

COMPARATIVE STUDY ON PERIPROSTATIC LOCAL ANESTHESIA WITH INTRAPROSTATIC LOCAL ANESTHESIA FOR ULTRASONOGUIDED TRANSRECTAL PROSTATIC BIOPSY

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Abstract :

Objectives: To compare pain, systemic lidocaine toxicity and complications between periprostatic with intraprostatic local anaesthesia for transrectal prostate biopsy.

Methods: This study was carried out in the Department of Urology, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka Medical College (DMCH) and Comfort Nursing Home, Dhaka during the period of January 2009 to October 2009, For this purpose, a total number of 60 consecutive patients having increased prostate specific antigen (PSA >4.0ng/ml), abnormal DRE/transrectal ultrasound were admitted in the above mentioned hospitals were enrolled in this study for surgical management.

Results: The age ranged from 50 to 90 years and the maximum number was found in the age group of 61-70 years in both groups. The mean(\pm SD) age was 68.5 \pm 7.5 years and 70.3 \pm 8.2 years in group I and group II respectively. The mean(\pm SD) PSA was 17.0 \pm 12.8ng/ml with their PSA ranged from 5.9- 62.8ng/ml in group I and in group II was 17.2 \pm 17.3ng/ml with their PSA ranged from 4.6 – 55.1ng/ml, which was not significant ($p > 0.05$) between two groups. Normal digital rectal was found 14(46.7%) and 16(53.3%) in group I and group II respectively. Carcinoma was found 13(43.3%) and 14(46.7%) in group I and group II respectively and rest of them were benign in group I and group II respectively. The mean(\pm SD) pain degree during biopsy was 2.6 \pm 1.1 and 2.0 \pm 1.2 in group I and group II respectively according to allocated pain score. Pain degree after 30 minutes of biopsy, most of the patients had no pain in both groups. Pain during anesthesia it was found that 4(13.3%) and 13(43.3%) of the patients had no pain in group I and group II respectively. The mean(\pm SD) pain degree during anesthesia was 2.7 \pm 1.2 and 2.1 \pm 1.2 in group I and group II respectively.

Conclusion: It is a simple and safe method that is less painful and it should be considered in all patients undergoing transrectal ultrasound guided prostate biopsy. The decreased discomfort of this procedure may enable more core biopsies to be taken in patients at high risk for prostate cancer or in those with an enlarged prostate.

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Introduction :

Transrectal ultrasound guided prostate biopsy is one of the most common procedures performed by urologists. Since its introduction in late 1980, TRUS guided biopsy has become a routine outpatient procedure for the diagnosis of prostate cancer. Over the past decade, one of the most significant development has been the ability

to provide local anaesthesia to patients undergoing TRUS procedure. Injection of a local anaesthesia into the perineum was a standard procedure when transperineal prostate biopsy was done but this type of anesthesia was abandoned when transrectal biopsy under ultrasound guidance became. Initially, biopsy involved taking a limited number of cores from a needle, with the sextant biopsy technique, which soon became the standard. By the time, the six cores were obtained, however, many patients reported pain.¹ The use of local anesthesia for

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prostate biopsy via a periprostatic block with few urologist opted to change their prostate biopsy procedure transrectal ultrasound (TRUS)-guided biopsy has become a routine outpatient procedure for the diagnosis of prostate cancer². Several methods of anesthesia have been proposed for lessening the discomfort associated with the procedure; of these, periprostatic local anesthetic infiltration is the most popular and has been proven to be most effective^{3,4}. Moreover, these studies aiming to determine the incidence of complications of periprostatic anesthetic infiltration before TRUS guided prostate biopsy have been limited to hemorrhagic or infectious complications, which are also common without the use of periprostatic anesthesia. The study, aimed to assess the frequency of complications and limitations related to local anesthetic infiltration. The vast majority of prostate cancers currently are detected by a combination of PSA screening and TRUS-guided biopsy of the prostate. Patient tolerance is a critical consideration based on the sensitivity of the prostate. Previously there was debate as to whether prostate biopsy actually causes significant discomfort for the patient, and clinicians traditionally took the biopsies with no anaesthesia⁵. However, up to 96% of patients report significant pain, and up to a third of patients who previously had a biopsy with no local anaesthetic periprostatic block (PPB) would refuse to undergo a repeat procedure without anaesthesia^{3,6}. Investigators have evaluated several methods of minimizing pain and improving patient acceptance of biopsy, including oral and i.v. sedation/analgesia, inhaled nitrous oxide, intrarectal anaesthetic gel, and PPB.^{7,8,9} A review of published reports on prostate biopsy and anaesthesia revealed that the PPB is the most commonly used method and is effective when compared with placebo or intrarectal gel¹⁰. There are several approaches by which the PPB can be delivered, but the ultimate goal for all of them remains complete abrogation of sensation within the prostate during biopsy. Until recently, there were no data on the ideal site for PPB injection¹¹. The most common technique uses a basal approach, where lidocaine, under TRUS guidance, is injected lateral to the junction of the prostate and seminal vesicles, which theoretically blocks the nerves as they approach the prostate from their origin in the pelvic plexus. The preference for the basal approach over that of an apical route might also be related to the greater potential for pain associated with anal pain fibres that often overlie the apex.

