COMPARISON OF ENDOSCOPIC VERSUS PERCUTANEOUS APPROACH (BLIND) TO CONTROL THE OBTURATOR JERK IN PATIENTS UNDERGOING TRANSURETHRAL RESECTION OF BLADDER TUMORS UNDER SPINAL ANESTHESIA

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Abstact

Objective: *The aim of the study was to compare the endoscopic versus percutaneous approach (blind) to control the obturator jerk in patients undergoing transurethral resection of bladder tumors under spinal anesthesia.*

Materials and methods*: A prospective observational study was performed in Department of Urology, Chittagong Medical College, Chittagong and some Private Hospitals (Ltd.) in Chittagong city during the period from January 2016 to June 2016. Total 100 patients were grouped into two, on alternate basis. Fifty(50) patients in group-A conducted with endoscopic infiltration with 20ml of injection 2% lignocaine at the bladder tumor base and another 50 patients in group-B, conducted with blind percutaneous technique with same drug and volume (20ml inj.2% lignocaine) to control obturator jerk. Severity of obturator jerk in both procedure, percentage of complete resection, ONB procedure related time, ONB procedure related complications and surgeon's satisfaction level were recorded and compared between two approaches. Chi-square analysis was performed to compare the ease of approach and outcome of the two techniques. A value of P<0.05 was considered statistically significant.*

Results: *The mean age of the patients were 59.44+7.681. In group-A, 50 patients were given inj. 2% lignocaine endoscopically at the bladder tumor base to control obturator jerk. Twenty five patients (50%) had no jerk, 20 patients(40%) developed mild jerk and 5 patients (10%) developed moderate jerk and no patients developed severe jerk. Second attempt was taken in moderate jerk patients (5 patients) and succeeded in 3(6%) patients. So, in this group, complete resection of bladder tumor was possible in 96%. In group B, complete resection of bladder tumor was possible in 84%. Statistical analysis was done and result is significant in case of endoscopic procedure to control obturator jerk(p<0.05). ONB Procedure related time was <20 mins. in 32(64%) patients in group-A and 45 (90%) patients in group-B. 20 mins. or more time was required for 18 (36%) patients in group-A and 5 (10%) patients in group-B. Statistical analysis was done and result is significant in percutaneous (blind) technique (p<0.05). ONB procedure related complications in group-A and Group –B were noted. Statistical analysis was done and result is insignificant (p>0.05). Surgeons satisfaction level were recorded on the basis of obturator jerk block and complete resection and which was statistically significant in favour of endoscopy group (p<0.05).*

Conclusion*: It is concluded that endoscopic injection of 2% lignocaine into the bladder tumor base is better in case of jerk elimination and complete resection than blind percutaneous approach. Though, ONB procedure related time was significantly less in percutaneous group.*

Key words: *Endoscopic approach, percutaneous approach, obturator jerk, transurethral resection of bladder tumors.*

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Introduction

Bladder cancer is the second most common cancer of the genitourinary tract. It accounts for 7% of new cancer cases in men & 2% of new cancer cases in women[1]. The recurrence rate is 70% and out of these 6%-10% show a progression with an eventual lethal outcome[2].

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Standard treatment of superficial bladder tumor is transurethral resection with intra vesical chemo or immunotherapy. Urethrocystoscopy and transurethral resection of bladder tumor whether it is superficial or muscle invasive; would be diagnostic as well as therapeutic[3]. But per-operatively, transurethral resection of bladder tumor is not free of difficulties. One of the most important difficulty is obturator jerk that may bring disaster during the procedure. Obturator jerk is the sudden involuntary reflex contraction of adductor group of muscles due to electrical stimulation of the obturator nerve. To avoid the obturator jerk reflex, urologist often can not fully resect the tumor on the lateral and infero lateral bladder wall[4]. The incidence of severe adductor muscle spasm (obturator jerk) was reported to be around 20%.

Various measures are available in the literature for its prevention are- (1) General anesthesia 2) Reduction in the intensity of the resector (3) Use of laser resector (4) Changes in the site of the inactive electrode 5) shifting to saline irrigation. 6) periprostatic infiltration 7) Nerve cooling. But unfortunately all of the above techniques have been proven ineffective and a selective obturator nerve block still remains the safest and most effective alternative to this problem[5].

Different approaches for the obturator nerve block had evolved in the last decade. Choquet *et al,* described the inguinal approach with using nerve stimulator[6]. According to Richard R et al, with the blind classic approach, the effectiveness of inhibiting the obturator jerk reflex was about 80%[7]. According to Malik M A et al, success rate of blind percutaneous approach is 90.5%[8].

