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A Prospective Analysis of the Efficacy and Safety of Caudal Block for Transrectal Ultrasound Guided Prostate Biopsy in Patients with Anorectal Disorders

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ABSTRACT

In this study, the efficacy and safety of the caudal block technique for **transrectal ultrasonography-guided biopsy** (Trus-guided biopsy) in patients with anorectal problems were investigated.

A total of 31 consecutive patients with anal-rectal problems underwent prostate needle biopsy. All patients included in the study were examined by an experienced general surgeon, and the presence of anorectal problems was confirmed. The majority of patients (61%) were referred from the outer center to our clinic because a biopsy could not be performed due to severe pain felt during rectal probe insertion despite local anesthesia (topical prilocaine or lidocaine cream). A 12-core biopsy protocol was applied to all patients under the caudal block. Pain perception was separately assessed during caudal anesthesia, probe insertion, and sampling stages using a visual analog scale (VAS) score.

The mean age was 64.1 ± 9.1 years. The mean VAS score during caudal anesthesia was 1.8 ± 0.81. At probe insertion, the mean VAS score was 1,44 ± 012. During the needle penetration into prostate tissue and sampling, the mean VAS score was 2.44± 013. All of the patients did not state any bothersome pain at any stage. We did not find any complications related to the anesthesia method.

Topical creams and/or **periprostatic nerve block** (PNB) do not provide adequate analgesia in patients with anorectal disorders undergoing Trus-guided biopsy. Caudal block technique can be performed effectively and reliably in this selected patient group.

Keywords: Caudal block, hemorrhoids, periprostatic local anesthesia, prostate

Introduction

Transrectal ultrasound-guided prostate biopsy (Trus-guided biopsy) is the gold standard method in the diagnosis of prostate cancer (1). It is known that this procedure causes severe pain and discomfort in many patients (2). Pain is due to three reasons: the first is the insertion of the probe into the rectum; the second is the manipulation of the probe in the rectum; and the third is the needle penetration into the prostate tissue (3). Clinicians who consider these causes of pain have used periprostatic nerve block (PNB), intra-rectal local anesthetic drugs, nonsteroidal anti-inflammatories, and similar pain-reducing anesthetic techniques and agents (3–7). Although PNB is widely preferred among all anesthesia applications, it has been reported that it is not sufficient, especially in the placement and manipulation of the rectal probe (8). Some reports have revealed that the combination of intrarectal local anesthesia (IRLA) and PNB is more effective than the use of either technique alone (9). TRUS-guided biopsy is not possible in the vast majority of patients with anorectal problems without general anesthesia. It has been observed that in these patients, much more severe pain develops during the insertion and manipulation of the ultrasound probe into the rectum than in normal patients (10).

Caudal block (CB), which is a kind of epidural anesthesia, is a highly effective, easy-to-learn, and easy-to-apply method in the surgery of areas innervated by sacral and lumbar spinal nerves. It

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has been reported that the success rate of caudal anesthesia can reach up to 96% even in the first attempt (10). Caudal block can be preferred as an alternative to general anesthesia, especially for patients who cannot tolerate the pain that occurs during a prostate biopsy in spite of local anesthesia. In this patient group, in the absence of adequate analgesia, besides the high level of pain, both the success of the biopsy will decrease and there will be risks in terms of existing anorectal disease due to the effect of the force. In this context, CB may be an ideal option for a select group of patients, if not all patients. There is minimal information regarding the place of CB in a prostate biopsy.

In this prospective analysis, we aimed to assess the efficacy and safety of the caudal block anesthesia technique applied before TRUS-guided biopsy in patients with anorectal problems.

Material and Methods

Compliance With Ethical Standards: Before starting the study, approval was obtained from the Ethics Committee of the Van Yuzuncu Yil University Faculty of Medicine (date: May 29, 2019, and approval number: 14), and the principles of the Helsinki Declaration were taken as a basis during the study. Written informed consent was obtained from all patients.

