

Evaluating the Factors Associated with Pain Perception During Transrectal Ultrasound Guided Prostate Biopsy: Is Music One of Them?

Transrektal Prostat Biyopsisi Esnasında Ağrı Algısını Etkileyen Faktörlerin Değerlendirilmesi: Müzik Bunlardan Biri mi?

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ABSTRACT Objective: Transrectal ultrasound guided prostate biopsy (TRUS-Bx) is essential in diagnostic investigation of patients with clinical suspicion of prostatic neoplasia. Despite the effective local anaesthesia some patients can not tolerate the procedure easily due to pain. The aim of our study was evaluating the factors that effect pain perception during TRUS-Bx and also evaluating the effect of listening to music on pain perception during the procedure. **Material and Methods:** This prospective study was performed in our department between May and November 2014. The patients were divided in two groups. Group 1: Patients listened to music, Group 2: Patients who did not listen to music. 5% lidocain cream and periprostatic enjection with 4 cc lidocain each side of prostate were applied for local anaesthesia to all patients. Twelve or more cores or biopsy samples were taken. Age, count of biopsy, prostate volume, pain scores during rectal probe insertion, periprostatic enjection and needle insertion by using visual analog scale (VAS) from 0 to 10 were recorded. **Results:** Fifty-one patients were enrolled (26 listened to music, 25 no listened). Mean age, PSA level, prostate volume, biopsy core count, length of biopsy time were 63.5 years, 12.9 ng/dl, 56.4 cc., 13.1 cores, 8.1 minutes respectively. Mean pain score during probe insertion, periprostatic enjection and needle insertion were 0.88, 0.84 and 0.92 respectively. Music, age and PSA level did not effect the pain scores. The only variable that effected the pain scores was prostatic volume. Patients with small prostate (<50 cc) felt more pain (p=0.007). **Conclusion:** We demonstrated that prostatic volume is the only effective variable in pain perception during TRUS biopsy and listening to music could not be beneficial for pain in prostate biopsy.

Key Words: Pain perception; biopsy; music; prostatic neoplasms; anesthesia, local

ÖZET Amaç: Prostat kanseri şüphesi olan hastalarda transrektal ultrason yardımlı prostat biyopsisi tanı için gereklidir. Her ne kadar lokal anestezi etkili olsa da bazı hastalar ağrı nedeni ile işlemi kolay tolere edemez. Bu çalışmanın amacı prostat biyopsisi esnasında oluşan ağrı üzerine etkili parametreleri tespit etmek ve işlem esnasında müzik dinlemenin ağrı hissine etkisini araştırmaktır. **Gereç ve Yöntemler:** Bu çalışma kliniğimizde Mayıs-Aralık 2014 tarihleri arasında prostat biyopsisi yapılan hastalar üzerinde prospektif, randomize olmayan şekilde yapılmıştır. Biyopsi yapılacak hastalar işlem esnasında klasik müzik dinleyen ve dinlemeyen olarak iki gruba ayrıldı. Tüm hastalara %5 lidokain içeren krem ile anal kanala, prostatın herbir tarafına 4 cc lidokain enjeksiyonu ile periprostatik alana lokal anestezi uygulandı. Tüm hastalardan standart 12 kor veya daha fazla biyopsi örneği alındı. Yaş, biyopsi sayısı, prostat hacmi, rektal probun uygulanması esnasındaki ağrı, periprostatik anestetik enjeksiyonu sırasındaki ağrı, biyopsi işlemi esnasındaki ağrı, işlemden hemen sonra hastalar tarafından doldurulan görsel ağrı skalası (VAS) ile değerlendirildi. **Bulgular:** Çalışmaya, 26 hasta müzik dinleyen gruba 25 hasta dinlemeyen gruba dahil olacak şekilde toplam 51 hasta alındı. Ortalama yaş, PSA, prostat hacmi, ortalama biyopsi sayısı ve biyopsinin süresi sıra ile 63,5 yıl, 12,9 ng/dL, 56,4 cc, 13,1 kor ve 8,1 dakika idi. Rektal probun uygulanması esnasındaki ortalama ağrı, periprostatik anestetik enjeksiyonu sırasındaki ortalama ağrı ve biyopsi işlemi esnasındaki ortalama ağrı sıra ile 0,88, 0,84, 0,92 olarak bulundu. Müzik, yaş ve PSA seviyesi ağrı skorlarına etkisiz bulundu. Ağrı üzerine etkili parametre olarak sadece prostat hacmi bulundu. 50 cc'den daha küçük prostatı olan hastalar daha fazla ağrı hissettiler (p=0,007). **Sonuç:** Lokal anestezi altında prostat biyopsisi esnasındaki ağrı üzerine etkili parametre, prostat hacmi olarak bulundu ve işlem esnasında klasik müzik dinlemenin ağrı algısını değiştirmediği saptandı.