In Bangladesh only one study has been performed in BSMMU on the basis of infiltration of injection 2% lignocaine into the bladder wall at the the tumor base through endoscopic route and success rate was 100%[9]. But, there is a scarcity of study in our country through percutaneous (blind) approach to control obturator jerk.

So, this prospective observational study has been designed to assess and compare the obturator nerve block in both endoscopic and percutaneous (blind) procedure.

Materials and Methods

This is a prospective observational study and this study had been conducted on the patients with urinary bladder tumor admitted in the department of Urology, Chittagong Medical College Hospital, Ekushey Hospital Pvt. Ltd., CSCR Hospital Pvt. Ltd. and Surgiscope Hospital Pvt .Ltd. in Chittagong City. from January 2016 to June 2016. Purposive sampling technique was applied to collect the sample from study population having mass on lateral and infero-lateral bladder wall. In this prospective study fifty consecutive patients were selected by exclusion and inclusion criteria in each group (group-A and group- B). The mean age group of our patients were 59.44+7.681.

All patients were evaluated by history, physical examinations and investigations..

Informed written consent was obtained from the patients after full explanation about purpose of the study, expected outcome and possible complications. They were informed of their right to withdraw from the study at any stage. After relevant investigations(USG of KUB, panendoscopy and routine investigations) each patient was prepared for operative procedure.

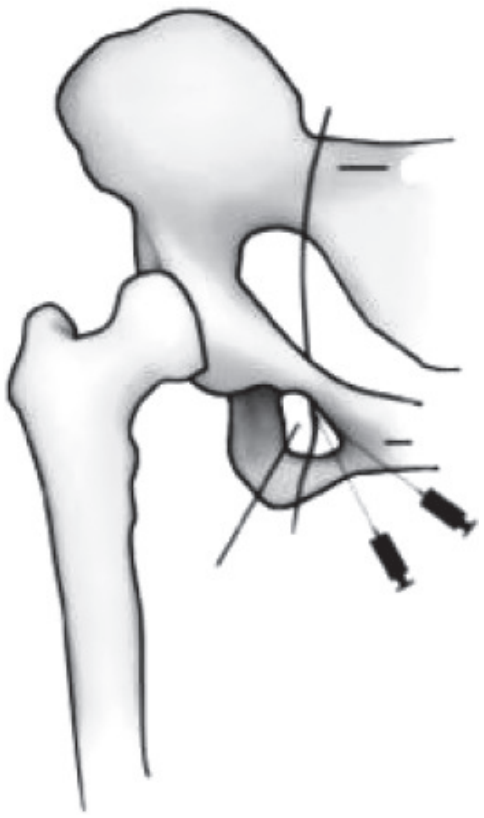

Fig.-1: *Pathway and blockage of the obturator nerve. The obturator nerve passes through the obturator foramen. The needle tip is inserted into the obturator foramen in a fan-like fashion.*

(a) (b) (c)

Fig.-2: T*echnique of Pubic Approach (blind) for Obturator Nerve Block*

After spinal anesthesia , routine cystoscopy was done to assess exact location and size of the tumor. For the blind percutaneous technique, the patient is placed in the lithotomy position or leg abduction position. The needle insertion point is 1.5 cm lateral and 1.5 cm inferior to the pubic tubercle.The needle insertion point has already been anesthetized by lower body anesthesia, thus local anesthesia for the skin is not required. The needle is inserted through the skin almost vertically. If the needle tip makes contact with the inferior margin of the superior pubic ramus, then it must be withdrawn to just beneath the skin and advanced 15Ú~30Ú laterally and 10Ú~20Ú superiorly-posteriorly for 2~4 cm (Fig. 2). The syringe is drawn back to ensure that no blood returns before injecting 5 ml of 1% lidocaine. The needle is slightly withdrawn and advanced both 1 cm laterally and medially, and 5 ml of 1% lidocaine is again injected after ensuring no blood back-flow (Fig. 3). Steps 3 to 5 place the needle around the obturator nerve by 3 needle advancements, and after ensuring no blood back-flow, 5 ml of 1% lidocaine is injected in a fan-like fashion.

Endoscopic infiltration of 2% lignocaine inj. into the bladder tumor base is done in lithotomy position under spinal anesthesia. Endoscopic instrument set up done and cystoscopy proceed. Special needle introduced through special sheath with obturator. 20ml syringe with lignocaine attached with at the back of the needle. Tumor base identified, local anesthetic infiltrated in multiple points.