Study Design: Thirty-one patients who had abnormal digital rectal examination findings and/or elevated prostate-specific antigen levels (4 ng/mL or more) were included in the study. All patients included in the study had anal-rectal problems. Patients with neurological disorders, allergies to lidocaine, bupivacaine, or opioids, patients with coagulation disorders and currently using anticoagulants were not excluded from the study. In addition, patients with generalized anxiety disorder and psychiatric disorders were also excluded from the study. All patients included in the study were examined by a general surgeon, and the presence of anorectal problems was confirmed. Of the patients, 13 (42%) had hemorrhoids; 4 (13%) had anal stenosis; 6 (19%) had an anal fissure; and 2 (7%) had Crohn's disease. Six (19%) patients had a history of surgery due to a perianal abscess or fistula. The digital rectal examination was very painful in all patients, and the rectal examination could not be performed in 14 (45%) patients due to severe pain. The majority of patients (61%) were referred from the outer center to our clinic because a biopsy could not be performed due to severe pain felt during rectal probe insertion despite local anesthesia (topical prilocaine or lidocaine cream).

Caudal Anesthesia Technique: In the regional anesthesia unit, a peripheral intravenous line was placed with a 22-gauge cannula and a 3 ml/kg/hour isotonic sodium chloride solution was started in all patients. Automatic non-invasive blood pressure, electrocardiography, and peripheral oxygen saturation were monitored, and baseline values were recorded. No medication was administered to the patients for premedication.

The patients were placed in the left lateral decubitus position with their knees on the chest. Aseptic preparation was performed with povidone-iodine. After the sterile drape, the posterior superior iliac prominences and sacral cornues were identified by palpation. It is accepted that the third angle of the equilateral triangle formed by combining these points mostly overlaps the sacral hiatus. After the sacral hiatus was determined by palpation, 1 ml of lidocaine (Aritmal 2% 100 mg 5 ml ampoule, Osel, Istanbul, Turkey) was infiltrated at the injection site. A 22-gauge caudal needle was inserted over the sacral hiatus into the midline, at a 45-degree angle to the skin (figure-2). It was advanced until the bone was felt. Then the needle was withdrawn several millimeters and the needle angle was decreased from 20° to 5°. It was advanced slowly until a distinct "pop" or "give" was felt while puncturing the sacrococcygeal ligament. After feeling that the sacrococcygeal ligament was passed, the needle was advanced 1-2 cm. It was aspirated to rule out vascular or intrathecal placement. For the local anesthetic solution, 0.5 mg/kg bupivacaine and 0.5 μg/kg fentanyl were combined with isotonic saline to a 10 ml volume prior to the procedure (figure-3). After the blood or cerebrospinal fluid aspiration test was negative, 3 mL of the prepared local anesthetic solution was injected as a test dose (figure-3). Before administering the remaining dose, patients were observed for 2-3 minutes for spinal anesthesia due to possible intrathecal injection. If possible signs of spinal anesthesia were not observed, the remaining 7 mL of the solution was injected within 15-20 seconds by controlled and intermittent aspiration. All patients underwent caudal block procedures by the same anesthesiologist. Transrectal prostate biopsy was started 15 minutes after caudal anesthesia was administered. Pain control was performed before the procedure.

Trus-Guided Biopsy Technique: After the necessary surgical area cleaning was done in the left lateral decubitus position with the knees on