To minimize further pain a completely new method, namely intraprostatic anesthesia and compared it with traditional periprostatic anesthesia. Better analgesia would be achieved by anesthetizing the prostate itself, which is the source of pain. Such a method would need to block all sensory nerves, not only from the posterior, but also from the anterior side. Intraprostatic administration of local anesthesia significantly decreases pain during prostate biopsy compared with periprostatic injection. In addition, the number of patients who had a pain score above 4 in the periprostatic group was 7.0% and in the intraprostatic group it was 3.0%). Thus, the proportion of patients with severe pain seemed to be lower in the intraprostatic group than in the periprostatic group, although this difference was not statically significant^{12,13,14,15}.

Materials and Methods:

The study was a hospital based prospective study comprises of 60 adult male patients with increased prostate specific antigen(PSA > 4.0 ng/ml), abnormal DRE finding and abnormal transrectal ultrasound, attending in BSMMU, Dhaka Medical College Hospital and Comfort Nursing Home from January 2009 to October 2009 in the department of Urology , BSMMU. Patients were included according to selection and exclusion criteria with a target to recruit finally not less than 30 cases in each group . Grouping was done as Group I : Periprostatic L/A (30)and Group II : Intraprostatic L/A(30) . Inclusion criteria was : a) Adult male b) Increased prostate specific antigen (PSA > 4.0 ng/ml) c) Abnormal DRE finding (nodule) d) Abnormal transrectal ultrasound (hypoechoic lesion) . All patients were given an explanation of the study and informed written consent was taken each patient as per instruction of the ethical committee. Patients were usually placed in the left lateral position with knees and hips flexed at 90°. Lidocaine gel was used with 7 MHZ probe . The prostate was imaged in the transverse and sagittal planes and prostate volume was measured by the non planimetric ellipsoid method. For periprostatic anaesthesia 5 ml 1.0 % lidocain were injected via 7 inch 22 gauge PCN needle into region prostatic vascular pedicle at the base of the prostate just lateral to the junction between the prostate and seminal vesicles and for intraprostatic a total of 10 ml 1.0 % lidocain in portions were injected at 2 sites in the right and left sides of the prostate from base to apex^{16,17}. Immediately after injections 10 core biopsies were obtained with an 18 gauge needle. After completion of the procedure patients

were given a questionnaire enquiring about morbidity and pain threshold . They were asked to complete it and mail it to the urology department . Safety measure was taken to monitor ligocain toxicity.

Result :

After proper explanation of all aspects of the study, every patient was scheduled for USG - guided transrectal prostatic biopsy under local anesthesia.

Table I
Systemic lidocaine toxicity in periprostatic and intraprostatic groups

Systemic lidocaine Toxicity	Group I (n=30)		Group II (n=30)	
	n	%	n	%
Lidocaine allergy	0	0.0	0	0.0
Hypotension	0	0.0	0	0.0
Anaphylactic reaction	0	0.0	0	0.0
Dizziness	2	6.7	0	0.0
Visual disturbance	1	3.3	0	0.0

Group I: Periprostatic

Group II: Intraprostatic

Table – I showed that the no systemic lidocaine toxicity was observed in group II. But only dizziness were found in 2 cases (6.7%) and visual disturbance were found in 1 (3.3%) case respectively in group I.

Table II
Complications in periprostatic and intraprostatic groups

Complications	Group I (n=30)		Group II (n=30)		P value
	n	%	n	%	
Urinary tract infection					
Yes	2	6.7	1	3.3	^b 0.500
No	28	93.3	29	96.7	
Hematuria					
Yes	23	76.7	19	63.3	^a 0.259
No	7	23.3	11	36.7	
Rectal bleeding					
Yes	14	46.7	11	36.7	^a 0.432
No	16	53.3	19	63.3	

Group I: Periprostatic

Group II: Intraprostatic

^a= p value reached from chi square test

^b= p value reached from fisher exact test

Regarding the complications the table- II showed urinary tract infection was found 2(6.7%) in group I and 1(3.3%) in group II patients. Hematuria was found 23(76.7%) in group I and 19(63.3%) in group II. Rectal bleeding was found 14(46.7%) in group I and 11(36.7%) in group II. The statistically not significant (p>0.05) between two groups in chi square and fisher exact test respectively.