Anahtar Kelimeler: Ağrı algısı; biyopsi; müzik; prostat neoplazi; anestezi, lokal

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Prostate cancer is one of the the most common tumors in men.¹ Transrectal ultrasound-guided prostate biopsy (TRUS-Bx) is essential in diagnostic investigation of patients with clinical suspicion of prostatic neoplasia on physical examination, or elevation of the prostatic specific antigen (PSA).^{2,3} In PSA era, there has been a significant increase in the number of biopsies.⁴ Although prostate biopsy is a well-tolerated procedure for most of men, 65-90% of patients have discomfort and 19% have severe pain.⁵ TRUS-Bx is a widely used common procedure but there is no certain protocol or guideline for the preparation of the patient and analgesia. Many studies for achieving ideal way of painless biopsy can be found in literature and many of them are about the technique and amount of analgesics. The use of periprostatic nerve blockade with lidocaine is the most accepted way of local anaesthesia recently.⁶ Despite the effective local anaesthesia some patients can not tolerate the procedure easily. Patient's anxiety, pain threshold and some other variables such as age may cause this condition.^{7,8} In the recent era, music as a non-pharmacological treatment for pain and anxiety before surgical interventions became popular and some studies evaluated effects of musical interventions upon pain perception and reported that pleasant or cheerful music decreased perceptions of pain and discomfort.^{9,10}

The aim of our study was evaluating the factors that effect pain perception during TRUS-Bx and also evaluating the effect of listening to music on pain during the procedure.

MATERIAL AND METHODS

In this prospective and non-randomised survey, patients underwent prostate biopsy in our department were determined for pain perception under local anaesthesia between May and November 2014. After getting local ethics committee approval from our hospital local Ethical Committee (2014-66), informed consents were taken from patients and patients were informed about visual analogue scale (VAS). The patients with high (>3 ng/mL) prostate specific antigen (PSA) levels or digital rectal examination abnormalities were included. Pa-

tients who had acute prostatitis, lidocaine allergy, chronic pain syndrome, recto-anal pathology or bleeding diathesis were excluded. All patients had quinolone group antibiotic for prophylaxis, they had used fleet enema in the morning of biopsy. Biopsies were performed at left lateral decubitus position by the same physician. 5% lidocaine cream was applied into rectum then periprostatic enjection was performed with 4 cc for each side of prostate lidocaine for local anaesthesia. Twelve or more cores biopsies were taken with guidance of transrectal ultrasonography (TRUS).

All patients were asked whether they want to listen to music and patients were divided in two groups according to the state that enjoy listening to classical music as group 1: listened to classical music without headphones during the procedure and group 2: patients who did not listen to classical music. Age, number of biopsy procedures, prostate volume, pain scores during rectal probe insertion, periprostatic injection, needle insertion by using visual analog scale (VAS) from 0 to 10 were recorded.

STATISTICAL ANALYSIS

The number of patients in each group wasn't calculated as power analysis. SPSS™ version 16.0 (SPSS Inc, Chicago, Illinois, USA) was used for statistical analysis and $p < 0.05$ was accepted as threshold for significance. Binary comparisons between groups were made with Mann-Whitney U test and multivariate analysis for determine which factors that effect pain perception was made with linear regression analysis.

RESULTS

Fifty-one patients who had undergone transrectal ultrasound-guided prostate biopsy were enrolled in this study from May-November 2014. Mean age was 63.5 ± 7.2 years. Mean PSA level was 12.9 ± 21.45 ng/dL. Mean prostate volume was 56.4 ± 27.6 cc. Mean pain score during probe insertion was 0.88 ± 1.16 during periprostatic injection 0.84 ± 1.25 , during needle insertion was 0.92 ± 1.35 and they were all tolerable. None of the patients wanted to end the procedure due to pain. There wasn't statistical difference between two groups who listened

