



Outcome of Obturator Nerve Block by Inguinal and Transvesical Approach in Transurethral Resection of Bladder Tumor

Md. Mahmud-Ur-Rahman¹, Md. Shafiqul Alam Chowdhury², Md. Amanur Rasul³, Sudip Das Gupta⁴, Mohammed Mizanur Rahman⁵

Received: 07 - 05 - 2020
Accepted: 05 - 08 - 2020
Conflicts of interest: None

Abstract

Introduction and aim of the study: Spinal anaesthesia for transurethral resection of bladder tumor (TURBT) does not prevent unintended stimulation of the obturator nerve when electro resection is performed on the lateral and Postero-lateral wall of the bladder. It results in muscle contraction of the adductor muscles of the thigh, which may lead to perforation of bladder wall with the resectoscope loop. The aim of the study was to compare the outcome of obturator nerve block by inguinal and transvesical approach.

Materials and Methods: A prospective experimental study was done in the department of Urology Dhaka Medical College Hospital during the period of November 2016 to April 2018. Total 60 Patients were included for the study as per inclusion and exclusion Criteria. Patients were then allocated purposively into two groups by simple random sampling. Group A consisted of 30 patients where obturator nerve block (ONB) was done by transvesical approach and Group B also consisted of 30 patients where ONB was done by inguinal approach.

Results: In the present study, the baseline characteristics of the patients in Group-A and Group-B were almost similar having no statistically significant difference. Obturator jerk more frequently occurred in group-B, in 13 (56.37%) patients following TURBT compared to Group-A, where 05 (16.67%) patients developed obturator jerk. The inter-group difference was statistically significant ($p < 0.05$). In case of 26 (86.67%) patients tumour was completely resectable in group-A, while in 21 (70.00%) patients of Group-B tumour was completely resectable. This was not a statistically significant difference ($P > 0.05$). There was no incidence of bladder wall perforation in group-A, whereas this complication occurred in 02 (06.67%) cases of Group-B ($p > 0.05$). Mean operative time in Group-A and group-B is 50.46 (± 11.64) and 59.10 (± 15.83) respectively ($p < 0.05$).

Conclusion: We conclude that transvesical approach is better in case of Jerk elimination and Less Procedure related time than inguinal approach during TURBT

Keywords: Calyceal access, complications, dilatation, percutaneous nephrolithotomy, renal calculi, nephrostomy, feasibility.

Introduction

Transurethral resection of bladder tumors (TURBT) is a gold-standard method for the diagnosis, treatment, and staging of bladder tumor. During and after the

resection, several complications may occur. Although bleeding is the most common complication, the most important complication is the bladder perforation, which is about 1-6%.¹ Considering to localization of

1. Registrar, Department of Urology, SSMC Mitford Hospital
2. Professor, Department of Urology, Dhaka Medical College & Hospital, Dhaka
3. Professor & Head, Department of Urology, Dhaka Medical College & Hospital, Dhaka
4. Associate Professor & Head Department of Urology, SSMC Mitford Hospital
5. Associate Professor, Department of Urology, Patuakhali Medical College, Patuakhali

Correspondence: Dr. Md. Mahmud-Ur-Rahman, Registrar, Department of Urology, SSMC Mitford Hospital, Dhaka-1000, Bangladesh. E-mail: mahmudurss31@gmail.com

tumor, the risk of bladder perforation is more likely if tumor is located at the lateral wall of bladder and obturator jerk is responsible for this disastrous complication in most of the cases.² 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, urologist often cannot fully resect the tumor on the infero-lateral bladder wall.³ Within the pelvic cavity, the obturator nerve runs close to prostatic urethra, bladder neck and inferio-lateral bladder wall.⁴ When the bladder is distended with irrigation fluid, the obturator nerve is very close to the inferiolateral bladder wall. Thus, when performing transurethral surgery, in full bladder electric current can easily stimulate the obturator nerve and activating the obturator jerk, which can suddenly push the bladder wall towards the electro-cautery blade and leads to perforation.⁵ and may even cause injury to the iliac vessels.⁶

Various measures are available for prevention of stimulation of the obturator nerve. But most of the techniques have been proven ineffective.⁷ Narins (1957) and Hobika(1961) proposed the use of D-tubocurarine and succinylcholine to block neuromuscular transmission during general anesthesia, in order to prevent the obturator jerk. Administration of neuromuscular blockers requires endotracheal intubation, which bears lot of risk especially in geriatric patients.⁸ Then Prentiss (1965) proposed regional anesthesia to block the obturator nerve to prevent obturator jerk reflex during TURBT.⁸

