent prior to participating in the study. Patients allergic to lidocaine, presenting with coagulopathy or prostatitis or who did not cooperate with procedure evaluation were excluded from the study. Four patients were excluded. Patients were randomly distributed into 2 groups. One group was patients who received nerve block, initially 31 patients, 2 of whom were excluded due to lack of required data, leaving 29 (n=29). They were given perineal injection of 5 mL of simple lidocaine at 2% to bilaterally block the pudendal nerves. The other group was patients who did not receive nerve block, initially 29 patients, 2 of whom were eliminated from the study due to having to change the method of anesthesia, leaving 27 (n=27). They received topical rectal anesthesia with lidocaine at 10% combined with oral analgesia based on paracetamol three times a day for five days, beginning the day of the procedure. All patients received antibiotic prophylaxis with 500 mg ciprofloxacin BID one day before and five days after the procedure. Each patient completed the visual analogue scale (VAS) for pain immediately
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After the procedure, it consisted of a 10 cm line scaled from 0 to 10 and was used to later compare the different moments of the study, such as when the transducer was introduced and when the needle punctured the prostate to take the biopsy samples and to evaluate pudendal nerve block.

**Material:** A Bard® Magnum automatic biopsy gun was used with 20 cm 18-gauge tru-cut transrectal biopsy needles with 1.9 cm sample segment length and Esaote XVision My Lab 50® ultrasound equipment with 6.5 Hz endocavity transducer with transrectal prostate biopsy guidewire and 22-gauge Chiba needle.

**Technique:** With the patient in the lithotomy position and previous skin preparation with antiseptic solution, both ischial spines were palpated, bilaterally infiltrating the skin at this point with 2 mL of lidocaine, marking needle insertion site. Then, by means of DRE, left ischial tuberosity was palpated and the physician proceeded with percutaneous perineal insertion of the Chiba needle just under the ischial spines at the point of previous superficial infiltration. The needle was inserted 4-6 cm in a cephalic direction, slightly anterior to the patient, controlling the depth of the needle with the tip of the index finger in the rectum by feeling the needle move and the tissues compress. Needle position was corroborated by moving it slightly, taking great care to avoid perforating the rectum. At this point, 5 mL of simple lidocaine at 2% was infiltrated. The same procedure was carried out contralaterally. The patient was then changed to the left lateral decubitus position and with a minimum 5-minute pause or until the patient manifested the effect of cutaneous anesthesia in the perineal region and anal sphincter relaxation, indicating satisfactory nerve block. Then the procedure was begun, flexing the knees toward the chest.

**Statistical analysis:** Study variables in both groups were age, PSA level, number of cores taken, and prostate volume. Student t test was used for continuous values. Ordinal values were evaluated with the Mann-Whitney U test and nominal values with the Fisher exact test. Mean and SD were obtained and Student t test was used to evaluate variable equity. There was statistical significance when \( P < 0.05 \).

### Table 1. Levene test to evaluate variable fairness.

<table>
<thead>
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<th>Variable</th>
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<th>P</th>
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<td>Prostate volume</td>
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### Table 2. Variable distribution by group

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<td></td>
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<tr>
<td>Volume</td>
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<td>.186</td>
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<tr>
<td>Without block</td>
<td>27</td>
<td>11.78</td>
<td>1.155</td>
</tr>
</tbody>
</table>

Source: Urology Service, Hospital Regional Lic. Adolfo López Mateos, ISSSTE.

Image 1. Patient distribution by group.

Image 2. Percentage distribution of TRUS-guided prostate biopsy indication.

Source: Urology Service, Hospital Regional Lic. Adolfo López Mateos, ISSSTE.
RESULTS

From February to May 2009, TRUS-guided prostate biopsy was performed on 60 consecutive patients enlisted in the study who were randomly distributed into two groups. The first group was made up of an initial 31 patients. Two were eliminated from the study because data was not able to be gathered, leaving a total of 29 (n = 29). TRPB was carried out with bilateral pudendal nerve block as the only method of anesthesia. The second group initially was made up of 29 patients but 2 were eliminated from the study because they received a different anesthesia method, leaving a total of 27 (n=27). This group received paracetamol as oral analgesia and lidocaine at 10% as topical rectal anesthesia (Image 1).