to music and didn't, according to age, PSA, prostate volume, processing time and count of biopsy (p=0.55; p=0.698; p=0.175; p=0.718 and p=0.581 respectively). There was no statistical difference between the groups with music and without music for probe insertion, periprostatic injection, and biopsy pain (Table 1). When we divided the patients into two groups as older and younger than 65 years, there was no difference for all three pain scores (Table 2). We couldn't find also any differences between the first biopsy group and recur-

rent biopsy group for pain perception (Table 3). The patients had PSA level higher than 4 ng/dL and less than 4 ng/dL were similar according to pain scores (Table 4). Pain scores were not different between the patients with and without rectal examination abnormality (Table 5). When we compare the patients' pain for prostate volume, patients with small prostate size (<50 cc) felt more pain during biopsy. This comparison was also statistically significant (p=0.007) (Table 6). Multivariable analysis for biopsy number, core number, age, prostate vol-

TABLE 1: Pain perception at probe insertion, needle insertion and biopsy procedure in patients listened to music and did not listen.

Pain	Music	N	Mean	P (Mann Whitney U)
Probe	Music(+)	26	0.8462	0.690
	Music(-)	25	0.9200	
Needle	Music(+)	26	0.7308	0.244
	Music(-)	25	0.9600	
Biopsy	Music(+)	26	0.8077	0.463
	Music(-)	25	1.0400	

TABLE 4: Pain perception at probe insertion, needle insertion and biopsy procedure according to PSA level.

	PSA group	N	Mean	P
Probe	PSA<4	31	1.0000	0.370
	PSA>4	19	0.7368	
Needle	PSA<4	31	1.1290	0.043
	PSA>4	19	0.4211	
Biopsy	PSA<4	31	1.1290	0.084
	PSA>4	19	0.6316	

PSA: Prostatic specific antigen.

TABLE 2: Pain perception at probe insertion, needle insertion and biopsy procedure in patients older and younger than 65 years.

	Age	N	Mean	p
Probe	<66	32	0.7812	0.908
	>65	19	1.0526	
Needle	<66	32	0.7500	0.467
	>65	19	1.0000	
Biopsy	<66	32	0.9375	0.897
	>65	19	0.8947	

TABLE 5: Pain perception according to benign and abnormal DRE findings.

	DRE	N	Mean	P
Probe	Benign	33	0.6970	0.286
	Abnormal	18	1.2222	
Needle	Benign	33	0.8182	0.510
	Abnormal	18	0.8889	
Biopsy	Benign	33	0.8485	0.532
	Abnormal	18	1.0556	

DRE: Digital rectal examination.

TABLE 3: Pain perception at probe insertion, needle insertion and biopsy procedure according to biopsy count.

	Biopsy count	N	Mean	p
Probe	1	40	0.9000	0.365
	>1	11	0.8182	
Needle	1	40	0.9000	0.326
	>1	11	0.6364	
Biopsy	1	40	0.9500	0.959
	>1	11	0.8182	

TABLE 6: Pain perception at probe insertion, needle insertion and biopsy procedure according to prostatic volume.

	Prostate size	N	Mean	P
Probe	<51cc	25	0.8400	0.683
	>50 cc	26	0.9231	
Needle	<51 cc	25	1.0800	0.074
	>50 cc	26	0.6154	
Biopsy	<51 cc	25	1.3600	0.007
	>50 cc	26	0.5000	

ume, music and PSA showed that only prostate volume was associated with decreasing pain score ($p=0.018$). There was no complication like infection and rectal bleeding that needed intervention after the procedure. Only one patient had hypotensive attack and recovered with intravenous liquid (0.9% NaCl) support.

DISCUSSION

In the current study, we demonstrated that TRUS-Bx is quite painless procedure with existing anesthetic technique. Transrectal ultrasonography-guided prostate biopsy (TRUS-Bx), standart procedure for diagnosing prostate cancer, is one of the most frequently performed urological procedure.¹¹ Zisman has shown that most of the patients felt substantial pain and up to one third of them who previously had a biopsy without anaesthesia would refuse to undergo a repeat biopsy without anaesthesia.¹² Now, this debate is resolved with the help of anaesthetic aid. Currently, there are a lot of study about most suitable anaesthesia for TRUS-Bx are available in literature.¹³ Pain during biopsy is mainly caused by the introduction and manipulation of ultrasound probe in anal canal and rectum, and needle penetration into the prostate capsule, which is richly innervated with nerve fibres.¹⁴ Although periprostatic nerve block (PPNB) is accepted as the most effective method for pain reducing during biopsy, some studies have shown the superiority of combined, with perianal-intrarectal lidocaine-prilocaine cream, anaesthesia compared to PPNB only.¹⁵ We also use combined anaesthesia which is suggested by Giannarini in our routine prostate biopsy procedures.¹⁶ We believe in that administering perianal-intrarectal lidocaine cream before probe insertion decreases pain perception related to probe.