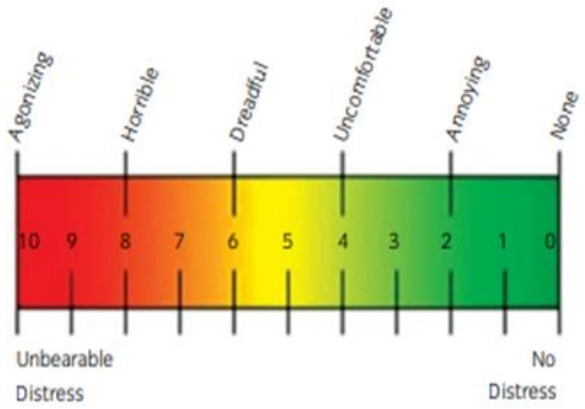

Fig.1. Visual Analog Scale

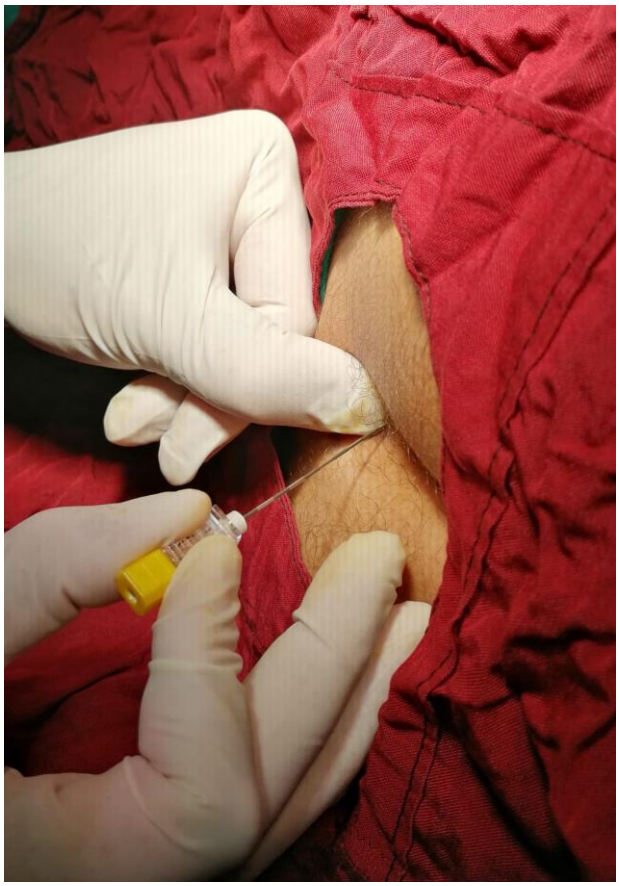

Fig.2. The patient was placed in the lateral decubitus position, and the posterior superior iliac prominences and sacral cornues were identified by palpation. After skin preparation with povidone-iodine, a 22-gauge caudal needle was inserted over the sacral hiatus into the midline, at a 45-degree angle to the skin

the chest, the transrectal ultrasound probe was inserted into the rectum. After the prostate dimensions were measured, the biopsy procedure was started. Biopsy was performed in all patients with Hitachi Hi-Vision 5500 system (Hitachi Aloka Medical, Tokyo, Japan). An 18-G, 20 cm, automatic, disposable biopsy needle (Mission;

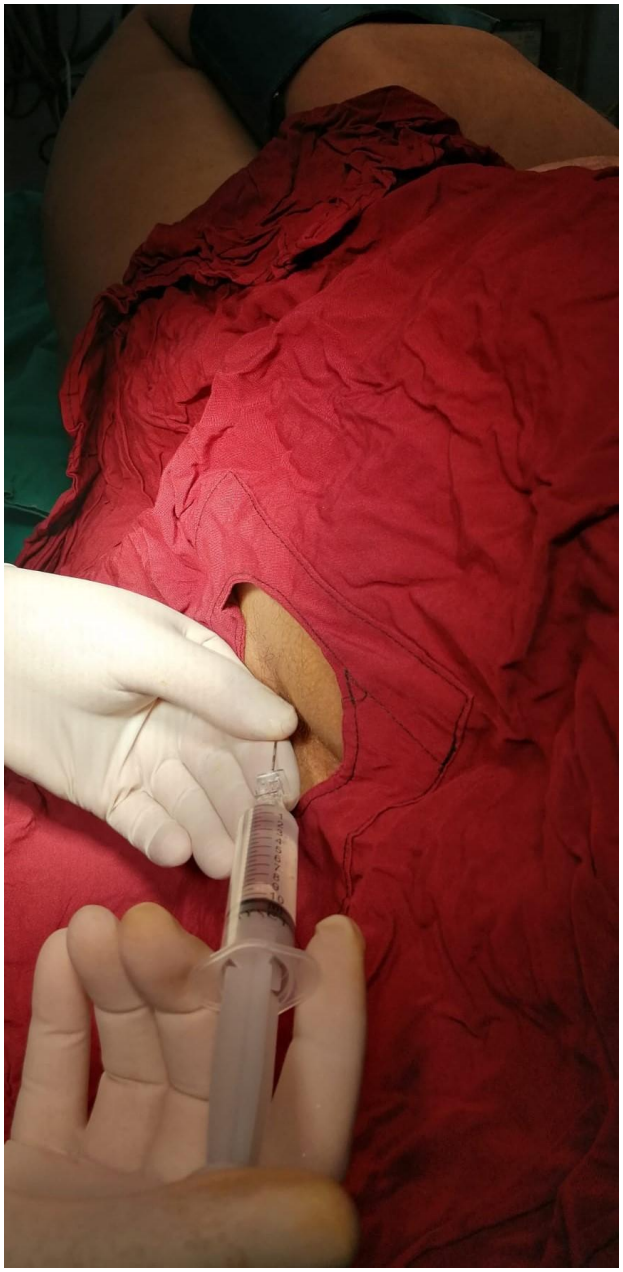

Fig.3. After the blood or cerebrospinal fluid aspiration test was negative, 3 mL of the prepared local anesthetic solution was injected as a test dose