Different techniques for local blockade of the obturator nerve have been introduced. Obturator nerve block (ONB) in the obturator canal by local anaesthesia is one of these techniques. The success rate of ONB using the 'blind anatomic approach' has been reported to be 83.8-85.7%.⁹ Ultrasound guided technique can be used for block administration. Definitely ultrasound guided technique is considered superior but blind technique is simple, equally effective and can be used in the set ups where there is non-availability of advanced gadgets.⁸ But in above mentioned procedures the chance of obturator vessel injury is more as well as the identification of obturator nerve and its localization is very difficult, time consuming and demand special gadgets like ultrasound or nerve stimulator. Recently, it has been suggested that local blockade of the obturator nerve by 2% lidocaine introduced transvesically during cystoscopy is an effective method for avoiding its stimulation in TURBT which could be easily performed^{10,11}.

Materials and methods

The study was conducted in patients with urinary bladder mass having their lesion in the lateral or postero-lateral wall of the urinary bladder during the period from November 2016 to April 2018 at Dhaka Medical College Hospital. Total 60 patients were included for the study as per inclusion and exclusion criteria.

Patients were then allocated into two groups. Group-A, consisted of 30 patients where obturator nerve block (ONB) was done by transvesical approach and Group-B, also consisted of 30 patients where ONB was done by inguinal approach. All the odd numbered cases were allocated for Group A; the even numbered cases were allocated for Group B.

