

Three different anesthesia techniques for a comfortable prostate biopsy

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Abstract

Aim: In this paper, we aimed to compare the efficacy of three different anesthesia techniques applied in 90 cases of which transrectal ultrasound (TRUS) -guided prostate biopsies were taken.

Materials and Methods: Between February 2012 and July 2012, TRUS-guided 16 core biopsies were taken from 90 patients who comply the study criteria. Patients were randomly divided into three groups each of which consists of 30 individuals. Group 1: Was applied periprostatic block anesthesia; Group 2: Was administered intrarectal lidocaine gel; Group 3: Was applied pudendal block. Visual analog scale (VAS) of patients in groups was evaluated.

Results: There was no statistically significant difference between the mean ages, prostate-specific antigen values of three groups. Although pain ratings of Groups 2 and 3 were high, no significant difference was present between each other ($P > 0.05$). In Groups 1 and 2, the difference between VASs was significant. In the group where periprostatic block was applied, pain ratings were significantly low compared with the other two groups ($P = 0.0001$).

Discussion: Enabling pain and discomfort control in patients is very important during TRUS-guided prostate biopsy. In our study, we observed that the periprostatic block enables more comfortable compared with patient groups with intrarectal lidocaine gel and pudendal block and better reduction in pain scores.

Key Words: Analgesia, biopsy, periprostatic block, prostate

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Received: 09.06.2014, **Accepted:** 24.06.2014


INTRODUCTION

Transrectal ultrasound (TRUS)-guided prostate biopsy is the golden standard used in the diagnosis of prostate cancer. Although, prostate biopsies were carried out by finger-guided transperineal way in 1930s when defined for the first time, then it was started to be performed by transrectal way defined by Astraldi.^[1] Hodge *et al.* defined the first systematic biopsy in

1989 as “sextant” biopsy.^[2] In recent years, a great number of studies were performed about more effective biopsy diagrams and basically more sampling and taking biopsy from the unsampled areas in sextant biopsy were focused on.^[3,4] Naturally more sampling increased procedure-related pain and disorders, and more effective anesthesia techniques were needed. Today anesthesia administration during prostate biopsy is compulsory. Although there is no consensus about anesthesia to be applied, essentially the pain to be felt by patient must to be reduced.^[5] We desired to show that three different methods may enable the comfort and which one is more effective in patient.

MATERIALS AND METHODS

Ninety cases with a suspicion of prostate cancer, where TRUS-guided prostate biopsy was applied between February 2012 and July 2012, were included into the study. Patients were

Access this article online	
Quick Response Code:	Website: www.urologyannals.com
	DOI: 10.4103/0974-7796.152014

randomly divided in groups of 30. Group 1: Periprostatic nerve block group; 5 cc of 2% lidocaine was separately injected into between prostate base and seminal vesicle – the region where both neurovascular bundles is found – in the sagittal plane by the help of 25 cm 18 gauge (G) spinal needle (Angiotech 18 gauge (G) spinal needle (Surgical Specialties Corporation; Vancouver, British Columbia, Canada)) after inserting TRUS probe in the right upper lateral position. Group 2: Intrarectal analgesia group; 10 cc of 2% lidocaine gel was intrarectally administered for patients 10 min before inserting TRUS probe. Group 3: Pudendal block group; pudendal nerve block was applied for the pudendal nerve between the sacrospinous ligament and the sacrotuberous ligament (to the inferomedial inside Alcock's canal). Following draping after appropriate monitorization and local antiseptics and sterilization of the targeted region were provided, the fascia between the sacrotuberous and sacrospinous ligaments was entered from the gluteal region by 14 cm 22 G spinal needle by starting on the middle line via ultrasound, while patient is lying in the prone position. Five mm of 1% lidocaine were injected into either pudendal nerve fascia. Sixteen core biopsies were taken from patients in each group 10 min after anesthetic procedure. Prostate biopsy indications included the patient with abnormal rectal examination and/or serum prostate-specific antigen (PSA) levels above 4.0 ng/mL. Those from whom TRUS-guided prostate biopsy was taken previously, who have bleeding diathesis or receive anticoagulant therapy, who have anus and rectum's painful conditions such as hemorrhoid, anal fissure, or stricture, who have neurologic conditions such as acute prostatitis and lower extremity paraplegia where the sensation of pain is reduced or does not exist, and patient using analgesics or narcotic drug were excluded from the study.