Bard Biopsy Systems, Tempe, AZ, USA) was used in all patients. All procedures were performed by the same surgeon. A 12-core biopsy protocol was applied to all patients. Biopsy specimens were individually numbered and evaluated by a uropathologist.

Assessment of Pain: The presence and severity of pain were evaluated with an **10**-point Visual Analogue Scale (VAS) score (0 point = no pain, 10 point = excruciating pain, figure 1). VAS-1 for pain during the anesthesia procedure, VAS-2 for pain during insertion and manipulation of the

rectal probe, and VAS-3 for pain when the needle enters the prostate tissue.

Statistical Analysis: Categorical parameters (comorbidities, prostate cancer rates) were represented as frequencies (n) and percentages (%), whereas continuous variables (age, BMI, PSA levels, prostatic volume values, and VAS scores) were expressed as mean±standard deviation.

Results

Demographic and clinical information of the patients is summarized in Table 1. When the VAS scores obtained from the patients are evaluated; the mean VAS -1 (pain score during caudal anesthesia procedure) 1.8 ± 0.81, mean VAS-2 (probe placement and manipulation) 1.44 ± 0.12, mean VAS-3 (pain when biopsy needle enters prostate tissue) 2.44± 0.13 was calculated. Vasovagal syncope, hypotension, or motor block did not develop in any of our patients. Caudal block and then biopsy were successfully performed in all of our patients. Mild rectal bleeding was seen in 7 (25.5%), hematuria in 4 (13%) patients, dysuria in 8 (26%) patients, acute urinary retention in 1 (3%) patient, and urosepsis in 1 (3%) patient. In the pathological evaluation, prostate cancer was diagnosed in 12 (38.7%) patients. BPH was diagnosed in 11 (35.4%) of the remaining patients, and chronic prostatitis was diagnosed in 8 (26%).

Discussion

Prostatic tissue sampling methods have been used for over a century for the definitive diagnosis of prostate cancer. Transperineal open biopsy and finger-guided needle biopsies were initially used. Today, trus-guided biopsy is a routinely used technique (11). A periprostatic nerve block (PNB) performed before a prostate biopsy has been shown to be effective in reducing pain during a biopsy in many patients (2, 3, 12, 15). However, the ability of this technique to relieve pain has not been universally validated (16). Although this is the most widely accepted method of local anesthesia today, the search for the ideal anesthesia method continues (1). In the PNB technique, an anesthetic injection is performed after the probe is inserted into the rectum. This situation causes the procedure to be more painful, especially in patients with anorectal problems (17). The procedure could not be performed on the majority of the patients in the study because the USG probe could not be placed despite the use of local anesthetic creams. However, in our study, TRUS-guided biopsy was successfully performed with the CB technique in all of these patients with anorectal problems.

Caudal block is a technique in which local anesthetic drugs are applied to the epidural space by entering the sacral hiatus. While this procedure is easy and fast, it is also a safe technique that provides very early patient mobilization (18). There are also clinicians who recommend ultrasonography or fluoroscopy to increase the success rate of CB (19). In our study, CB was performed on all patients by an experienced anesthesiologist. Ultrasound or fluoroscopy were not needed. The overall success rate was found to be 100%. In the literature, the overall success rate of CB varies between 96-100% (19).

In a study comparing patients who received CB and intrarectal local anesthetic gel, it was reported that significantly less pain developed in the CB group. It was reported that in the CB group, it provided an additional benefit in decreasing anal sphincter tone and feeling less pain during probe insertion and manipulation (20).