Per-operative presence or absence of obturator jerk is noted by visual observation. Duration of ONB Procedure, complications of ONB related procedure, surgeon's satisfaction level on ONB procedure were recorded in the data collection sheet. Patientst were monitored with NIBP, pulse, SpO_2 and ECG intraoperatively. General anesthesia with muscle relaxation and intubation were planned in those cases where second attempt of ONB also failed.

Results:

The mean age of the patients were 59.44+7.681. In group-A, 50 patients were given inj. 2% lignocaine endoscopically at the bladder tumor base to control obturator jerk . Twenty five patients (50%) had no jerk, 20 patients(40%) developed mild jerk and 5 patients (10%) developed moderate jerk and no patients developed severe jerk. Second attempt was taken in moderate jerk patients (5 patients) and succeeded in 3(6%) patients. So, in this group, complete resection of bladder tumor was possible in 96%. In group B, 10patients (20%) developed no jerk, 29 patients (58%) developed mild jerk and 11 patients (22%) developed moderate jerk and no patients developed severe jerk. Second attempt was taken in moderate jerk patients (11 patients) and succeeded in 3(6%) patients. In this group, complete resection of bladder tumor was possible in 84%. Statistical analysis was done and result is significant in case of endoscopic procedure to control obturator jerk.*(p<0.05).* ONB Procedure related time was <20 mins. in 32(64%) patients in group-A and 45 (90%) patients in group-B. 20 mins. or more time was required for 18 (36%) patients in group-A and 5 (10%) patients in group-B. Statistical analysis was done and result is significant in percutaneous (blind) technique *(p<0.05*). ONB procedure related complications in group-A (meatus injury, urethral injury, bladder neck injury, difficulty in injection at the bladder tumor base, hemorrhage etc.) were noted in 14(28%) patients where as complications in Group –B (injury to the vessel, injury to the nerve, hematoma) were 10(20%) patients. Statistical analysis was done and result is insignificant *(p>0.05*). Surgeons satisfaction level were recorded on the basis of obturator jerk block and complete resection. Surgeon was satisfied about 41 patients (82%) in group A and 36(72%) patients in group B and which was statistically significant in favour of endoscopy group (p<0.05).

Table I

Distribution of quantitative variables.

Name of the procedur	Age	Systolic blood pressure	Diastolic blood pressure	Hb%	Random blood sugar	Serum creatinine
Endoscopic (n=50)	59.84±7.476	131.20±12.55	78.80±7.73	10.20±1.14	6.52±1.14	1.04±0.19
Percutaneous (n=50)	59.04±7.936	125.20 ±15.08	76.80±8.43	10.80±1.21	6.52±1.21	1.00±000
Mean± SD	59.44±7.681	128.20±14.13	77.80±8.11	10.50±1.21	6.52±1.17	1.02±0.14
Total(n=100)	100	100	100	100	100	100

Table II

Distribution of qualitative variables

Attributes	Group-A	Group-B	p value
Gender(M:F)	2:1	3:1	0.241
Locations of tumor(lat.wall)	41	39	0.47
Post wall & bladder neck	9	11	0.231

Table III

Duration of the ONB procedure.

Group-A(no. of pt.)	Time (min)	Group-B (no. of pt,)	Time (min)
6	25	4	18
4	23	10	16
8	22	14	15
22	20	14	12
10	18	8	10
Total 50	Mean 21.6	Total 50	Mean 16.8

Table IV

Intensity of Obturator Jerk

	Group-A	Group-B		Total		P
Obturator Jerk	No	Count	25	10	35	value*
		% within Name of the procedure	50.0%	20%	35.0%	0.0176
	Mild	Count	20	29	49	
		% within Name of the procedure	0%	58.0%	49.0%	0.043
	Moderate	Count	5	11	16	0.031
		% within Name of the procedure	10.0%	22.0%	16.0%	
	severe	%	0	0	0	0
Total			50	50	100	
			100.0%	100.0%	100.0%	

Table IV
Percentage of Complete resection

		Group-A	Group-B	Total	P value*	
	Yes	Count	48	42	90	
	%	within	96.0%	84.0%	90.0%	
Complete resection		Name of procedure				0.021
	No	Count	2	8	10	
		% within	4.0%	16.0%	10.0%	0.001
		Name of procedure				
Total		Count	50	50	100	
		% within	100.0%	100.0%	100.0%	
		Name of procedure				

Table V
Surgeon's satisfaction level in both procedure.