One day before and for 4 days after biopsy procedure, 500 mg ciprofloxacin was given to all patients orally 2 times a day. Fleet enema was applied to all patients intrarectally before biopsy for intestinal cleansing. In order to prevent a false pain rating, the beat sound of the biopsy device was made listened to patients before the procedure, and it was expressed not to take any notice of this sound. All biopsies were taken from the same physician and biopsy form, pain scales were filled by the same physician. Pain expectation of patients increases the amount of pain felt during the procedure and ultimately a vicious cycle where anxiety and pain increase each other mutually occurs.

Visual analog scale (VAS)^[5] was used in pain rating during TRUS-guided biopsy. The pain level was scored between 1 and 10.

Visual analog scale is used to make some values numeric, which are unable to measure numerically. Two end definitions of the parameter to be evaluated are written on two ends of a 100 mm line and patient is wanted to specify that where itself

status is matched by making a dot, indicating, or lining. For example, no pain is written on the end for pain, very severe pain is written on the other end and patient marks its status at that moment on this line (VAS). The length of the distance from the site where no pain is present to the site where patient marked indicates pain of the patient.

After patients were given a right upper lateral position, 6.5 MHz rectal probe with “ LOGIQ200 PRO Series” (GE Healthcare LOGIQ200 PRO Series urologic ultrasound (GE Healthcare Company; Milwaukee, Wisconsin, U.S.A)) US was used for TRUS imaging. After the probe was had inserted rectally, prostate was imaged in sagittal and transverse plane and prostate volume was calculated by ellipsoid formulation in ultrasound device. Using full automatic 25 cm 18 G biopsy needle, standard 16 core biopsies were taken from each patient. Vital signs of the patients were observed for approximately 1 h after the procedure. They wanted to apply to a hospital in cases like high body temperature (>38°C), burning during urination, hematuria, and rectal hemorrhage.

All patients included into the study were informed about TRUS-guided prostate biopsy and its complications and their informed consent form were received for the procedure.

Statistical analysis

The conformity of data to a normal distribution was tested; Student's *t*-test, one-way variance analysis, repeated measures analysis were used in the analysis of continuous variables with the normal distribution, Mann–Whitney U-test, Kruskal–Wallis test, and Friedman test were used in the analysis of continuous variables without normal distribution. Chi-square test was used in the analysis of categorical variables. The cases where *P* value is found lower than 0.05 were accepted statistically significant.

RESULTS

In Group 1, Group 2, and Group 3, the mean age of patients included into the study was 61.4 ± 7.9 (47-82), 59.7 ± 6.3 (49-72), and 63.4 ± 7.5 (48-77) years, respectively. The mean age in all groups was 61.5 ± 7.4 (47-82) years. No statistically significant difference was determined in terms of age distribution between groups ($P = 0.16$).

The mean body mass index of patients in Group 1, Group 2, and Group 3 was 27.8 ± 3.4 (21.10-36.5), 25.5 ± 2.5 (20.8-30), and 27.7 ± 2.7 (22.8-32.8) kg/cm², respectively. The mean body mass index in all groups was 26.8 ± 3.06 (20.8-36.5) kg/cm². No significant difference was determined in terms of body mass index distribution between groups ($P = 0.76$).

The mean serum total PSA (TPSA) level of patients in Group 1, Group 2, and Group 3 was 14.5 ± 23.7

(1.84-100) ng/mL, 9.7 ± 7.4 (3.3-38.5) ng/mL, and 8.3 ± 5.2 (2.4-26.9) ng/mL, respectively. Serum TPSA level in all groups was 10.8 ± 14.7 (1.8-100) ng/mL. No statistically significant difference was determined in terms of serum TPSA level distribution between groups ($P = 0.705$).

The mean serum free PSA (FPSA) level of patients in Group 1, Group 2, and Group 3 was 3.12 ± 6.09 (0.3-30) ng/mL, 1.65 ± 1.14 (0.33-5.34) ng/mL, and 1.51 ± 1.04 (0.25-5.2) ng/mL, respectively. The mean serum FPSA level in all groups was 2.09 ± 3.66 (0.25-30) ng/mL. No statistically significant difference was determined in terms of serum FPSA level distribution between groups ($P = 0.811$).

Patients' mean FPSA/TPSA ratio in percentages in Group 1, Group 2, and Group 3 was 19 ± 10 (5-45), 17 ± 6 (4-31), and 18 ± 8 (4-40), respectively. The mean serum FPSA/TPSA ratio in all groups was 18 ± 8 (4-45). No statistically significant difference was determined in terms of FPSA/TPSA ratios between groups ($P = 0.983$).

