The combined role of Intravenous sedation and local periprostatic nerve block in pain reduction during transrectal ultrasound guided biopsy of the prostate

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Purpose

To evaluate pain relief during transrectal ultrasound guided prostate biopsy (TRUSPB). Three methods are compared; intravenous diazepam alone, local peri-prostatic nerve block alone in addition to combination of the 2 previous methods. And to evaluate if there is any increase in the incidence of complications when employing either method.

Prostate biopsy under transrectal ultrasound (TRUS) guidance is considered the procedure of choice for diagnosing prostate cancer (1). And as in any other diagnostic biopsy procedures; patients perceive anxiety before, during and after biopsy and ultrasound guided prostate biopsy is not an exclusion. (1)

TRUS guided prostatic biopsies are mainly performed in an outpatient clinic, men undergoing transrectal prostate biopsy experience considerable psychological stress. (2) It may be attributable to the fear of the potential diagnosis of cancer, the anal route of penetration, the fact that the subject organ examined is part of the sexual system and the anticipated pain and as a matter of fact the issues of discomfort and pain perceived throughout the procedure referred to the negative impact of the whole procedure, that is probe insertion and biopsy punctures. (3)

Thus it is essential to employ a simple method that can liberate the patient from pain during prostate biopsy. (1,4) by employment of a simple form of anesthesia. (5)

Studies so far addressing the benefit of local pain control during TRUS guided prostate biopsy resulted in controversial findings, regardless of the method of local anesthetic application. (6)

In our own knowledge, it is the first time to discuss The combined role of Intravenous sedation and local periprostatic nerve block in pain reduction during trans-rectal ultrasound-guided biopsy of the prostate.
Methods and Materials

336 patients of age ranging from 43-98 years old underwent TRUSPBs patients were randomized into 3 equal groups; either to receive intravenous diazepam 5 mg slowly (Group I) or bilateral periprostatic nerve block by 10 ml of 1% lidocaine solution injected under ultrasound guidance (Group II) or having combined intravenous diazepam and periprostatic nerve block (Group III). Pain during biopsy was assessed using a 10 points visual analog pain scale (VAS).

From November 2011 to November 2012, 336 patients fitted our inclusion criteria underwent transrectal ultrasound-guided prostate biopsy (TRUSPB).

Indications for biopsy included abnormal digital rectal examination, elevated PSA or focal abnormality in TRUS.

Patient with previous allergy to diazepam or lidocaine, bleeding diathesis, anticoagulant therapy, history of chronic prostatitis, acute anal and rectal conditions (as haemorrhoids, anal fissures or strictures), neurological conditions or patients with respiratory asthma or chronic liver diseases were excluded from the study.

Informed consent was obtained from all patients after detail description of the study.

Bowel preparation with cleansing enema (a sodium phosphate and dibasic sodium phosphate enema) and antibiotic prophylaxis with Levofloxacin 500 mg. was prescribed.

Patients were randomized into three equal groups where **Group I**: to receive intravenous diazepam 5 mg slowly just before probe insertion **Group II**: received 10 cc of 1% Lidocaine injected into the periprostatic nerve plexus bilaterally under ultrasound guidance using a 22 gauge 7 inch needle, prior to injection caution was taken to aspirate before injection to avoid accidental intravascular injection of lidocaine, proper needle placement (fig.1) and injection of lidocaine a sonographic hypoechogenicity is created between the rectal wall and the base of the seminal vesicles causing the seminal vesicles to separate from the rectal wall and appear to be raised (fig.2 &3) prostate biopsies had begun 2 to 3 minutes after lidocaine injection.

**Group III**: intravenous diazepam 5 mg slowly just before probe insertion and 10 cc of 1% Lidocaine injected into the periprostatic nerve plexus bilaterally under ultrasound guidance.

Prostatic biopsies was performed in combined directed and random technique or extended random technique in absence of focal abnormality with mean number of biopsies 10 biopsies (9 to 12 biopsy) were done per patient.
The sedation scale were evaluated according to the following sedation scale (18)

Table 1. sedation scale used (quoted from song etal. (18))

<table>
<thead>
<tr>
<th>Response</th>
<th>Sedation scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>No response to shaking</td>
<td>1</td>
</tr>
<tr>
<td>Responds only to shaking</td>
<td>2</td>
</tr>
<tr>
<td>Responds only to name call loudly</td>
<td>3</td>
</tr>
<tr>
<td>Lethargic response to name spoken to normal tone</td>
<td>4</td>
</tr>
<tr>
<td>Responds readily to name spoken in normal tone</td>
<td>5</td>
</tr>
</tbody>
</table>

After the procedure discomfort and pain experienced during performing the biopsy technique was graded using a 10-point linear visual analog pain scale (fig.4)

All patients were monitored during and after the procedure for possible complications, patients were also questioned regarding any adverse effect at one week duration (at the time of receiving the histopathological results).
Fig. 1: Site for periprostatic lidocaine injection "Mount Everest sign" (arrow) is white pyramid identified in the sagittal plane created by hyperechoic fat in notch between seminal vesicle (SV) and prostate (P) laterally.

