Local anesthesia by periprostatic block in transrectal ultrasound guided prostatic biopsy

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Periprostatic block

Abstract  Objective: To evaluate the efficacy of local anesthetic by peri-prostatic block in decreasing the pain and discomfort experienced by patients undergoing transrectal ultrasound (TRUS)-guided biopsy of prostate.

Patients and methods: Fifty patients were submitted for TRUS-guided prostate biopsy. Patients were randomized in two groups: group-I, with 25 patients submitted to local anesthesia by 5 ml of 1% lidocaine injected at each side at the Mount of Everest and group-II, with 25 patients who underwent TRUS biopsy by conventional method with local xylocaine cream. After biopsy, patients were questioned about pain intensity during the procedure, using a grading scale from 0 to 10. Side effects and later complications of the procedure were also evaluated.

Results: Group I patients with peri-prostatic block had a significantly lower pain score compared with group II without LA. In LA group the mean pain scores were 3.0 ± 1.8 and in group II patients with conventional method of biopsy it was 6.4 ± 2.2 (p < 0.001). There were no significant problems associated with LA infiltration.

Conclusion: TRUS-guided prostate biopsy is a traumatic and painful experience, but the peri-prostatic blockage use is clearly associated with more tolerance and patient comfort during the exam.

1. Introduction

Transrectal ultrasound-guided prostate biopsy became essential in diagnostic investigation of patients with clinical suspicion of prostatic neoplasia due to gland alterations on physical examination, or rising of the prostatic specific antigen (PSA) [1,2]. Prostatic biopsy indication is increasing in the last years owing to increase in life expectancy, better diagnostic methods, and Public Health Campaign intensification [3,4].

This procedure is performed on most centers, without any kind of anesthesia or sedation [5,6]. Besides the embarrassment...
and the anxiety, this exam is almost always accompanied by pain sensation, because of transrectal ultrasonography (TRUS) probe introduction, or by biopsy itself [7]. Some series show that 11–90% of patients have pain during the exam, making the realization of this diagnostic procedure traumatic [8,9]. However, the method of pain measurement by several studies has been subjective, underestimating sometimes the real upset suffered by the patients.

Recently there has been increasing interest in various methods for providing local anesthesia during the procedure.

Our aim was to evaluate the efficacy of local anesthetic by peri-prostatic block in decreasing the pain and discomfort experienced by patients undergoing transrectal ultrasound (TRUS)-guided biopsy of prostate.

2. Patients and methods

Between May 2012 and January 2013 fifty patients were referred to our department at Ain Shams University hospitals for TRUS biopsy and were included in our study.

Inclusion criteria for biopsy included (1) Abnormal digital examination, and/or (2) Abnormal TRUS, and/or (3) Elevated PSA (>4 ng/ml).

Fig. 1 65-Year old male patient with senile enlargement of the prostate referred to us for TRUS guided biopsy due to elevated PSA (5 ng/ml). Starting with the right side, sagittal ultrasound view (A) shows white pyramidal site between the prostate and the seminal vesicle laterally “Mount Everest sign” (arrow). The 22-gauge, 7-inch spinal needle placed through the biopsy guide channel under ultrasound guidance (B) into the area where the prostatic innervations enter (arrows) followed by injection of 10 ml lidocaine. The ultrasonic wheal (arrows) is seen as a hypoechoic filling of the Mount Everest site (C) dissecting along the nerve to bathe the entire ipsilateral prostatic innervation. The same steps are repeated on the left side (D–F).
Exclusion criteria included (1) Lidocaine and diclofenac allergy, (2) hemorrhagic diathesis, anticoagulation therapy (users of drugs affecting coagulation), (3) acute prostatitis, inflammatory diseases, or other rectal conditions, (4) patients with painful anal condition and (5) an inability to rate a visual analog scale (VAS).

Approval of the institutional committee was taken. Patients received 500 mg ciprofloxacin the night before and two hours prior to the procedure. Once informed, consent was obtained, patients were randomized into two groups, Group-I (peri-prostatic local anesthesia); Group-II (conventional biopsy method).

All the patients were examined at left lateral decubitus, intrarectal application of 20 mL of hydrophilic gel lubricant was used for both groups, then local xylocaine cream was applied to group II patients. After 10 min, TRUS for the prostate with 7.5 MHz multiplanar probe was performed. In group I patients after assessing the prostate size, echo pattern and architecture, the probe was adjusted to the sagittal plane, with the on-screen biopsy guide operational before placement. A 22-gauge, 7-inch spinal needle was placed through the biopsy guide channel under ultrasound guidance (Figs. 1 and 2)B into the area where the prostatic innervations enter the gland. The probe was angled laterally until the notch between the prostate and the seminal vesicle was visualized. The fat in this notch is present in all patients and creates what is called the “Mount Everest sign,” (Figs. 1 and 2)A because it has a white pyramidal appearance.