The mean TRUS prostate volume of those in Group 1 was 57 ± 47.5 (20-270) mL, those in Group 2 was 53.5 ± 24.1 (20-107) mL, and those in Group 3 was 48.8 ± 21.2 (18-90) mL. Total TRUS prostate volume was 53.1 ± 32.9 (18-270) mL. No statistically significant difference was determined in terms of TRUS prostate volume between groups ($P = 0.753$).

The mean maximal urine flow rate of patients in Group 1, Group 2, and Group 3 was 17.7 ± 4.1 (12-29) mL/s, 19.2 ± 4.1 (12-28) mL/s, and 16.9 ± 6.8 (8-46) mL/s, respectively. The mean maximal urine flow rate in all groups was 17.9 ± 5.2 (8-46) mL/s. A statistically significant difference was determined in terms of maximal urine flow rate between Group 2 and Group 3 ($P = 0.027$).

The mean urine flow rate of patients in Group 1, Group 2, and Group 3 was 9.5 ± 2.8 (3-16) mL/s, 10.7 ± 2.7 (6-16) mL/s, and 8.2 ± 3.1 (4-18) mL/s, respectively. The mean urine flow rate in all groups was 9.4 ± 3.07 (3-18) mL/s. A statistically significant difference was determined in terms of the mean urine flow rate between Group 2 and Group 3 ($P = 0.003$).

When pathology results of patients were examined, it was observed that there are three different results as adenocarcinoma, benign prostatic hyperplasia, and chronic prostatitis. Furthermore, no statistically significant difference was determined between groups ($P = 0.739$).

The mean VAS of patients in Group 1, Group 2, and Group 3 was 1 ± 0.94 (0-4), 2.2 ± 1.2 (0-4), and 1.8 ± 1.1 (0-4), respectively. The mean VAS in all groups was 1.73 ± 1.25

(0-4). A statistically significant difference was determined in terms of VAS between three groups.

The VAS values were separately compared between three groups. No statistically significant difference was determined between Group 2 and Group 3 ($P = 1.00$). A statistically significant difference was determined between Group 1 and Group 3 ($P = 0.003$). A statistically significant difference was determined between Group 1 and Group 2 ($P = 0.001$).

No complication required for hospitalization occurred in any patient. Transient hypotension developed in four cases where pudendal block was performed. 1 h after followed-up, these patients were directed in order to follow pathology results.

DISCUSSION

Transrectal ultrasound-guided prostate biopsy is the golden standard for diagnosing patients with a suspicion of cancer. Defining sextant biopsy performed by TRUS and developing of many other biopsy techniques in under the guidance of this method became a crucial stage in establishing histopathological diagnosis.^[6] Although it is a commonly used method, there is no standardization in respect to patient preparation and technique.

Directly making the biopsy procedure without applying any anesthesia method or analgesic causes pain and discomfort in patients for diagnosing the most frequently seen prostate cancer among urologic cancers.^[7-9] This may impair patient-physician cooperative and prevent to take biopsy in the adequate amount from right sites. Pain occurs especially during inserting the probe into anal canal, during taking biopsy with needle and movement of the probe. An analgesic or anesthetic method is applied in order to increase patient cooperative and comfort during the procedure, to reduce pain and to relieve the procedure. There are many different approaches used for that purpose. Rectal lidocaine gel, lidocaine/prilocaine gel, lidocaine suppository, periprostatic nerve blockage, pudendal block, nonsteroid antiinflammatory drugs, tramadol, propofol, midazolam, and oxygen application with nitrogen oxide are among these. There is no consensus yet about method among clinics that will apply. Patient's susceptibility to pain, present pathologies particularly anorectal diseases, past medical history, undergone biopsy experience, sociocultural level, and mood state before the procedure are some of factors arising from patient in pain perception. The intensity of the number of patient in clinic and the preference of individuals who will make biopsy are the factors affecting the method to be preferred in background for the method to be applied.^[9,10]

In our study, we compared the efficacy of periprostatic blockage, intrarectal lidocaine gel, and pudendal block methods commonly

applied to patients before the procedure on reducing pain. We used VAS to healthily determine the level of pain felt by patient and to reveal the efficacy of the anesthesia method applied.

