



Pan African Urological Surgeons' Association

African Journal of Urology

www.ees.elsevier.com/afju
www.sciencedirect.com



The contribution of periapical nerve block in transrectal ultrasound-guided prostate biopsy: Results from a prospective randomized trial

T. Ould Ismail*, A. Janane, Y. Dakkak, J. Eloundo, J. Chafiki, M. Ghadouane, A. Ameer, M. Abbar

Department of Urology, Military hospital for Instruction MEDV, Rabat, Morocco

Received 16 June 2011; received in revised form 8 April 2012; accepted 9 May 2012

KEYWORDS

Prostate;
Anesthesia;
Nerve block;
Biopsy

Abstract

Objective: Periprostatic nerve block has been shown to be the most effective method to reduce pain during transrectal ultrasound (TRUS) guided prostate biopsy, but the ideal technique remains controversial. The aim of this study was to compare pain control between bilateral basal block (BBB) alone and BBB combined with periapical nerve block (PNB).

Patients and methods: From November 2007 to May 2009, 182 consecutive patients with abnormally elevated serum prostate-specific antigen (PSA) or suspicious digital rectal examination (DRE) underwent TRUS-guided needle biopsy of the prostate. The patients were prospectively randomized after informed consent had been obtained. Group 1 ($n=90$) underwent bilateral basal block (BBB) with periprostatic infiltration of 8 ml 1% lidocaine into the neurovascular bundle at the prostate-seminal vesicle junction on each side. Group 2 ($n=92$) underwent BBB with the addition of periapical nerve block (PNB) using 2 ml 1% lidocaine per side. A visual analog scale (VAS) was used to evaluate the patient's perception of pain during the biopsy.

Results: The mean patient age was 64.6 ± 8.2 years and the average VAS was 1.9 ± 2.0 . The mean VAS was lower in Group 2 compared with Group 1, 1.6 ± 1.9 versus 2.2 ± 2.0 ($p=0.026$). In the subgroup aged 56–65 years the mean VAS was 1.26 ± 0.6 in Group 1 versus 2.46 ± 0.5 in Group 2 ($p=0.001$), and in the subgroup aged 66–87 years it was 1.41 ± 0.5 in Group 1 versus 1.66 ± 0.75 in Group 2 ($p=0.554$).

* Corresponding author.

E-mail address: rghibe96@yahoo.fr (T. Ould Ismail).

Peer review under responsibility of Pan African Urological Surgeons' Association.



Production and hosting by Elsevier

Conclusions: BBB combined with PNB seems to be more effective to BBB alone to reduce pain during TRUS-guided prostate biopsy and may be of maximum benefit for younger patients.

© 2012 Production and hosting by Elsevier B.V. on behalf of Pan African Urological Surgeons' Association. Open access under [CC BY-NC-ND license](#).

Introduction

Transrectal ultrasound (TRUS)-guided prostate needle biopsy is a common office procedure for diagnosing prostate cancer. It has been reported that this procedure is perceived as painful by 96% of patients, and 20% considered the pain severe [1]. Several investigators have advocated injection of periprostatic local anesthetic before TRUS biopsy to reduce patient pain [2].

Periprostatic nerve block has been presented as the most effective technique of pain control for TRUS-guided prostate biopsy. Because of the results from anatomic studies showing that the neuroanatomic pathway originates from the inferior hypogastric plexus located at the tip of the seminal vesicles and passes between the prostate and rectum on the inferolateral border of the prostate, the initial studies focused on bilateral injections at the junction of the base of the prostate and seminal vesicles. Many different injection sites, local anesthetic agents and doses have been described [3].

In this prospective, randomized study we evaluated the benefit of adding periapical 1% lidocaine infiltration in addition to periprostatic infiltration at the prostate-seminal vesicle junction.

Patients and methods

From November 2007 to May 2009, 182 consecutive patients with abnormally elevated serum prostate-specific antigen (PSA) or suspicious digital rectal examination (DRE) underwent TRUS-guided needle biopsy of the prostate. Exclusion criteria included lidocaine allergy, hemorrhagic diathesis, anticoagulation therapy, urinary infection and anorectal pathology.

Prostatic biopsies (12–16 cores taken from the apical margin, base, median and lateral areas) were performed with the patient in the left lateral decubitus position using a 6.5 MHz TRUS probe (Hitachi®) with an 18 gauge Tru-cut needle powered by a biopsy gun (Fig. 1). Antibiotic prophylaxis consisted of oral ciprofloxacin 500 mg.