Lidocaine (5 mL) is injected on each side. Successful placement of the needle is confirmed when the injectate causes a separation of the seminal vesicles and prostate from the rectal wall (the ultrasonic wheal), (Figs. 1 and 2)C.

![Case2](image-url)

Fig. 2 62-Year old male patient with senile enlargement of the prostate referred to us for TRUS guided biopsy due to hard nodule felt by PR. Ultrasonography revealed no suspicious nodules, followed by TRUS guided biopsy preceded by local anesthesia. The probe is angled to the right side in sagittal view (A) to display Mount of Everest sign (arrowed) followed by injection of 10 ml lidocaine by 7-inch spinal needle (arrowed) in the site of Mount of Everest sign (B). Successful injection is seen by the ultrasonic wheal (arrows). (C). The same steps are repeated on the left side (D and E).
Directing the anesthetic to the proper plane is facilitated by injecting the anesthetic as the needle enters the space, so as to expand its distance, and then pulling back slightly to open the potential space until anesthetic is seen dissecting caudally, as depicted in the images below. The space between the rectal wall and the prostate widens when the anesthetic dissects this plane. The TRUS guided biopsies were performed using a GE LOGIQ 9 ultrasound machine with a 7.5 MHz probe using 18G needle immediately following LA injection without waiting period. 6–12 cores were obtained with our biopsy protocol including routine sextant biopsies and additional cores were obtained as necessary according to any suspicious lesion.

Before the examination, patients received a Visual analogical scale (VAS) for pain which was explained to them (Fig. 3). The assessment ranges from 0 (no pain) to 10 (unbearable pain). Immediately following the procedure patients were asked to grade the pain they experienced rating it from 0 to 10. The results were analyzed using an unpaired t-test after which the investigators were unblinded as to which group was the peri-prostatic block and which was the conventional biopsy method.

Patients were reviewed for any complications immediately after the procedure and after two weeks, like rectal bleeding, gross hematuria, hemospermia, dysuria, and fever.

3. Results

Of 50 patients, 25 were included in Group I (periprostatic block), and 25 in Group II (conventional biopsy). Patients’ mean age was 65 years, mean PSA was 17 ng/mL, prostatic volume evaluated by TRUS was 63 and number of biopsy cores were 6–12 (mean 10) (Table 1).

Group I had significantly lower VAS pain scores compared to group II with mean pain scores of 3.0 ± 1.8 in group I and 6.4 ± 2.2 in group II (p < 0.001). The difference is statistically significant using an unpaired t-test.

Among the patients submitted to conventional biopsy (Group II), 7% of patients had VAS score 1, 9% had VAS score 2, 16% had VAS score 3, 18% had VAS score 4, 23% had VAS score 5, 7% had VAS score 6, 8% had VAS score 7, 8% had VAS score 8, 3% had VAS score 9 and 1% of patients had VAS score 10. But in the group where periprostatic block was performed (Group I), 9% of patients had VAS score 1, 37% had VAS score 2, 31% had VAS score 3, 7% had VAS score 4, 6% had VAS score 5, 5% had VAS score 6, 3% had VAS score 7, 2% had VAS score 8 and No patient had VAS score 9 or 10 (Fig. 4).

Complications observed were hamaturia, hemospermia, anal bleeding, fever, and prostatitis. (Table 2). No morbidity predominated among the groups.

4. Discussion

Prostate cancer diagnosis has been revolutionized by the use of PSA and TRUS-guided biopsy. Takahashi and Ouchi first introduced TRUS of the prostate in 1963 [10]. Hodge et al. [11] performed the first systematic sextant biopsy of the prostate. Currently TRUS-guided biopsy is the gold standard technique for obtaining biopsy of the prostate gland [12]. Though this has been performed routinely for more than a decade without any anesthesia, it is not without significant discomfort.