Desgrandchamps *et al.* divided patients into two groups where 2% intrarectal lidocaine gel or ultrasonic hydrophilic gel were applied in their placebo-controlled study where lidocaine gel anesthesia is examined in prostate biopsy and evaluated the degree of pain felt by patients. In both studies, intrarectal lidocaine gel application alone was reported not to provide statistically significant analgesia compared to ultrasonographic gel application.^[11,12]

Issa *et al.* divided patients into two groups where 10 mL of 2% intrarectal lidocaine gel is applied and does not applied and reported that visual pain score in cases where gel was applied was lower than those without anesthesia application.^[13]

In the study performed by Raber *et al.* between intrarectal gel and placebo before biopsy, they reported that there is a statistically significant reduction in the group where anesthesia is applied with lidocaine gel during insertion of probe into rectum and taking biopsy with needle compared with placebo group and that the rates of complication were similar.^[14]

In the study performed by Cevik *et al.* by applying 20 cc of intrarectal lidocaine gel and placebo in 100 patients, no difference was observed in terms of providing analgesia during biopsy between two groups.^[15]

In our study, 16 core prostate biopsies were taken 10 min after 10 cc of 2% lidocaine gel was intrarectally applied to patients. These patients were compared with those in whom periprostatic block was performed; pain scores of the group where intrarectal gel was applied were found higher.

Periprostatic nerve blockage was firstly defined by Nash *et al.* In their study, they injected 5 mL of 1% lidocaine to patients just to the lateral to the point where prostate and vesicula seminalis conjugate, to the prostate base unilaterally, and serum physiologic to the contralateral side. The injection to this area aims nerve fibers in the prostate pedicle. Authors found that pain ratings in cases where unilateral prostatic nerve blockage is performed were significantly lower in the side injected than the side not injected.^[16]

In the year 2000, Soloway and Öbek emphasized that anesthesia or analgesia is needed during biopsy procedure. In the study they performed, they carried out nerve blockage in the middle region and apex of prostate by injecting 5 mL of 1% lidocaine into the junction of prostate and vesicula seminalis by TRUS to 50 patients. It was reported that pain felt during the procedure is reduced in all of patients and that no important complication was seen in patients apart from one patient.^[17]

Various modifications of local anesthetic infiltration were made in a way to be applied three separate points including the right, left, and apex or the apex alone; the studies revealing that these methods also are effective showed that periprostatic nerve blockage applied around prostate is effective at every localization.^[18,19]

In our study, we applied the infiltration in periprostatic nerve blockage between prostate base and seminal vesicle to the region where both (right-left) neurovascular bundles are present, where nerves do not branch yet after inserting TRUS probe. 10 min after the procedure, 16 core biopsies were taken. Pain scores of patients during taking biopsy with needle were recorded and compared with pudendal block and intrarectal gel group. Pain scores in the group where periprostatic nerve blockage was applied were statistically significantly low compared to the group where intrarectal gel was applied. When those in whom intrarectal gel and pudendal block were applied were compared, it was determined that there was no statistically significant difference. Pain scores between cases where periprostatic block was applied and pudendal block was performed were statistically significant. A transient hypotension occurred in four cases where we pudendal block applied. However, patients were followed-up out-patiently without hospitalizing. Other than this, no serious complication occurred. Our results also are compatible with numerous studies in the literature. It was determined that TRUS-guided prostate biopsy performed by applying periprostatic blockage was easily tolerated by patients and that the level of pain was prominently reduced.

In another study performed by Obek *et al.*, they divided patients into four groups as control group, periprostatic blockage, intrarectal lidocaine gel group, and group of periprostatic block along with intrarectal lidocaine gel.^[20] The group where one analgesia or anesthesia method was applied was shown to be more superior compared to the group where not applied. Furthermore, periprostatic blockage along with intrarectal gel was reported to provide the best analgesia. No serious complication requiring hospitalization was seen in any of patients. Similarly the superiority of intrarectal gel application along with periprostatic blockage to placebo was shown in a great number of studies.^[21,22]

Alavi *et al.* evaluated 150 cases where they applied periprostatic blockage or intrarectal gel before biopsy. Pain was determined to be significantly lower in the group where lidocaine injection and periprostatic blockage. No any complication was reported in patients other than 2 patients developing prostatitis and receiving antibiotic therapy at hospital.^[23]

In the study performed by Mallick *et al.*, they compared pain scores during applying anesthesia method of cases where

intrarectal gel, and periprostatic blockage were applied, during biopsy, and ½ h after the procedure. Statistically significant lowness was determined in pain scores in the group where intrarectal gel was applied especially during applying anesthesia method and ½ h after biopsy. Pain was determined to be low in the group where periprostatic blockage was performed during biopsy. As a result, they suggested intrarectal gel application along with periprostatic blockage. Due to anesthesia method, no serious complication was seen in any patient. In patients re-evaluated 3 weeks later, prolonged hematuria by 2%, and hematospermia by 1% were reported in both groups.^[24]

The superiority of the intrarectal gel group to the patient group where analgesia was not applied was shown in the literature. We examined whether or not this superiority is a superiority of groups where analgesia are applied to each other without placebo group, in other words, without the group where no any analgesia is applied for TRUS. So we excluded the patient group where analgesic agent was not applied, in other words the placebo group from our study.