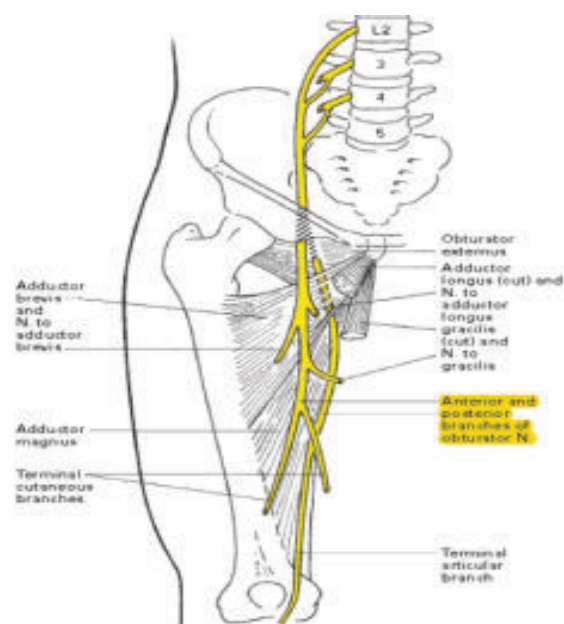


Fig-1: Anatomy of Obturator Nerve

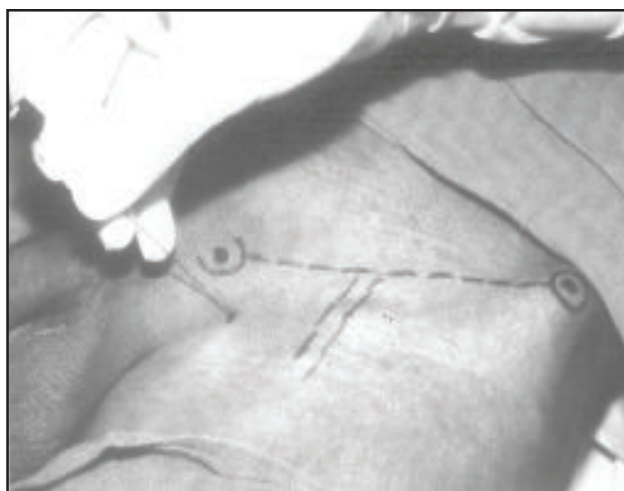


Fig-2: Technique of inguinal approach to block obturator nerve

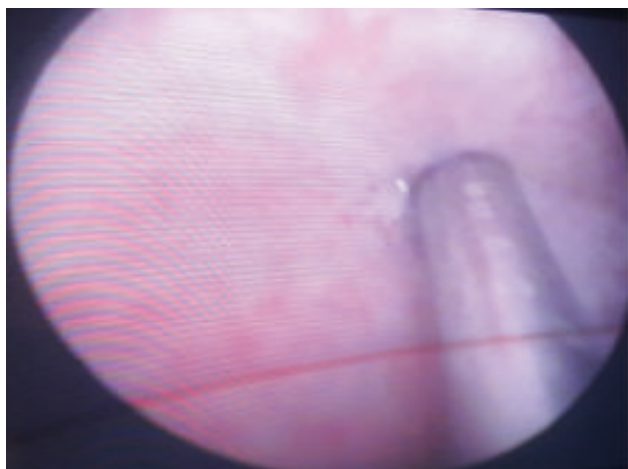


Fig.-3: Local anaesthetic injection by endoscopic needle

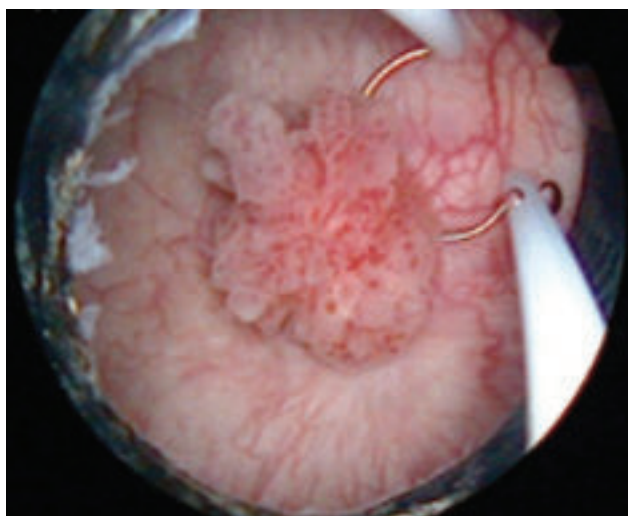


Fig.-4: TURBT in study subject

Each study subject was evaluated by history, physical examination and investigation.

After pre-operative preparation and informed written consent, patients were sent to operation theatre where spinal anaesthesia was applied in all cases. In Group-A, where ONB was done by transvesical approach, patients were placed on lithotomy position. With all aseptic precaution, William Cystoscopic Injection needle (Cook Medical, 5Fr, 23G, 35cm) was used to inject 10 ml of 2 % lidocaine through the postero-lateral bladder wall between the ureteral orifice and the bladder neck. Where location of bladder tumor felt over the assumed puncture site, ONB was done blindly at possible obturator line and around the tumoral region in the bladder. In Group-B, where patients were subjected to inguinal approach of ONB, was placed in supine position with leg flexed at knee joint and slightly

abducted at hip. A 22 G 10 cm long spinal needle was inserted at a point 2 cm below and 2 cm lateral to pubic tubercle. The needle was advanced perpendicular to the superior ramus of the pubic bone until it touches the bone. The needle will then be slightly withdrawn and redirected to the inferior margin of the superior pubic ramus. The needle was advanced up to 1.5 to 2 cm beyond the depth at which pubic ramus was contacted and enter the obturator foramen and the adductor muscle contraction was observed then 10 ml 2% lignocaine was injected in a fan shape manner.⁷ After the ONB procedure, cystoscopic findings were recorded. TURBT was performed by 26 Fr continuous flow sheath resectoscope (Karl Storz). Monopolar cautery with a (Karl Storz) resection loop and 1.5% glycine as irrigant were used to resect the tumor and the diathermy (Valleylab) setting will adjusted between 100-110W for cutting and 70-80 W for coagulation. All resection was performed in standard fashion. Tumors were resected from periphery to centre with the stalk resected last. During resection occurrence of obturator jerk, resectability of tumor or any tear or perforation of the bladder wall were observed. Postoperative irrigation was given as indicated. Operative time was calculated from insertion of cystoscope upto catheter placement.

Ethical Consideration

The study was approved by Ethical Clearance Committee of Dhaka Medical College.

Results

A total of 60 patients with urinary bladder mass having their lesion in the lateral or postero-lateral wall of the urinary bladder were selected during the period from November 2016 to April 2018 at Dhaka Medical College Hospital. They were equally allocated into Group-A and Group-B and obturator nerve block (ONB) was done by transvesical and inguinal approach respectively. The different parameters of the patients have been shown in tabulated form and statistical analysis has been done in both groups to see any significant difference. *p* value was set at 0.05 and *p*<0.05 was considered as significant.

In Group A age range from 34-78 years with mean age SD 54.67(± 9.77) years and in Group B age range from 43-80 years with mean age SD 56.10(± 9.15). No significant difference was observed between the two groups in relation to age (*p*>0.05, Table-I).

