Original Article

OBTURATOR NERVE BLOCK (ONB) IN TRANSURETHRAL RESECTION OF BLADDER TUMOR (TURBT)

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ABSTRACT

Background:

Obturator Nerve Block (ONB) in Transurethral Resection of Bladder Tumor (TURBT) can prevent adductor reflex to avoid complications like bleeding, bladder perforation or incomplete tumor resection. ONB using anatomical land marks, use of nerve stimulator or ultrasound are various techniques of nerve block.

Study Design:

Prospective observational study.

Material & Methods:

Prospective study was conducted using ONB with anatomical land marks from 15-10-2011 to 15-07-2013. All patients of bladder tumor having mass on lateral & infero-lateral wall of bladder were included in the study.

Results:

Total number of patients was 53 with male to female ratio of 5:1. Average age was 55.72 years. Twenty two (41.5%), patients had two masses with size range of 1-6 cm. Duration of surgery (TURBT) was 15-30 minutes in majority (62%) of patients. Eleven patients (20.75%) required blood transfusion. Forty two (79.24%) patients were administered bilateral and 20.76% unilateral nerve block. ONB was completely successful in 90.56% cases and 9.44% has partial or incomplete block. No bladder perforation, haematoma or bruising at site of injection occurred.

Conclusion:

ONB with spinal anesthesia using anatomical land marks is a safe procedure with comparable success rate to the usage of nerve stimulator or ultrasonography in ONB but less time consuming. We recommend ONB in all patients of bladder tumor undergoing TURBT.

Key Words:

Obturator Nerve Block, urinary Bladder Tumor, TURBT, Nerve stimulator in ONB, Ultrasound guided ONB.

INTRODUCTION:

Obturator nerve (ON) originate from L2 - L4 lumber plexus and passes through obturator foramen to supply adductor muscles of thigh. It passes close to infero-latrel bladder wall, bladder neck and prostatic urethra.[(1)]

In transurethral urological surgeries bladder is distended with irrigation fluid. Obturator

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nerve path comes very close to the lateral bladder wall. Electric current can easily stimulate the obturator nerve while doing transurethral resection of bladder tumor (TURBT). Stimulation of obturator nerve causes sudden jerk (adductor reflex) due to contraction of adductor muscles. This all happens in fraction of a second and may lead to bladder perforation or deep cut which may cause profuse bleeding. This may also results in incomplete resection of the bladder tumor.[2,3] TURBT is usually performed under spinal anesthesia (S.A). Motor part of the obturator nerve is blocked under this anesthesia however jerk do occur due to non blockage of sensory part. d-tubocurarine and succinylcholine has been used to block neuromuscular junction but this requires a general anesthesia (G.A) with endotracheal intubation. However morbidity is relatively high in old age patients requiring tumor surgery under G.A. [4,5]

Prentiss was the first person who used regional block of obturator nerve in 1965.[6] Various techniques of obturator nerve block (ONB) is now being described in literature.[7,8,9] ONB is also used along with femoral nerve block to decrease post operative pain in total knee surgery and in spastic patients to decrease adductor spasm.[10,11]

ONB can be done using anatomical land marks with and without nerve stimulator. Use of ultrasound has been described more successful in ONB. [12,13,14]

A study was planned to assess the outcome of ONB using anatomical land marks.

MATERIAL & METHODS:

This prospective study was performed from 15-10-2011 to 15-07-2013. All patients irrespective of age and sex, suffering from bladder mass/tumor were included.

Inclusion criteria:

All bladder tumor patients having mass on lateral and inferolateral walls were included.

Exclusion criteria:

- Pre-existing obturator nerve injury.
- Abnormal coagulation profile.
- Infection at injection site.
- Allergy to local anesthetic agents.