In the study performed by Jones *et al.*, 24 core biopsies were taken after periprostatic anesthesia was ensured with 20 cc of 2% lidocaine; all of patients tolerated the procedure easily; no any complication requiring intervention was reported.^[25]

Following these studies, a large number of studies where lidocaine in various amounts was applied to various localizations in the periprostatic region were performed; a reduction in pain was observed almost in all of them. However, Wu *et al.* observed in their studies with 5 mL lidocaine infiltration to the lateral to vesicula seminalis, that there is no difference from placebo.^[26]

Von Knobloch *et al.* used 1% artacaine that is lidocaine-like rapid-acting anesthetic as periprostatic local anesthetic; Rabets *et al.* compared application of bupivacaine that is long-acting anesthetic and lidocaine to periprostatic area and determined that both methods enable an effective analgesia.^[27,28] Adsan *et al.* performed unilateral pudendal nerve blockage by 10 mg of 1% prilocaine under the guidance of perineally rectal examination with finger before prostate biopsy and provided a prominent reduction during biopsy and probe insertion in pain according to placebo.^[29]

In the study where Lynn *et al.* compared periprostatic blockage and intrarectal lidocaine gel application, significantly lesser pain than the other group was reported to be felt in cases where periprostatic blockage was applied.^[30]

In the study performed by Stirling *et al.* by applying periprostatic blockage, intrarectal lidocaine gel, and placebo, pain felt during probe insertion was significantly less in intrarectal gel group

compared to the other two groups, while pain during biopsy was determined to be lesser in periprostatic block group; it was reported that two analgesia methods can effectively and safely be used in biopsy.^[31]

In the study performed by Masood *et al.* on 110 cases where TRUS prostate biopsy will be applied, they compared entonox inhalation that is gas anesthetic, air inhalation, and placebo and reported that entonox enables rapid and effective pain control in proportion to the other two groups. However, contrary to local anesthesia, as patient is unconscious during sedation application, extra attendants who will follow up patient during and after biopsy are needed. Therefore, cost of general anesthesia is more than local anesthesia.^[32]

Manikandan *et al.* evaluated 235 cases where they applied etonox, periprostatic blockage, and placebo in the procedure of TRUS prostate biopsy and reported that pain is significantly lesser at a rate similar to each other in the other two groups compared with the placebo group. It was shown that entonox or periprostatic blockage can safely be used in TRUS prostate biopsy applications.^[33]

Peter *et al.* indicated that there is a prominent reduction in disorder especially in repeated biopsies by use of intravenous propofol; however, they also expressed an increased cost and an obligation to make this anesthesia under operation room conditions.^[34]

In the study performed by Cantiello *et al.*, prostate biopsy was taken from two patient groups where pudendal block was performed a pudendal block + intrarectal lidocaine gel was applied. Pain control in cases where combined anesthetic was applied was seen to be better.^[35]

In the study performed by Venegas-Ocampo *et al.*, cases where bilateral pudendal block was applied and who received intrarectal lidocaine gel + oral paracetamol were compared. It was shown that there is a statistically significant difference in terms of pain score between the group where bilateral pudendal block and the other one.^[36] In our study, VAS scores were not found statistically significant between the group where pudendal block was performed and the group where intrarectal lidocaine gel was applied.

CONCLUSION

There are a wide number of various analgesia forms and/or combinations performed by many authors in the literature in order to remove pain and discomfort of cases where TRUS-guided prostate biopsy will be performed. We determined that the most effective pain control among three

methods we made is provided by periprostatic local anesthetic injection and that it enables an ideal patient comfort.

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How to cite this article: Şahin A, Ceylan C, Gazel E, Odabaş Ö. Three different anesthesia techniques for a comfortable prostate biopsy. *Urol Ann* 2015;7:339-44.

Source of Support: Nil, **Conflict of Interest:** None.