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Fig. 2: sagittal image pre injection of periprostatic lidocaine

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Fig. 3: sagittal image post injection of periprostatic lidocaine the signs of proper injection with a hypoechoic wheel and apparent elevation of the SV

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Fig. 4: Modified linear visual analog pain scale
Results

336 patients were enrolled in our study randomized into three equal groups including 112 patients per group, patients age ranged from 44-92 with (mean 62) as in group I patients age was 44-82 (mean 61±8.7) while in group II the patients age ranged from 49-92 (mean 62.1 ±9.1) and that of Group III (mean 62.5 ±9.7); Regarding the PSA there was no significant difference regarding the mean value (F= 0.02, P=0.998) as it was 11.7 , 11.5 and 11.7 ng/ml. for group I,II and III respectively. While the mean prostate volume for group I was (30±13) cc , for group II was (36±16.4) cc and that of group III was (29±1.6) cc. without any statistical significant difference (F= 1.65, P=0.195)

The sedation scale in patients of group I and III was ranging from 2-4 according to sedation scale with mean 3 scale

The injection of local anesthetic agent was completed in less than one minute in all patients of group II and III, no additional time delay before proceeding to biopsy in any case where the average procedure time were 12-14 and its mean =13 minutes for group I and 13-15 minutes and its mean=14 min. for group II and 12-15 minutes and its mean=14 min. for group III, this is followed by bimanual compression for 1 min.

Table 2. Demographic characteristics of the patients

<table>
<thead>
<tr>
<th>Patient group</th>
<th>Group I</th>
<th>Group II</th>
<th>Group III</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of patients</td>
<td>112</td>
<td>112</td>
<td>112</td>
</tr>
<tr>
<td>Age range (mean±SD)</td>
<td>44-82 61.4±8.7</td>
<td>49-92 62.1±9.1</td>
<td>44-82 62.5±9.7</td>
</tr>
<tr>
<td>Mean PSA</td>
<td>11.7</td>
<td>11.5</td>
<td>11.7</td>
</tr>
<tr>
<td>Mean prostate volume</td>
<td>30±1.2</td>
<td>36±16.4</td>
<td>29±1.6</td>
</tr>
<tr>
<td>SUM number of biopsy cores (mean±SD)</td>
<td>1092 9.7±3.2</td>
<td>1107 9.8±3.3</td>
<td>1094 9.7±3.3</td>
</tr>
<tr>
<td>Number of cases positive for malignancy (%)</td>
<td>56 (50%)</td>
<td>28 (25%)</td>
<td>44 (39%)</td>
</tr>
</tbody>
</table>
Average duration in minute | 12-14 | 13-15 | 12-15
--- | --- | --- | ---
Mean pain score (±SD) | 4.95±1.1 | 4.1±1.37 | 2.18±1.6

In all cases vital signs were determined before and after the biopsy; all patients had normal vital signs, there were no noted patients' complications due to anaesthesia injection as significant rectal wall haematoma, excessive rectal or urethral bleed or evident lidocaine toxicity. Patients were followed up after one week, none of them had complained of persistent haematuria or rectal bleeding lasting more than 5 days. No major infectious complications that would require hospitalization were encountered. No significant statistical finding were found to occur in the study groups due to the mode of anaesthesia employed, No symptoms or signs of lidocaine toxicity or over dosage were found. No symptoms or signs of lidocaine or diazepam toxicity or over dosage were found.

Table 3. Complications encountered in the study

<table>
<thead>
<tr>
<th>complication of biopsy</th>
<th>group I</th>
<th>group II</th>
<th>group III</th>
</tr>
</thead>
<tbody>
<tr>
<td>immediate insignificant haematuria</td>
<td>34</td>
<td>22</td>
<td>32</td>
</tr>
<tr>
<td>immediate insignificant haematochezia</td>
<td>8</td>
<td>17</td>
<td>6</td>
</tr>
<tr>
<td>minor infectious complications</td>
<td>5</td>
<td>1</td>
<td>3</td>
</tr>
</tbody>
</table>

Mean prostatic biopsy cores in patients groups were 9.7±3.2 for group I , 9.8±3.3 for group II and 9.7±3.3for group III, statistical analysis using analysis of variance (ANOVA) showed that there is no significant statistical difference regarding mean prostatic biopsy cores in the 3 groups (p value=0.897)

Pathological findings were positive for malignancy in 56 patients in group I (50%) , in 28 patients (25%) of group II and in 44 patients (39%) of group III patients.
Mean pain score in patients groups were 4.95±1.1 for group I, 4.1 ± 1.37 for group II and 2.18 ± 1.6 for group III, statistical analysis using analysis of variance (ANOVA) showed that there is a statistically very high significant difference regarding the pain score in the 3 groups (f value = 120.27 with p value=0.000).
**Fig. 5**: visual analog pain scale of the study groups

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Fig. 6: Pain score less than 5 among study groups

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Conclusion

Patients should have pain relief measures during TRUSPB to decrease the procedure pain and improve patient tolerance permitting proper aiming for biopsy cores and increasing the number of biopsy core without increasing the patient distress.

The combined IV sedation and local periprostatic block is efficient in controlling and limiting pain better than employing each alone with no significant increase in complications incidence.
References


(9) Jones SJ., Oder M. and Zippe CD. :Saturation prostate biopsy with periprostatic block can be performed in the office. J urol., 2002; 168: 2108-2110.


Personal Information

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