		Group-A	Group-B	P value*	
Surgeon's	Satisfied	Count	41	36	0.023
satisfaction		% within	82.0%	72.0%	
		Name of procedure			
	Not satisfied	Count	9	14	0.045
		% within	18.0%	30.0%	
		Name of procedure			
Total	Count	50	50	100	
		% within	100.0%	100.0%	
		Name of procedure			

Table VI
ONB Procedure related complications.

			Group-A	Group-B	Total	P value*
Procedure related complications	Yes	Count	14	10	24	
(Bleeding, hematoma, nerve		% within	28.0%	20%	24.0%	0.098
injury, urethral injury, bladder		Name of the procedure				
neck injury etc.)	No	count	36	40	76	
		% within	72.0%	80.0%	76.0%	0.532
		Name of the procedure				
	Total	Count	50	50	100	
		% within	100.0%	100.0%	100.0%	
		Name of the procedure				

Discussion

Obturator jerk is one of the most common disastrous difficulties during transurethral resection. When the bladder wall is distended with irrigation fluid with about 300 ml, the obturator nerve lies very close to the lateral bladder wall *(Kourifes C and Ravi R).* Thus, when performing transurethral surgery, an electric current can easily stimulate the obturator nerve and activates the adductor muscle jerk, resulting in a sudden leg movement, which may in turn lead to

extraperitoneal perforation of the bladder wall with the resectoscope loop. Also, intraperitoneal perforation or obturator artery rupture may occur. In case of perforation, tumor dissemination can reach upto 4% (*Pladzyk K et al.)*

The incidence of severe adductor muscle spasm in patients undergoing transurethral surgery for lateral, iferolateral, posterolateral wall and neck involved bladder tumors were reported about 20% (*Moningi S et al* **).** For this reason, selective ONB is considered as the safest and most effective method to resolve this problem.(*Youn Yi Jo et al.)*

The present study has been designed to compare the obturator jerk block in both procedures; to compare the percentage of complete resection, jerk abolition, ONB procedure related time, ONB procedure related complications and to compare the surgeon's satisfaction level. Both techniques were performed after induction of spinal anesthesia.

In this study group- A age ranges from 55-70 years and mean age SD 59.84±7.476 years, in group-B age ranges from 52-65 years and mean age SD 59.04 ±7.936.

Duration for each ONB procedure was noted. Time required for endoscopic approach is more as compared to blind percutaneous approach and was statistically significant ($p<0.05$). Malik M A et al(2013'Dec.) also had similar result.

In our study, overall jerk elimination rate is more in endoscopic approach (90%vs 78%) and was statistically significant ($p<0.05$) . In a study of Rahman S et al, complete elimination of obturator jerk with endoscopic technique is 93.3%. So, our result of obturator jerk elimination through endoscopic approach is almost similar (93.3% vs 90%).

In group–A, rate of complete resection was more as compared to group-B. Statistical analysis was done and result was significant (96% vs 84%, P=0.021). Rahman S et al stated that, overall response of endoscopic technique in complete resection of bladder tumor was 100% and it is almost similar with our endoscopic result(100%vs 96%). According to Richard R et al, with the blind anatomic approach (pubic), the effectiveness of inhibiting the obturator jerk was about 80%. Malik M A et al found that, the success rate of blind anatomic approach of ONB is 90.5%. So, our result on percutaneous (blind) technique is almost similar to Richard R et al and little bit away from Malik M A et al.

Procedure related complications were also evaluated in our study. Urethral injury, bladder neck injury, loss of vision due to hemorrhage, hematoma and difficulty in anatomical land mark identification and percutaneous site infection were noted in both group. Statistical analysis was done and result was insignificant.(P>0.05) There were no incidents of urinary bladder perforation.

In our study, we measured surgeon's satisfaction level on the basis of jerk abolition and complete resection in each procedure. Surgeon's satisfaction were significantly higher in group-A than with group-B (82% vs 72%,P=0.023). Surgeon's satisfaction level may be increased if we can block the accessory obturator nerve. Rahman S et al, showed that in endoscopic technique obturator jerk block and complete resection of bladder tumor(surgeon's satisfaction) was 93.3%.

This study showed two important techniques of obturator jerk block and also showed advantage and disadvantages of one over another. But, in respect of successful obturator jerk block, complete resection, surgeons satisfaction level, endoscopic approach is superior to percutaneous (blind) approach.

Conclusion:

It is concluded that endoscopic injection of 2% lignocaine into the bladder tumor base is better in case of jerk elimination, complete resection and surgeon's satisfaction level than blind percutaneous approach. Though, ONB procedure related time was significantly less in percutaneous (blind) group.

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