Table III
Degree of Pain during anesthesia in periprostatic and intraprostatic groups

Degree of pain during anesthesia	Group I (n=30)		Group II (n=30)		P value
	n	%	n	%	
No pain	4	13.3	13	43.3	^a 0.009
Pain	26	86.7	17	56.7	
Mild	13	50.0	8	47.1	
Moderate	11	42.3	8	47.1	^a 0.942
Severe	2	7.7	1	5.9	
Mean±SD	2.7	±1.2	2.1	±1.2	^b 0.05NS

Group I: Periprostatic

Group II: Intraprostatic

S= significant, NS= not significant

^a P value reached from Chi square test

^b P value reached from Mann Whitney U test

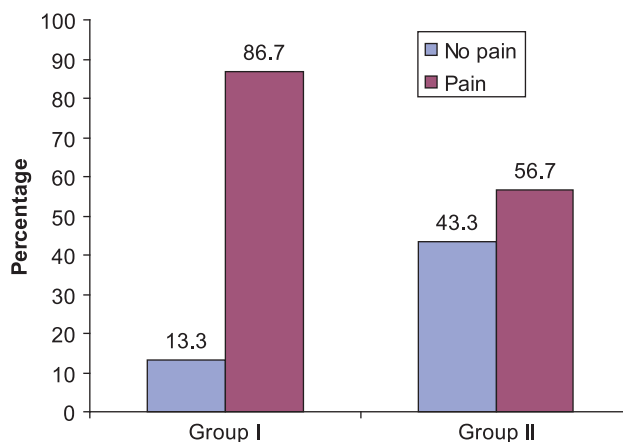


Fig 1 : Bar diagram showing pain during anesthesia in periprostatic and intraprostatic groups

Fig -1 showed pain during anesthesia of patients group I in 4(13.3%) and 13(43.3%) of patients in group II had no pain. However, 26(86.7%) had pain in group I and 17(56.7%) in group II and the difference is statistically significant. A total of 43 patients had pain, out of which 26 and 17 patients were in group I and group II respectively. Table –III showed in group I, it was found

13(50.0%) had mild pain, 11(42.3%) moderate and 2(7.7%) had severe pain during anesthesia. In group II, 8(47.1%) had mild pain, 8(47.1%) moderate and 1(5.9%) had severe pain. Which was not statistically significant ($p>0.05$).

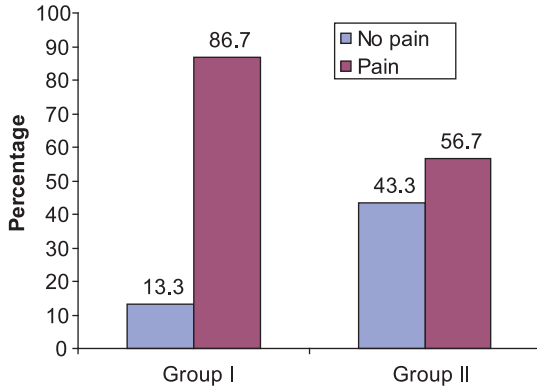


Fig 2: Bar diagram showing pain during biopsy in periprostatic and intraprostatic groups

Figure 2 showed that the regarding the pain degree during biopsy it was found that most 4(13.3%) patients had no pain in group I and 13(43.3%) in group II. However, 26(86.7%) had pain in group I and 17(56.7%) in group II. No pain was significantly ($p<0.05$) higher in group II compared to group I. A total of 43 patients had pain, out of which 26 and 17 patients were in group I and group II respectively. In group I, it was found 13(50.0%) had mild pain, 11(42.3%) moderate and 2(7.7%) had severe pain during biopsy. In group II, 8(47.1%) had mild pain, 8(47.1%) moderate and 1(5.9%) had severe pain. Which was not statistically significant ($p>0.05$).