![Fig. 3 Visual Analog Scale for pain.](image)

![Fig. 4 Comparison of visual analog pain scores for patients with periprostatic block (group I) (blue bars) and patients with conventional TRUS biopsy (group II) (red bars). Pain scores recorded by group I patients were significantly lower.](image)

### Table 1  Characteristics of study group.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Biopsy with periprostatic local anesthesia</th>
<th>Conventional biopsy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients (n)</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>Age (years)*</td>
<td>60.9 (±07.5)</td>
<td>66.0 (±06.3)</td>
</tr>
<tr>
<td>mean ± SD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PSA (NG/ML)*</td>
<td>15.7 (±12.3)</td>
<td>19.5 (±14.9)</td>
</tr>
<tr>
<td>mean ± SD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prostatic volume (g) mean ± SD</td>
<td>73.9 (±15.1)</td>
<td>77.2 (±26.7)</td>
</tr>
<tr>
<td>Number of biopsies mean ± SD</td>
<td>10 (±0.6)</td>
<td>10 (±0.9)</td>
</tr>
</tbody>
</table>

* p > 0.05.

### Table 2  Number of patients that presented complications when compared periprostatic block and conventional biopsy.

<table>
<thead>
<tr>
<th>Complications</th>
<th>Biopsy with periprostatic local anesthesia</th>
<th>Conventional biopsy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hematuria</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Hemospermia</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Fever</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Anal bleeding</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Prostatitis</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>
Recently, various types of local anesthesia have been proposed to reduce the pain and decrease the discomfort associated with prostate biopsy. Though improvements in the biopsy procedure have been introduced over the years, pain and discomfort still remain the most common side effects. This does not mean that general anesthesia should be used routinely for TRUS guided prostate biopsy [13–15].

In our study local anesthesia depends on blocking all possible routes of painful stimuli through injection of LA at the notch between the prostatic base and the seminal vesicles (Mount Everest).

LA infiltration of the neurovascular bundles bilaterally should therefore be effective and has been used in some studies [16,17] as well as in the technique that we have used. Though there is a theoretical risk of vascular injury with this site of infiltration, we have not seen any in our experience and to our knowledge none have so far been reported in the literature. Biopsies of the basal and mid zones of the prostate tend to involve puncture of the rectal mucosa that has no innervation for sharp stimuli.

Different attempts have been made to investigate the use of anesthesia in maintaining a VAS pain score at the lowest possible level (less than 4 for the mean data). Complications after anesthesia or biopsy were the same for both groups (hematuria, anal bleeding, fever, and prostatitis) and were rare. As generally described in the literature, no major complication was found, the most common minor complications being hematuria or hemospermia.

The obvious necessity of reducing discomfort of TRUS-guided prostate biopsy is represented by the increasing number of recent papers in this field. Collins et al. [18] reported that 20 (22%) of the patients had pain during the procedure. Desgrandchamps et al. [19] observed moderate to severe pain (VAS score 6–10) in 13 (12%) of 109 patients. Peyromaure et al. [20] reported that only 51 (18.6%) of 275 patients submitted to prostate biopsy with 10 fragments, related no pain or discomfort. However, Aus et al. [21] observed this symptom in only 24 (7%) of 343 patients studied.

However, in our study, 26% of patients undergoing prostate biopsy with the conventional method had VAS pain score > 5 yet with peri-prostatic block there was an important reduction of pain being only 5% of patients had VAS pain score > 5, with no additional complication.

Tavera et al. [22] reported that 93 (93%) of 100 patients had from absence of pain to moderate pain (VAS pain score 0–5) with periprostatic blockage performed with 10 ml of 1% lidocaine, compared to the presence of moderate to severe pain (VAS pain score 6–10) in 55 (55%) of 100 patients where no anesthetic procedure was performed. Of 25 patients in our study submitted to local peri-prostatic anesthesia with lidocaine, 22 patients (90%) had VAS pain score 0–5, just 3 patients (10%) had VAS pain score 6–10.

The statistical difference observed confirms the peri-prostatic blockage superiority when compared to conventional biopsy with local xilocaine cream. Due to anesthetic blockage of capsular sensitive fibers, there is an important reduction in pain sensation related by patients. As the procedure progresses, the patient feels less anxious and more relaxed, not contracting the pelvic muscles, making the exam more tolerable.

5. Conclusion

Periprostatic local anesthesia promotes significant pain reduction, making the TRUS-guided prostate biopsy well tolerated by the patients. We believe that some analgesia method must be routinely performed during this exam. There are no doubts that our data show the statistic superiority of peri-prostatic blockage compared to conventional biopsy group. Biopsy becomes much more soothing and tolerable with local xilocaine cream, but local anesthesia by peri-prostatic block with lidocaine is a mode of anesthesia which is safe and effective in reducing discomfort.

In this context, the periprostatic anesthesia is a feasible and low cost option, and can be performed as an outpatient procedure with no additional morbidity.

Conflict of interest statement

The authors have no conflict of interest to declare.

References