Informed consent was obtained from all the patients. Spinal anesthesia was administrated to each patient. Patients were subjected to unilateral or bilateral ONB depending upon the location of tumor on ultrasonography. ONB was administrated by blind anatomical approach. Patient was put in supine position, with thigh externally rotated and abducted. Regional anesthesia needle of 22 gauge was taken along with 20ml syringe. Needle was inserted at point 1.5cm lateral and 1.5cm inferior to pubic tubercle. The needle was inserted through skin vertically and if touched to inferior ramus of pubis, then after slightly withdrawing, it was advanced laterally and superoposteriorly. Negative suction was applied to ensure that no blood came out and then 10 ml of 1 % lidocaine was injected. Injection was repeated on the contralateral side if required. Procedure (TURBT) was completed when there was complete ONB. If reflex occurred on either side, ONB procedure was repeated on that particular site. General anesthesia with muscle relaxation and intubation was planned in those cases where second attempt of ONB also failed.

Outcome was measured by presence or absence of jerk and any complication of the procedure. Data was tabulated and analyzed by using Chi-square test.

RESULTS:

Total number of patients was 53. Male to female ratio was 5:1. Average age of patients was 55.72 years with a range of 26 to 90 years. Thirty one (58%) patients were between 41 to 60 years and 30% above 60 years of age. Size of tumor ranged from 1 cm to 6 cm (Table I). Twenty two patients (41.5%) have two masses while 38% have single mass (Table II). Duration of surgery in majority of patients (62%) was 15-30 minutes. Duration was significantly related to size of tumor and number of masses. ($P<0.001$ $x^2= 29.34$, $P<0.001$ $x^2=35.07$) (Table III & Table IV). Eleven patients (20.75%) required single blood transfusion and this is significantly related to size of tumor and number of masses. ($P<0.001$ $x^2=17$, $P<0.05$ $x^2=7.17$) (Table V & Table VI). None of patients developed clot retention or secondary hemorrhage postoperatively.

Forty two patients (79.24%) were administered bilateral obturator nerve block and 11(20.76%) had unilateral ONB. ONB was

completely effective in 48 (90.56%) patients, while 05 patients (9.44%) were given G.A with succinylcholine in whom jerk was observed. Out of these 05 patients, partial effectiveness of ONB was observed in 02 patients (Table VII & Table VII).No perforation of bladder occurred and there was no haematoma or bruising at site of injection.

Size of Tumor					
ONB Effectiveness		1 – 2 cm	2 – 5 cm	Above 5 cm	Total # PT
	Yes	26	15	7	48
	No	1	3	1	5
	Total # PT	27	18	8	53
Not Significant P<0.10 x^2=3.681					

Table I: Size of Tumor and effectiveness of Obturator Nerve Block.

Number of Masses					
Size of Tumor		One	Two	Multiple	Total # PT
	1 – 2 cm	11	12	4	27
	2 – 5 cm	6	7	5	18
	Above 5 cm	3	3	2	8
	Total # PT	20	22	11	53
Not Significant P<0.50 x^2=1.75					

Table II: Number of Masses and size of tumor.

Duration of Surgery					
Size of Tumor		< 15 mints	15 – 30 mints	> 30 mints	Total # PT
	1 – 2 cm	10	17	0	27
	2 – 5 cm	1	14	3	18
	Above 5	0	2	6	8
	Total # PT	11	33	9	53
Significant P< 0.001 x^2= 29.34					

Table III: Size of tumor and duration of surgery.

Number of Masses					
Duration of Surgery		One	Two	Multiple	Total # PT
	< 15 mints	9	2	0	11
	15 – 30	9	18	6	33
	> 30 mints	2	2	5	9
	Total # PT	20	22	11	53
Significant P< 0.001 x^2= 35.07					

Table IV: Duration of Surgery and number of masses.

Number of Transfusion				
Size of Tumor		None	One	Total # PT
	1 – 2 cm	27	0	27
	2 – 5 cm	12	6	18
	Above 5 cm	3	5	8
	Total # PT	42	11	53
Significant P< 0.001 x^2= 17				

Table V: Number of Transfusions related to size of tumor.

Number of Masses					
Number of Transfusion		One	Two	Multiple	Total # PT
	None	19	17	6	42
	One	1	5	5	11
	Total # PT	20	22	11	53
Significant P< 0.05 x^2= 7.17					

Table VI: Number of Masses and blood transfusion.