Although the advance in anaesthesia allowed a better tolerability of the procedure by most patients, some men still perceived the procedure unacceptably painful and uncomfortable. However, the increased number of punctures or some patient's variables may be the reason for this. We aimed to find which variables are effective on pain perception in this study.

We also supply music for half of our patients and evaluated their VAS scores but couldn't find any significant positive effect on pain. The need for prostate biopsy causes more or less anxiety in patients because of both biopsy itself and possibility of cancer detection, which contributes to increase discomfort during procedure. It is known that acute emotional anxiety causes increased pain perception through physiologic mechanisms, mainly by activation of an adrenergic response.¹⁷ The positive effect of music on pain and anxiety in surgical procedures has been evaluated and proven by many studies.¹⁸⁻²⁰ It may be logical to use music in prostate biopsy to reduce anxiety by music-induced attention shift during this unwilling procedure. Tsivian et al. used music and found beneficial impact on procedural anxiety and pain perception.¹⁷ They used headphones and eliminated all voices. Our patients did not use headphones so they heard the biopsy sound and this might decrease the effect of music.

One of our subjects was patient's age for pain perception. We could not find any difference in pain scores of older and younger patients. Dell'Atti evaluated how the age factor might influence the tolerance in prostate biopsy with 248 patients undergone TRUS-Bx with local anaesthesia for the first time. And he concluded that patients older than 65 years felt pain more intensive than younger ones, similarly Djavan et al.^{8,21} The reason for different endpoint may be the type of local anaesthesia. We used both perianal-intrarectal lidocaine cream and periprostatic nerve block but they used only lidocaine spray. Prostatic capsule innervation that may be higher in younger patients could cause higher pain perception without PPNB.

When we compared the patients' VAS scores according to first and repeat biopsy, our results were not statistically different in three sequential steps of the procedure, namely probe insertion, periprostatic administration of local anaesthetic and obtaining of biopsy cores on the contrary Moussa et al.²² They also did not use mucosal anaesthetic and they did not use the same ultrasound probe in their all procedures so that they might find higher VAS scores in repeat biopsy group.

VAS pain scores were higher in patients with a small prostate and the difference was statistically significant in our study on the contrary to result of Giannarini et al. and Yun et al.^{16,23} There may be more pressure to neurovascular bundle due to large size of prostate then some decrease may occur in transmission of pain perception in those patient with large prostate. According to recent reports, higher prostate volumes do not necessarily increase the pain associated with the procedure.^{24,25} It seems that further studies about distributions of periprostatic neurovascular bundles in correlation with prostate volume and relation between volume and biopsy pain are required.

A major limitations of our study were the relatively small sample size, the absence of randomisation and subjective pain score evaluation method by VAS score. There was very little difference in pain scores between the two groups and also this level of pain clinically insignificant.

In conclusion, according to our study the prostatic volume is only effective variable in pain perception during biopsy. Listening to music for reducing pain during procedure could not be found effective in TRUS prostate biopsy under local anaesthesia.