Table IV

Pain after 30 minutes of biopsy in periprostatic and intraprostatic groups

Pain degree after 30 minutes of biopsy	Group I (n=30)		Group II (n=30)		P value
	n	%	n	%	
No pain	11	36.7	13	43.3	^a 0.598
Pain	19	63.3	17	56.7	
Mild	10	52.6	9	52.9	
Moderate	8	42.1	7	41.2	^a 0.995
Severe	1	5.3	1	5.9	
Mean±SD	2.1 ±1.1		2.0 ±1.2		^b 0.740 ^{NS}

Group I: Periprostatic

Group II: Intraprostatic

NS= not significant

^a P value reached from Chi square test

^b P value reached from Mann Whitney U test

Table-IV and figure 3 showed that the pain degree after 30 minutes of biopsy it was found that most of the patients had no pain in both groups, which were 11(36.7%) and 13(43.3%) of the patients respectively. However, 19(63.3%) had pain in group I and 17(56.7%) in group II. No significant ($p>0.05$) difference were found regarding the pain degree after 30 minutes of biopsy between two groups. A total of 36 patients had pain, out of which 19 and 17 patients were in group I and group II respectively. In group I, it was found 10(52.6%) had mild pain, 8(42.1%) moderate and 1(5.3%) had severe pain during biopsy. In group II, 9(52.9%) had mild pain, 7(41.2%) moderate and 1(5.9%) had severe pain. Which was not statistically significant ($p>0.05$).

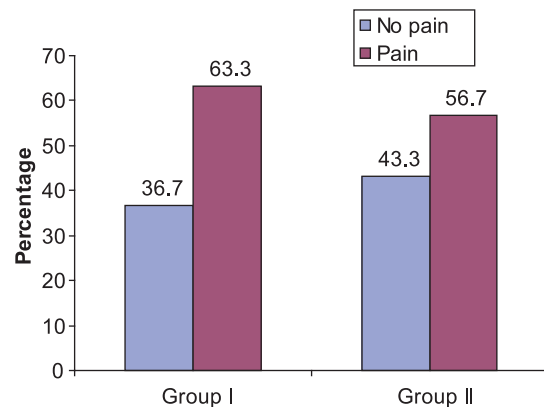


Fig 3: Bar diagram showing pain after 30 minutes of biopsy in periprostatic and intraprostatic groups

Table V

Follow up Data reviewed-3 weeks after biopsy

Three weeks after biopsy	Group I (n=30)		Group II (n=30)	
	n	%	n	%
None	30	100.0	30	100.0
Mild	0	0.0	0	0.0
Moderate	0	0.0	0	0.0
Severe	0	0.0	0	0.0

Group I: Periprostatic

Group II: Intraprostatic

Three weeks after biopsy it was found that no patients had pain in both group.

Table – VI showed that the location of the pain was found that most of the patients felt pain in rectum/anns in both groups, which were 17(56.7%) and 12(40.0%) of the patients respectively. In group I, no pain feel 9(30.0%), pain feel in penis 2(6.7%), scrotum/testis 1(3.3%) and

abdomen 1(3.3%). In group II, no pain feel 11(36.7%), pain feel in penis 2(6.7%), scrotum/testis 1(3.3%) and abdomen 4(13.3%). The difference was not statistically significant ($p>0.05$) between two groups in chi square test.

Table VI

Pain location in periprostatic and intraprostatic groups

Pain location	Group I (n=30)		Group II (n=30)		P value
	n	%	n	%	
None	9	30.0	11	36.7	0.581
Rectum/anns	17	56.7	12	40.0	
Penis	2	6.7	2	6.7	
Scrotum/testis	1	3.3	1	3.3	
Abdomen	1	3.3	4	13.3	

Group I: Periprostatic

Group II: Intraprostatic

P value reached from chi square test

Discussion :

TRUS-guided biopsy of the prostate has become a ubiquitous and critical tool for evaluating and managing prostate cancer. Improving patient tolerance and comfort associated with the procedure, by decreasing associated pain and morbidity, is therefore of paramount importance. In current practice there are several methods by which prostatic anaesthesia or analgesia can be achieved, including i.v. or oral sedation, intrarectal gels and periprostatic injection with lidocaine. Of these methods, the periprostatic injection with anaesthetic is clearly the most effective¹⁰, but there is no consensus on the ideal site for delivery of the anaesthetic agent. The original description of one bilateral injection with lidocaine shows that it is clearly effective and can be mastered easily¹. The rationale is that most prostatic innervation appears to arise from the pelvic plexus, so the incoming nerves are blocked lateral to the prostatic base as they approach the gland. This site is readily identified by the hyperechoic pyramid that corresponds to the fat in the notch between the prostatic base and seminal vesicles on TRUS. Due to its white, peaked appearance, the investigators describe this as the 'Mount Everest sign' to assist clinicians with recognizing the correct site of injection⁸.