There were no statistically significant differences between the two groups in relation to age (P = 0.704), prostate volume (P = 0.196) and cores taken during biopsy (P = 0.078). There was statistical difference in relation to PSA (P = 0.014) but the study objective was not considered to be affected by that datum (Table 1).

Table 2 shows data and SD in relation to age, PSA, prostate volume and the number of cores obtained. Regarding TRUS-guided prostate biopsy indication, there was biochemical PSA elevation in 85.7% of patients, a combination of PSA elevation and positive DRE in 12.5% and positive DRE in 1.8% (Image 2).

Pain evaluation upon introduction of US transducer in the patients of the first group had a mean pain VAS of 1.21 ± 1.47 with a 0-5 range and the second group had a mean pain VAS of 3.48 ± 1.89 with a 0-7 range, producing a P ≤ 0.001 (Table 3).

Needle punctures of the prostate to collect cores in the first group resulted in a mean 1.93 ± 1.39 with a 0-5 range and a mean 3.78 ± 1.28 with a 1-7 range for the second group, producing a P ≤ 0.001 (Table 4).

In the first group pain felt by patients during pudendal nerve block was measured, obtaining a very satisfactory result of 1.00 ± 0.96 with a 0-3 range.

Image 3 gives an idea of the entire procedure with the comparison of the two methods of anesthesia.

DISCUSSION

Periprostatic block is applied in various Mexican hospital centers (verbal reference). However, the disadvantage of this technique is that it does not anesthetize the perineal region which can result in significant pain for some patients upon transrectal introduction of the transducer.2-5 Unilateral perineal pudendal nerve block has been tested in a study,2 but pain VAS values were higher than those of the present study at the moment of transducer insertion, while similar values were obtained for needle puncture and block procedure.

A study comparing different anesthesia methods during TRPB concluded that dimethyl sulfoxide combined with intrarectal lidocaine, with a waiting period of 10 minutes, is the best anesthesia method for

<table>
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<th>Group</th>
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<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>SD</th>
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<td>0</td>
<td>5</td>
<td>1.21</td>
<td>1.47</td>
</tr>
<tr>
<td>Without block</td>
<td>27</td>
<td>1</td>
<td>7</td>
<td>3.78</td>
<td>1.28</td>
</tr>
</tbody>
</table>

Source: Urology Service, Hospital Regional Lic. Adolfo López Mateos, ISSSTE.
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The results of the present study were similar to said method, making it of interest to compare these two types of anesthesia including cost, time and efficiency to see which was more advantageous. Pudendal nerve block was not evaluated in said study. Different forms for counteracting transducer insertion discomfort have been studied. Perianal/ pericapsular anesthesia was evaluated in patients presenting with anal problems as a possibility for pain control in these subjects.

In the present study, bilateral pudendal nerve block was found to be a procedure easy for the urologist to learn and put into practice. Performance confidence is gained after 2-4 procedures. There were no serious reactions in patients of the present study. No patient needed emergency room attention nor were there any eventualities in posterior appointments. Two patients presented with mild transitory fecal incontinence (less than one hour) and 8 patients presented with postmiictional drip, urgency and incomplete bladder voiding sensation but it was not able to be determined whether these symptoms were secondary to TRPB or to the nerve block per se and patients referred to these symptoms as mild. In general the procedure was well-tolerated and patients were at ease during biopsy, allowing the physician to evaluate needle puncture site well with no brusque movements by the patient. The resources used did not vary much from those normally used in any other anesthesia procedure.

**CONCLUSIONS**

Transperineal pudendal nerve block was identified in the present study as a safe and efficacious method that is easy to learn for the urologist who performs TRUS-guided prostate biopsy as an outpatient procedure. Satisfactory anesthesia results were obtained, especially upon transrectal transducer insertion which facilitated ease for both the physician and patient during the procedure. It is the authors’ opinion that further studies can be carried out on this technique comparing it with other commonly used anesthesia methods and with those methods presently considered to be the best, and evaluating its effectiveness in patients presenting with anal problems or in those patients indicated for US-guided saturation TRPB.

**BIBLIOGRAPHY**