REFERENCES

- Parkin DM, Bray F, Ferlay J, Pisani P. Global cancer statistics, 2002. *CA Cancer J Clin* 2005;55(2):74-108.
- Berger AP, Ferauscher F, Halpern EJ, Spranger R, Steiner H, Bartsch G, et al. Periprostatic administration of local anesthesia during transrectal ultrasound-guided biopsy of the prostate: a randomized, double-blind, placebo-controlled study. *Urology* 2003;61(3):585-8.
- Landis SH, Murray T, Bolden S, Wingo PA. Cancer statistics, 1999. *CA Cancer J Clin* 1999;49(1):8-31.
- Wang MC, Papsidero LD, Kuriyama, Valenzuela LA, Murphy GP, Chu TM. Prostate antigen: a new potential marker for prostatic cancer. *Prostate* 1981;2(1):89-96.
- Matlaga BR, Eskew LA, Mccullough DL. Prostate biopsy: indications and technique. *J Urol* 2003;169(1):12-9.
- Hollingsworth JM, Miller DC, Wei JT. Local anesthesia in transrectal prostate biopsy. *Urology* 2006;67(6):1283-4.
- Saraçoğlu T, Unsal A, Taşkın F, Sevinçok L, Karaman CZ. The impact of pre-procedural waiting period and anxiety level on pain perception in patients undergoing transrectal ultrasound-guided prostate biopsy. *Diagn Interv Radiol* 2012;18(2):195-9.
- Dell'attı L, Borea PA, Russo GR. Age: "a natural anesthetic" in pain perception during the transrectal ultrasound-guided prostate biopsy procedure. *Urologia* 2011;78(4):257-61.
- Roy M, Peretz I, Rainville P. Emotional valence contributes to music induced analgesia. *Pain* 2008;134(1-2):140-7.
- Zhao H, Chen AC. Both happy and sad melodies modulate tonic human heat pain. *J Pain* 2009;10(9):953-6.
- Aus G, Abbou CC, Bolla M, Heidenreich A, Schmid HP, Van Poppel H, et al. EAU guidelines on prostate cancer. *Eur Urol* 2005;48(4):546-51.
- Zisman A, Leibovici D, Kleinmann J, Siegel YI, Lindner A. The impact of prostate biopsy on patient well-being: a prospective study of pain, anxiety and erectile dysfunction. *J Urol* 2001;165(2):445-54.
- Autorino R, De Sio M, Di Lorenzo G, Damiano R, Perdonà S, Cindolo L, et al. How to decrease pain during transrectal ultrasound guided prostate biopsy: a look at the literature. *J Urol* 2005;174(6):2091-7.
- Hollabaugh RS, Dmochowski RR, Steiner MS. Neuroanatomy of the male rhabdosphincter. *Urology* 1997;49(3):426-34.
- Raber M, Scattoni V, Roscigno M, Dehò F, Briganti A, Salonia A, et al. Topical prilocaine-lidocaine cream combined with peripheral nerve block improve pain control in prostatic biopsy: results from a prospective randomized trial. *Eur Urol* 2008;53(5):967-73.
- Giannarini G, Autorino R, Valent F, Mogorovich A, Manasero F, De Maria M, et al. Combination of perianal-intrarectal lidocaine-prilocaine cream and periprostatic nerve block for pain control during transrectal ultrasound guided biopsy: a randomized, controlled trial. *J Urol* 2009;181(2):585-91.
- Tsivian M, Qi P, Kimura M, Chen VH, Chen SH, Gan TJ, et al. The effect of Noise-cancelling Headphones or music on pain perception and anxiety in men undergoing transrectal prostate biopsy. *Urology* 2012;79(1):32-6.
- Roy M, Peretz I, Rainville P. Emotional valence contributes to music induced analgesia. *Pain* 2008;134(1-2):140-7.
- Zhao H, Chen AC. Both happy and sad melodies modulate tonic human heat pain. *J Pain* 2009;10(9):953-60.
- Yeo JK, Cho DY, Oh MM, Park SS, Park MG. Listening to music during cystoscopy decreases anxiety, pain, and dissatisfaction in patients: a pilot randomized controlled trial. *J Endourol* 2013;27(4):459-62.
- Djavan B, Waldert M, Zlotta A, Dobronski P, Seitz C, Remzi M, et al. Safety and morbidity of first and repeat transrectal ultrasound guided prostate needle biopsies: result of a prospective European prostate cancer detection study. *J Urol* 2001;166(3):856-60.
- Moussa AS, El-Shafei A, Diaz E, Gao T, Zaytoun MO, Fareed K, et al. Identification of the variables associated with pain during transrectal ultrasonography-guided prostate biopsy in the era of periprostatic nerve block: the role of transrectal probe configuration. *BJU Int* 2013;111(8):1281-6.
- Yun TJ, Lee HJ, Kim SH, Lee SE, Cho JY, Seong CK. Does the intrarectal instillation of lidocaine gel before periprostatic neurovascular bundle block during transrectal ultrasound guided biopsies, improve analgesic effect? A prospective, randomized trial. *J Urol* 2007;178(1):103-6.
- Bastide C, Lechevallier E, Eghazarian C, Ortega JC, Coulange C. Tolerance of pain during transrectal ultrasound guided biopsy of the prostate: risk factors. *Prostate Cancer Prostatic Dis* 2003;6(3):239-41.
- Rodriguez LV, Terris MK. Risks and complications of transrectal ultrasound guided prostate needle biopsy. A prospective study and review of the literature. *J Urol* 1998;160(6 Pt 1):2115-20.