Number of Masses					
ONB Effectiveness		One	Two	Multiple	Total # PT
	Effective	19	21	8	48
	Non	1	1	3	5
	Total # PT	20	22	11	53
Not Significant P< 0.10 x^2= 5.5					

Table VII: Effectiveness of ONB and number of Masses.

Duration of Surgery					
ONB Effectiveness		< 15 mints	15 – 30	> 30 mints	Total # PT
	Effective	10	31	7	48
	Non	1	2	2	5
	Total # PT	11	33	9	53
Not Significant P< 0.25 x^2= 2.16					

Table VIII: Effectiveness of ONB and Duration of Surgery.

DISCUSSION:

Incidence of carcinoma bladder is increasing in industrialized and developed countries. Most of tumors are superficial and well differentiated transitional cell carcinoma. TURBT is routinely performed procedure for bladder tumors, however every Urologist while attempting this surgery is very scared of obturator jerk/reflex and resultantly its consequences.[2,3] Bladder perforation, difficultly manageable bleeding, and sometimes incomplete resection of tumor and hazard of dissemination are major risks of this reflex[12]. Urologists have been trying to overcome this by various strategies. Use of succinylcholine or d-tubocurarine with G.A, blind ONB, with or without nerve stimulator, ultrasound guided ONB, superficial resection with low current and cutting with bipolar resectoscope are different procedure which have been reported in literature with variable success, and outcome[12,14,15,16].

We blocked obturator nerve to prevent jerk by anatomical technique (Blind ONB). Results of our study are very encouraging with acceptable outcome and no complication.

In our study success rate of blind ONB is 90.5 %. Augspurger et al reported a success rate of 83.8%-85.7%, which is comparable to our study.[17] However Gasparich et al and Kobayashi et al reported that ONB with nerve stimulator has better success rate (98.4%-100%).[18,19] ONB under ultrasound guidance has a success rate of (93-97%)[20,21] which slightly better than blind ONB, using anatomical land marks.

ONB with anatomical technique has comparable success and complication rate, however use of nerve stimulator before ONB has better outcome. Time required for ONB with nerve stimulator is more as compared to blind ONB. Similarly, Use of Ultrasound for

ONB is also time consuming procedure with marginal better outcome.

Mehmet Cesur et al[5] has recommended the use of succinylcholine and general anesthesia via local mask. According to them, ONB with spinal anesthesia (S.A) is time consuming and have potential risk of complications like hematoma, nerve damage and systemic toxicity. Especially in those patients in whom small tumors are diagnosed on cystoscopy, it is very much time consuming, to have ONB with S.A. Most of authors have recommended the use of S.A with ONB due to lesser complications of anesthesia. As bladder tumor is more common in advancing age, so SA is preferred method of anesthesia in these patients.

Incidence of perforation in TURBT has been said to be underreported and in various studies it range from 0.9 – 5 % [22-24]. Dick et al[(22)] has reported 5 % incidence of intraperitioneal perforation while Collado et al has reported 1.3 % incidence of bladder perforation, 83 % out of these are extraperitoneal[24]. Although our series is small but there is no incidence of perforation.

Bleeding is more common in TURBT. Dick et al[22] has reported 13% incidence of hemorrhage. Six percent patients required transfusion on the day of surgery while 07% postoperatively. Collado et al[24] has reported 3.4% incidence of blood transfusion. In our study, 11 patients (20.75%) received single blood transfusion which is higher than other studies[22-24]. Slightly higher rate of transfusion may be due to less hemoglobin level at the time of surgery in our patients. As for as bladder perforation is concerned, no perforation occurred in our patients which is better as compared to reported in literature [25,26].

Size of tumor and its presence as unilateral or bilateral is also comparable to other studies reported in literature [22-26].

CONCLUSION:

TURBT is routinely performed procedure for bladder tumors. Obturator nerve block along with Spinal Anesthesia can be safely employed to prevent the obturator jerk, which commonly occurs in tumors of posteolateral areas of bladder. Nerve stimulator or use of ultrasound for ONB have better outcome but it is more time consuming.

We recommend ONB in every patient of bladder tumor undergoing TURBT.

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