Table I: Distribution of the patients according to age, tumor size and number of tumor

	Group		<i>p</i> value
	Group-A (Intravesical ONB)	Group-B (Inguinal ONB)	
Mean ± SD Age (year)	54.67±9.77	56.10±9.15	0.5607
Tumor size (cm)	2.9 ± 1.6	2.3± 1.43	0.1314
Mean ± SD (No. of tumour)	2.06 ± 0.944	1.65 ± 0.889	0.0886

In both Group-A and Group-B, size of the tumours were predominantly >3cm. The difference in tumour size was not statistically significant ($p>0.05$, Table-I).

Mean number of tumors in Group-A and group-B was 2.06 (± 0.944) and 1.65 (± 0.889) respectively. This observation was not statically significant ($p>0.05$, Table-I).

Obturator jerk more frequently occurred in group-B, in 13 (56.37 %) patients following TURBT compared to Group-A, where 05(16.67%) patients developed obturator jerk. The inter-group difference was statistically significant ($p<0.05$ Table-II).

Table II: Distribution of the patients by obturator jerk

Obturator jerk	Group		<i>p</i> value
	Group-A (Intravesical ONB)	Group-B (Inguinal ONB)	
Present	05 (16.67%)	13(43.33%)	
Absent	25 (83.33%)	17(56.67%)	
Total	30	30	0.0486

In case of 26 (86.67%) patients tumour was completely resectable in group-A, while in 21 (70.00%) patients of Group-B tumour was completely resectable. This was not a statistically significant difference ($P>0.05$, Table-III).

Table III: Distribution of the patients according to tumor resectability

Tumor resectability	Group		<i>p</i> value
	Group-A (Intravesical ONB)	Group-B (Inguinal ONB)	
Resectable	26(86.67%)	21(70.00%)	
Irresectable	04(13.33%)	09(30.00%)	
Total	30	30	0.210

There was no incidence of bladder wall perforation in group-A, whereas this complication occurred in 02 (06.67%) cases of Group-B. However, the difference was not statistically significant ($p>0.05$, Table-IV).

Table IV: Distribution of the patients according to bladder wall perforation

Bladder wall perforation	Group		<i>p</i> value
	Group-A (Intravesical ONB)	Group-B (Inguinal ONB)	
Present	0 (00.00%)	02 (06.67%)	
Absent	30 (100.0%)	28 (93.33%)	
Total	30	30	0.4915

Mean operative time in Group-A and group-B is 50.46 (± 11.64) and 59.10 (± 15.83) respectively. This observation was statistically significant ($p<0.05$, Table-V).

Table V: Distribution of the patients by operative time

Operative time (minutes)	Group		<i>p</i> value
	Group-A (Intravesical ONB)	Group-B (Inguinal ONB)	
Mean ± SD	50.46±11.64	59.10±15.83	0.0192

Discussion

Obturator jerk is one of the most common disastrous difficulties during transurethral resection. Here, sudden involuntary reflex contraction of adductor group of muscle develops due to electric stimulation of obturator nerve. Different authors tried to establish different methods to control obturator jerk during transurethral resection of bladder tumour. The present study has been designed to compare the outcome of transvesical versus inguinal approach of obturator nerve block to control the obturator jerk. We found transvesical approach more effective in this occasion.

In the present study, mean age of the patients were 54.67 \pm 9.77 years and 56.10 \pm 9.15 years in Group-A and Group-B respectively showing no statistically significant difference. Rahman et al., (2010) found mean age 57.28 \pm 3.32 years in their study.¹⁰ We also found no statistically significant difference in respect of

tumour size and number in between two groups, rendering it potentially comparable. Tumour number in Group-A and group-B was 2.06 (± 0.944) and 1.65 (± 0.889) respectively. In both the groups size of the tumours were predominantly $>3\text{cm}$.

We found that obturator jerk more frequently occurred in group-B, in 13 (43.33 %) patients following TURBT compared to Group-A where 05(16.67%) patients developed obturator jerk ($p<0.05$). Khorrami et al., (2010) described the transvesical blockade of obturator nerve through cystoscope along with spinal anesthesia and compared it with spinal anesthesia only group.¹¹ They observed a significant jerk in the control group (16.5%) compared to the intervention group (3%). Rahman et al., (2010) found jerk in 3.7% cases.¹⁰ In contrast, more jerks have been reported in our study which could be due to impeded penetration of local anaesthetic through the bladder wall.

The current series shows complete resectability of bladder tumour was possible more frequently in group-A (86.67%) patients compared to Group-B (70.00%).