In different studies, the pain that occurs during the insertion and manipulation of the probe, which is the first stage of the biopsy, and the pain that occurs during the insertion of the needle into the prostate tissue, which is the second stage, have been investigated separately (21). Urabe F. et al. In their study, they divided the patients into two groups. They made CB+ IRLA for one group and PNB for the other group. The VAS score during TRUS probe insertion was found to be lower in the CB group than in the PNB group. CB+IRLA appeared to be more effective in relieving pain during probe insertion in this study.It has been reported that the VAS score at the entry of the needle into the prostate was not different between the two groups (22).

In another study, Cesur et al. (20) compared CB and IRLA. It was reported that the pain felt in the CB group was significantly lower. Kravchick S. et al. reported the results of patients who had local anesthesia with perianal-pericapsular lidocaine injection in 31 patients with anorectal problems (17). In this study, it was seen that most of the patients could not be biopsied with other local anesthesia methods. Despite the successful biopsy of these patients with the perianal-pericapsular method, the development of hypotension and vasovagal syncope in a significant portion of the patients (approximately 20%) is an important deficiency of this technique. Similarly, patients with anorectal problems were included in our

Table 1: Demographic and Clinical Data of The Patients

Variables	
Age, years (mean±sd)	64.1 ± 9.1
BMI, kg/m² (mean±sd)	26.9 ± 5.92
Comorbidities	
DM, n (%)	10 (32%)
CVD, n (%)	4 (13%)
Total PSA, ng/mL (mean±sd)	14.1 ±15.8
Prostatic volume (mean±sd)	70.2 ± 21.9
Prostate cancer, n (%)	12 (38.7%)
VAS 1 (mean±sd)	1.8± 0.81
VAS 2 (mean±sd)	1.44±0.12
VAS 3 (mean±sd)	2.44± 0.13

current study. Most of our patients were patients who could not be biopsied with other local techniques. Many of our patients were unable to undergo a digital rectal examination. However, the TRUS probe was successfully placed in all our patients with the CB technique, and a biopsy was taken. None of our patients developed hypotension or vasovagal syncope. Early and late complications in our study were found to be similar to previously reported rates (23).

The lack of a control group in our study is the major limitation of our study. However, most of our patients could not be biopsied with local anesthesia methods due to anorectal problems. Therefore, it would not be meaningful to create a control group outside of general anesthesia. Perhaps a pudendal nerve block would be a good option for the control group; however, in this technique, the index finger must be placed deep into the rectum to inject local anesthesia (23). This could have been a very painful procedure for our patient group. For this reason, patients with anorectal problems were excluded from the studies related to this pudendal technique (24).

It was observed that anesthesia with CB effectively and reliably reduced the pain during TRUS-guided biopsy in patients with anorectal problems. This method should be considered a reliable alternative that can be easily applied to patients who cannot be managed with other local anesthesia techniques and that does not impose a serious additional cost to the patient or the health system. Topical creams and/or PNB can not provide adequate analgesia in patients with anorectal disorders undergoing Trus-guided biopsy. We believe that this study will be a pioneer for randomized prospective comparative studies with general anesthesia or other local anesthesia techniques in the future.

References

1. Akyüz O, Kılıç B, Gündoğan S, et al. The Effectiveness of Caudal Block with Low Doses of Dexmedetomidine and Pethidine in Transrectal Prostate Biopsy: Preliminary Results. J Invest Surg. 2022;35(3):511-6.
2. Autorino R, De Sio M, Di Lorenzo G, et al. How to decrease pain during transrectal ultrasound guided prostate biopsy: a look at the literature. J Urol. 2005;174(6):2091-7.
3. Haq A, Patel H, Habib M, Donaldson P, Parry J. Diclofenac suppository analgesia for transrectal ultrasound guided biopsies of the prostate: a double-blind, randomized controlled trial. J Urol. 2004;171(4):1489-91.
4. Nash PA, Bruce JE, Indudhara R, Shinohara K. Transrectal ultrasound guided prostatic nerve blockade eases systematic needle biopsy of the prostate. J Urol . 1996;155(2):607-9.
5. Hergan L, Kashefi C, Parsons JK. Local anesthetic reduces pain associated with transrectal ultrasound-guided prostate biopsy: a meta-analysis. Urology. 2007;69(3):520-5.
6. Desgrandchamps F, Meria P, Irani J, Desgrippes A, Teillac P, Le Duc A. The rectal administration of lidocaine gel and tolerance of transrectal ultrasonography-guided biopsy of the prostate: a prospective randomized placebo-controlled study. BJU international. 1999;83:1007-9.
7. Ragavan N, Philip J, Balasubramanian S, Desouza J, Marr C, Javle P. A randomized, controlled trial comparing lidocaine periprostatic nerve block, diclofenac suppository and both for transrectal ultrasound guided biopsy of prostate. J Urol. 2005;174(2):510-3.