The patients ($n=182$) were prospectively randomized after informed consent had been obtained. Group 1 ($n=90$) underwent

bilateral basal block (BBB) with periprostatic infiltration of 8 ml 1% lidocaine into the neurovascular bundle at the seminal vesicle base on each side using a 7-inch 22 gauge spinal needle. Group 2 ($n=92$) underwent BBB with the addition of periapical nerve block (PNB) using 2 ml 1% lidocaine per side.

Immediately after the procedure, another operator requested the patients to complete a visual analog score (VAS) questionnaire about pain during the biopsy, using a scale of 0 (no pain) to 10 (maximal pain). Patients were followed up for 15 days and all complications were recorded, including rectal bleeding, hematuria, urinary retention, vasovagal reaction, fever, hematospermia, and urinary tract infection.

Statistical analysis was performed using Fisher's exact and Mann-Whitney tests (Statistical Package for the Social Sciences (SPSS) version 11.5.1, Chicago, IL) with $p < 0.05$ considered significant. Values are expressed as mean \pm standard deviation.

Results

There were no significant differences between the study groups with regard to patient age, prostate volume or serum PSA, but the mean VAS was significantly lower in Group 2 (Table 1).

The mean VAS was significantly lower in Group 2 compared with Group 1, in the subgroup of patients aged 56–65 years but not in the subgroup aged 66–87 years ($p=0.554$) (Fig. 2).

No complications occurred from the local anesthetic injection. Prostatitis requiring hospitalization and antibiotic treatment was documented in one patient of each group. No macroscopic hematuria lasting more than 2 days, urinary incontinence, retention or rectal bleeding developed.

Discussion

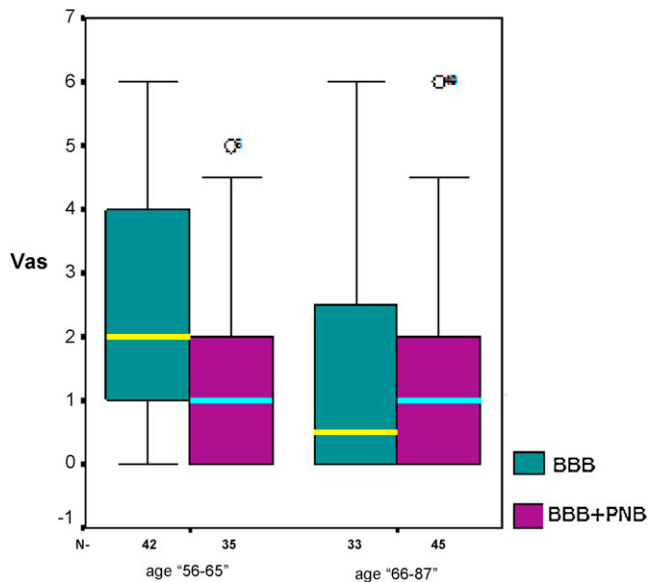
There is strong evidence in published reports that local anesthesia should be a routine part of prostate biopsy. Periprostatic nerve block may be the most effective method, although the ideal



Figure 1 Conditions of prostatic biopsy.

Table 1 Characteristics of the study groups.

	Group 1	Group 2	p-Value
Mean patient age (years)	63.5 ± 7.9	65.7 ± 8.5	0.064
Mean (range) serum PSA (ng/ml)	7.8 (2.56–1412)	9.9 (1.4–7609)	0.098
Mean prostate volume (cc)	54.3 ± 23.4	51.8 ± 21.0	0.543
Mean VAS	2.2 ± 2.0	1.6 ± 1.9	0.026

**Figure 2** VAS in Group 1 (BBB) compared with Group 2 (BBB + PNB) in patients aged 56–65 compared with 66–87 years.

technique remains to be established [3]. Cadaver studies have shown that the neuroanatomic pathway originates from the inferior hypogastric plexus located at the tip of the seminal vesicles and passes between the prostate and rectum to the inferolateral border of the prostate [4].

Various infiltration sites have been studied, including the apex only, bilateral neurovascular bundle regions only (defined variously as basolateral, posterolateral, periprostatic nerve plexus, prostate-vesicular junction), apex and neurovascular bundle, three locations (base, mid and apex) posterolateral, and lateral to the tip of the seminal vesicles [5].

The prostatic capsule has a rich autonomic innervation conveying visceral pain to the spinal cord through fibers coursing with the vascular pedicles and terminating in the inferior hypogastric plexus [4]. Therefore, infiltration of the neurovascular bundle region seems essential for effective anesthesia. However, apical infiltration alone has also been reported to provide significant pain relief. In one study, pain relief with apical infiltration alone was reported to be superior to infiltration at the neurovascular bundle region [6,7].