Regarding lidocain toxicity, it was observed that lidocaine allergy, hypotension and anaphylactic reaction were not found in both groups. However, dizziness and visual

disturbance were found 1(3.3%) and 1(3.3%) in group I and group II respectively. As regards to the systemic lidocaine toxicity, a number of investigators studied 2.0% in their studies¹⁸. Regarding the complications biopsy procedure the present study showed that rectal bleeding and urinary tract infection were observed 2(6.7%) and 1(3.3%) in group I and group II respectively. The same complication were found in 2% of case in the study in their series^{3,19,20,21}. In the current study urinary tract infection was 2(6.7%) in group I and 1(3.3%) in in group II. Regarding the hematuria, there are other studies have shown in a prospective study that having 63.0% and 75.0% in group I and group II respectively, which are consistent to the present study, where the present study found hematuria 23(76.7%) in group I and 19(63.3%) in group II. Similar results obtained by some investigators in their study^{3,12}. In this study it was observed that Rectal bleeding was 14(46.7%) in group I and 11(36.7%) in group II. Similar findings found¹².

In the present study it was found that 4(13.3%) and 13(43.3%) of the patients had no pain in group I and group II respectively during anesthesia. Mild pain was found 13(50.0%) in group I and 8(47.1%) in group II. The mean(\pm SD) pain degree after biopsy was 2.7 ± 1.2 and 2.1 ± 1.2 in group I and group II respectively according to allocated pain score. The mean pain degree difference was not statistically significant ($p>0.05$) between two groups during anesthesia.

Some investigators reported in their study that the patient responses to the 5 queries about pain in their study. The mean score \pm SD for the degree of pain during biopsy in the periprostatic group was 2.6 ± 1.1 and in the intraprostatic group it was 1.9 ± 1.1 . This difference was significant ($p<0.05$). Including the degree of pain after 30 minutes of biopsy and duration of pain, were not significantly ($p>0.05$) different between the two groups^{19,20}. The results obtained in above authors is strongly support the present study, where the pain degree during biopsy it was found that most patients had mild pain in group I which was 13(50.0%) and in group II no pain was predominant which was 13(43.3%) of the patients. The mean(\pm SD) pain degree during biopsy was 2.6 ± 1.1 and 2.0 ± 1.2 in group I and group II respectively according to allocated pain score. The mean pain degree difference was statistically significant ($p<0.05$) between two groups. Similarly, pain degree after 30 minutes of biopsy, it was found that, 11(36.7%) and 13(43.3%) of the patients had no pain in both groups respectively. The mean(\pm SD) pain degree after 30 minutes of biopsy was 2.1 ± 1.1 and 2.0 ± 1.2 in group I and group II respectively according to

allocated pain score. The mean pain degree after 30 minutes of biopsy difference was not statistically significant ($p>0.05$) between two groups.^{22,23}

The result of pain during biopsy, after 30 minutes of biopsy and during anaesthesia in the present study were strengthened by similar observations^{22,22,23}. All these investigators have observed comparable pain score in both groups.

Some authors mentioned for the location of pain and medicine intake for pain there were no apparent differences between the two groups, which strongly support the present study, where the present study found that most of the patients felt pain in rectum/anus in both groups, which were 17(56.7%) and 12(40.0%) of the patients respectively. In group I, no pain feel 9(30.0%), pain feel in penis 2(6.7%), scrotum/testis 1(3.3%) and abdomen 1(3.3%). In group II, no pain feel 11(36.7%), pain feel in penis 2(6.7%), scrotum/testis 1(3.3%) and abdomen 4(13.3%). The difference was not statistically significant ($p>0.05$) between two groups¹².

Conclusion :

This prospective study was carried out to compare pain, assess systemic lidocaine toxicity and complications between periprostatic with intraprostatic local anaesthesia for transrectal prostate biopsy. For this purpose, a total number of 60 consecutive patients having increased prostate specific antigen (PSA $>4.0\text{ng/ml}$), abnormal DRE/transrectal ultrasound were admitted in the above mentioned hospitals were enrolled in this study. This study presents intraprostatic local anesthesia technique is more acceptable than periprostatic local anesthesia technique for prostate biopsy. It is a simple and safe method that is less painful and it should be considered in all patients undergoing transrectal ultrasound guided prostate biopsy. In addition, the decreased discomfort of this procedure may enable more core biopsies to be taken in patients at high risk for prostate cancer or in those with an enlarged prostate. Further randomized studies using validated questionnaires should help demonstrate the usefulness of this new technique.

Conflict of interest: None declared.

Recommendations :

1. More studies should perform with large number of patients to draw a final conclusion.
2. Study with other local anesthetic agent (e.g. lidocain gel) should be performed to justify the

degree of pain and complication of perprostatic and intraprostatic agent which is an invasive procedure.

3. Intraprostatic local anesthetic technique should be considered in all patients under going transrectal ultrasound guided prostate biopsy.

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