In this study no serious side effects were detected in group-A patients. There was no incidence of bladder wall perforation in group-A, whereas this complication occurred in 02 (06.67%) cases of Group-B. However, this was not a statistically significant difference ($P>0.05$). Hizli et al., (2016) performed a study which compared intravesical technique with inguinal technique based on anatomical points and USG-guided nerve stimulator.⁹ While bladder perforations were seen in 6 of 20 patients in the intravesical group, 2 perforations were seen in 21 patients in the inguinal group. Mean operative time in Group-A and group-B is 50.46 (± 11.64) min and 59.10 (± 15.83) min respectively. This observation was statistically significant ($p<0.05$).

We used blind anatomical procedure to block obturator nerve in inguinal approach. Junne et al., showed that use of 2% lignocaine and electric stimulation to locate obturator nerve to inhibit the obturator jerk is better than blind anatomic approach, although its success rate was still not 100%.³ According to Augsurqer et al., with the blind anatomic approach, the effectiveness of inhibiting the obturator jerk was about 83.8%-85.7%, while with nerve stimulator, the results were superior,

and according to Gasperich et al., the effectiveness reached 89.4%-100%.^{12,13}

In the current study all the measured parameters favoured transvesical approach to get better result during TURBT. However, modern adjuncts like nerve stimulator and ultrasound guidance may improve the outcome of inguinal approach. The limitation of this study was small sample size, it was a single centred study and heterogeneity of surgeons.

Conclusion

This study was aimed to evaluate the outcome of obturator nerve block (ONB) by two different techniques during TURBT. We conclude that transvesical approach is better in case of jerk elimination and less procedure related time than inguinal approach in TURBT.

References

1. Kati, B., & Izgi, M., 2017. A nightmare during endoscopic bladder tumor resection; Obturator reflex. *J Turgut Ozal Med Cent.* 24(3). pp. 371-4.
2. Balbay, M.D., Cimentepe, E., Unsal, A., Bayrak, O., Koc, A. & Akbulut, Z., 2005. The actual incidence of bladder perforation following transurethral bladder surgery. *J Urol.* 174(6), pp. 2260-2.
3. Junne, Y.K, 2008. Prevention of obturator jerks during transurethral resection of bladder tumor. *JTUA.* 19(1), pp. 27-31.
4. Brown, D.L., 2010. Obturator nerve block. In: Brown, D.L., ed. *Atlas of Regional Anesthesia*, 4th ed. Philadelphia, PA: WB Saunders. pp. 125-8.
5. Collado, A., Chechile, G.E., Salvador, J. & Vicente, J., 2000. Early complication during endoscopic treatment for superficial bladder tumor. *J, Urol.* 164, pp. 1529-32.
6. M'liss, A., 1996. Transurethral resection of bladder tumor. In: Marshall, F.F., ed. *Text Book of Operative Urology*, 1st ed. Philadelphia: W.B Saunders. pp. 22.
7. Patel, D., Shah, V., & Patel, M., 2004. Contribution of the obturator nerve block in the trans-urethral resection of bladder tumours. *Indian J. Anaesth.* 48(1), pp. 47-9.
8. Kaur, K. & Bhardwaj, M., 2016. Study to evaluate the efficacy of obturator nerve block in preventing

- the adductor spasm in transurethral resection of bladder tumors. *Indian journal of applied research*. 6(1), pp, 269-70.
9. Hýzlý, F., Argun, G., Güney, I., Güven, O., Arýk, A.I., Bařay, S., Günaydýn, H., Bařar, H., & Köpüř, A., 2016. Obturator nerve block transurethral surgery for bladder cancer: comparison of inguinal and intravesical approaches: prospective randomized trial. *Irish J Med Sci*. 185(3), pp. 555-60.
 10. Rahman, S., Abedin, J., Islam, M.S., Islam, S., Hossain, S., Alam, Ak.Mk. & Salam, M.A., 2010. Effectiveness of endoscopic injection of 2% Lignocaine in to the bladder wall to control obturator jerk during transurethral resection of bladder tumor. *Bangladesh Journal of Urology*. 13(2), pp. 64-9.
 11. Khorrami, M.H., Javid, A., Saryazdi, H. & Javid, M., 2010. Transvesical blockade of the obturator nerve to prevent adductor contraction in transurethral bladder surgery. *J Endourol*. 24(10), pp. 1651-4.
 12. Augspurger RR, Donohus RE, prevention of obturator nerve stimulation during transurethral surgery: *J.Urol*. 1980;123:170.
 13. Gasparich JP, Mason JT, Burger RE. Use of nerve stimulator for simple and accurate obturator nerve block before transurethral resection. *J Urol* 1984; 132: 291-3