Akan et al. [3] compared periprostatic nerve blockade using a single apical injection of lidocaine versus bilateral injections at the base of the prostate and suggested that both techniques are effective in terms of pain prevention during TRUS-guided prostate biopsy, with better results in the single apical injection group.

Cevic et al. [5] performed a prospective, randomized study evaluating the benefit of adding periapical prostatic anesthesia to periprostatic infiltration of the prostate- seminal vesicle junction and concluded that additional apical infiltration did not reduce patient discomfort further. However, they used only 2 ml infiltration at the prostatic apex on one side. Increasing the time elapsed between the anesthetic infiltration and the biopsy procedure may further improve pain control.

In our study, the addition of periapical nerve block with an injection on either side of the apex significantly reduced pain. Nguyen and Jones [8] observed that the local anesthetic can disperse to the contralateral side when injected laterally at the apex. However, this could be the subject of a new study to investigate the difference in pain scores between those receiving single versus bilateral apical injections. Some investigators suggested that apical injection reduced pain perception in the areas near the prostatic base by a retrograde effect [6].

Many investigators believe that a younger patient age predisposes to increased pain perception. In the European Prostate Cancer Detection Study, Djavan et al. [9] found significantly increased pain perception during prostate biopsy in patients younger than 60 years when using no anesthesia. However, when patients received local anesthesia, Kaver et al. [10] found no difference in pain perception among patient groups younger than 60, 60–70, and older than 70 years. In other studies, patients younger than 60 years reported significantly greater VAS scores [5,11]. However, this statistically significant difference did not translate into a meaningful clinical difference, because the mean VAS for all age groups was less than 2 in the locally anesthetized patients. The explanation may be that younger patients experience prostate biopsy as a more painful experience unless locally anesthetized.

In our study, the difference in the mean VAS score in patients younger than 65 years was statistically significant.

Conclusion

BBB combined with PNB seems to be more effective than BBB alone to reduce pain during TRUS-guided prostate biopsy and may be of maximum benefit for younger patients.

Conflict of interest

The authors declare that they have no conflict of interest.

References

- [1] Zisman A, Leibovici D, Kleinmann J, et al. The impact of prostate biopsy on patient well-being: a prospective study of pain, anxiety and erectile dysfunction. *Journal of Urology* 2001;165:445–54.

- [2] Hergan L, Kashefi C, Parsons JK. Local anesthetic reduces pain associated with transrectal ultrasound-guided prostate biopsy: a meta-analysis. *Urology* 2007;69:520–5.
- [3] Akan H, Yıldız O, Dalva I, Yücesoy C. Comparison of two periprostatic nerve blockade techniques for transrectal ultrasound-guided prostate biopsy: bilateral basal injection and single apical injection. *Urology* 2009;73:23–6.
- [4] Hollabaugh Jr RS, Dmochowski RR, Steiner MS. Neuroanatomy of the male rhabdosphincter. *Urology* 1997;49:426–34.
- [5] Cevic I, Dillioglugil O, Zisman A, Akdas A. Combined periprostatic and periapical local anesthesia is not superior to periprostatic anesthesia alone in reducing pain during Tru-cut prostate biopsy. *Urology* 2006;68:1215–9.
- [6] Schostak M, Christoph F, Müller M, et al. Optimizing local anesthesia during 10-core biopsy of the prostate. *Urology* 2002;60:253–7.
- [7] Seymour H, Perry MJA, Lee-Eliot C, et al. Pain after transrectal ultrasonography-guided prostate biopsy: the advantages of periprostatic local anesthesia. *BJU International* 2001;88:540–4.
- [8] Nguyen CT, Jones JS. Comparison of traditional basal and apical periprostatic block: impact on injection pain and biopsy pain. *BJU International* 2007;99:575–8.
- [9] Djavan B, Waldert M, Zlotta A, et al. Safety and morbidity of first and repeat transrectal ultrasound guided prostate needle biopsies: results of a prospective European prostate cancer detection study. *Journal of Urology* 2001;166:856–60.
- [10] Kaver I, Mabjeesh NJ, Matzkin H. Randomized prospective study of periprostatic local anesthesia during transrectal ultrasound-guided prostate biopsy. *Urology* 2002;59:403–8.
- [11] Ozveri H, Cevik I, Dillioglugil O, et al. Transrectal periprostatic lidocaine injection anesthesia for transrectal prostate biopsy: a prospective study. *Prostate Cancer and Prostatic Diseases* 2003;6:311–4.