8. Rochester MA, Le Monnier K, Brewster SF. A double-blind, randomized, controlled trial of topical glyceryl trinitrate for transrectal ultrasound guided prostate biopsy. J Urol. 2005;173(2):418-20.
9. Heidenreich A, Bastian PJ, Bellmunt J, et al. EAU guidelines on prostate cancer. Part 1: screening, diagnosis, and local treatment with curative intent—update 2013. Eur Urol. 2014;65(1):124-37.
10. Wang N, Fu Y, Ma H, Wang J, Gao Y. Advantages of caudal block over intrarectal local anesthesia plus periprostatic nerve block for transrectal ultrasound guided prostate biopsy. Pak J Med Sci. 2016;32(4):978.
11. Kravchick S, Yoffe B, Cytron S. Modified perianal/pericapsular anesthesia for transrectal biopsy of prostate in patients with anal rectal problems. Urology. 2007;69(1):139-41.
12. Sharpe P, Klein J, Thompson J, et al. Analgesia for circumcision in a paediatric population: comparison of caudal bupivacaine alone with bupivacaine plus two doses of clonidine. Paediatr Anaesth. 2001;11(6):695-700.
13. Yeo L, Patel D, Bach C, et al. The development of the modern prostate biopsy. Prostate Biopsy. 2011:1-19.
14. Soloway MS, Öbek C. Periprostatic local anesthesia before ultrasound guided prostate biopsy. J Urol. 2000;163(1):172-3.
15. Stirling BN, Shockley KF, Carothers GG, Maatman TJ. Comparison of local anesthesia techniques during transrectal ultrasound-guided biopsies. Urology. 2002;60(1):89-92.
16. Issa MM, Bux S, Chun T, et al. A randomized prospective trial of intrarectal lidocaine for pain control during transrectal prostate biopsy: the Emory University experience. J Urol. 2000;164(2):397-9.
17. Alavi AS, Soloway MS, Vaidya A, Lynne CM, Gheiler EL. Local anesthesia for ultrasound guided prostate biopsy: a prospective randomized trial comparing 2 methods. J Urol. 2001;166(4):1343-5.
18. Wu CL, Carter HB, Naqibuddin M, Fleisher LA. Effect of local anesthetics on patient recovery after transrectal biopsy. Urology. 2001;57(5):925-9.
19. Wiegele M, Marhofer P, Lönnqvist P-A. Caudal epidural blocks in paediatric patients: a review and practical considerations. Br J Anaesth. 2019;122(4):509-17.
20. Wang J, Zhou H, An W, Wang N, Gao Y. Effective concentration of lidocaine plus fentanyl for caudal block in patients undergoing transrectal ultrasound guided prostate biopsy. Pain Res Treat. 2016;2016.
21. Cesur M, Yapanoglu T, Erdem A, Ozbey I, Alici H, Aksoy Y. Caudal analgesia for prostate biopsy. Acta Anaesthesiol Scand. 2010;54(5):557-61.
22. Urabe F, Kimura T, Shimomura T, et al. Prospective comparison of the efficacy of caudal versus periprostatic nerve block, both with intrarectal local anesthesia, during transrectal ultrasonography-guided prostatic needle biopsy. Scand J Urol. 2017;51(4):245-50.
23. Aslan R, Erbin A, Celik S, Ucpinar B, Eryilmaz R, Taken K. Periprostatic nerve block alone versus combined with perineal pudendal nerve block or intrarectal local anesthesia during transrectal ultrasound-guided prostate biopsy: a prospective randomized controlled trial. Int J Urol. 2019;26(8):833-8.
24. Adsan Ö, Inal G, Özdoğan L, Kaygısız O, Uğurlu Ö, Çetinkaya M. Unilateral pudendal nerve blockade for relief of all pain during transrectal ultrasound-guided biopsy of the prostate: a randomized, double-blind, placebo-controlled study. Urology. 2004;64(3):528-31.