

**Original Article****To study the efficacy of Obturator Nerve blocks using nerve stimulator in Transurethral Resection of Bladder Tumor (TURBT) under spinal anaesthesia**

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Email: rajeshnagmothe@gmail.com, Phone No 9323602314**Abstract**

This was a prospective randomized study, conducted to evaluate the efficacy of Obturator Nerve blocks using nerve stimulator in Transurethral Resection of Bladder Tumor (TURBT) under spinal anaesthesia.

Aim and Objectives: To study the effectiveness of Obturator nerve block given by nerve stimulation technique to block the adductor jerk under spinal anaesthesia during Transurethral Resection of Bladder Tumor (TURBT).

Material and Methods: Total 60 patients, aged between 45 and 70 years belonging to ASA physical status I-III, having inferolateral wall and bladder neck tumors that were scheduled for transurethral resection of bladder tumor at risk for electrical stimulation as determined by the attending surgeon and divided them into Group I and II. Patient in Both Group I and Group II received Inj Bupivacaine (0.5% hyperbaric/ heavy) for subarachnoid block. In Group II patients, after spinal anaesthesia was given Unilateral or bilateral Obturator Nerve block was given depending on the site of tumor by Nerve Stimulation technique using 10 ml of 0.75 % Ropivacaine. During the operative procedure, the primary endpoint of the study was resectability of the tumor whether it hampered or unhampered by adductor reflex under spinal anaesthesia. Complications like bleeding and bladder perforation were the secondary endpoints of this study.

Results: Only 5 (16.66%) patients in Group I, which does not received the Obturator nerve block, have no or minimum adductor muscle jerk in intraoperative period but 25 (83.33%) patients had significant adductor muscle jerk and required general anaesthesia with muscle relaxation for continuation of procedure. In Group II in which the Obturator nerve block is given after spinal anaesthesia only one patient(3.33%) required general anaesthesia and 29 (96.66%) patients was operated in spinal anaesthesia with Obturator nerve block. The incidence of bladder perforation which is a serious complication was 6.6% in Group I and there is no incidence of bladder perforation in Group II. Total requirement of blood product are significantly more in Group I (16.66%) as compare to Group II (2.66%).

Conclusions: Transurethral resection of the bladder tumor can be perform successfully under spinal anaesthesia, supplemented with Obturator Nerve block using nerve stimulation technique with minimum side effect. Thus, Obturator nerve block has become an essential component of spinal anaesthesia for TURBT.

Keywords: Transurethral resection of bladder tumor (TURBT), Adductor spasm, Obturator nerve block, Spinal anaesthesia.

Introduction

TURBT is a procedure in which bladder tumors was removed from the bladder wall. This is a procedure performed completely with a scope that is inserted through the urethra into the bladder.

TURBT can be performed under General anaesthesia or the regional anaesthesia. Regional anaesthesia offers many advantages such as technical ease of performing the procedure, reduced risk of bleeding, and early recognition of bladder perforation¹. As the patients are generally older having multiple comorbid condition, regional anaesthesia associated with less morbidity². The only shortcoming with subarachnoid block is sparing of the Obturator nerve which passed close to lateral wall of bladder tumor can get stimulate due to electric current resulting sudden adductor muscle contraction with a potential complication of bladder rupture or injury, during transurethral resection of bladder (TURBT). This risk is increased in resection of lateral wall tumors as electrosurgical resection of these lesions is more likely to inadvertently stimulate the Obturator nerve resulting in deep cut into bladder that may cause bladder perforation and profuse bleeding^{3,4}

The aim of this study was:

To compare the efficacy of Obturator nerve block using the nerve stimulation technique in Transurethral resection of bladder tumor (TURBT) under subarachnoid block.

Materials and Methods

This randomized prospective study was carried out in the department of anaesthesiology in Super Speciality Hospital in Urosurgery Operation Theater. After obtaining institutional approval and written informed consent, the study was conducted from March 2016 to may 2017.

We selected 60 patients, aged between 45 and 70 years belonging to ASA physical status I-III, having inferolateral and bladder neck tumors that were scheduled for transurethral resection of bladder tumor at risk for electrical stimulation as

determined by the attending surgeon and divided them into Group I and II. Each group comprise of 30 patients. Pre-existing Obturator nerve injury, thigh adductor muscle weakness, infection at the site of injection, abnormal coagulation studies, any contraindication to spinal anaesthesia and patient who refuse to give consent for participation in study are excluded from this study.

A detailed preoperative evaluation including medical history, physical examination, vital signs, laboratory tests and concurrent medical assessment was done for all the patients. Detail cardiac evaluation was done in patients with cardiac complaint. All patients received tablet Alprazolam 0.5 mg orally on the night prior to surgery. Routine preoperative fasting guidelines were followed in all the patients. Patients were evaluated again in the morning in Operation Theater. In the operation theatre standard Multipara monitor with electrocardiogram, NIBP and pulse-oximeter was applied to the patient for recording of ECG and NIBP and SPO2. After securing IV access, all patients were preloaded with IV Ringer Lactate 5 to 6 ml/kg over 10 minutes.

Sixty patients were divided into two equal groups of 30 patients in each group using the sealed envelope technique. Patient in Both Group I and Group II received Inj Bupivacaine (0.5% hyperbaric/ heavy) for subarachnoid block. The dose of Inj Bupivacaine for subarachnoid block was decided after taking into consideration about patient characteristic like age, height and weight. Under all aseptic precaution subarachnoid block was given in sitting position using 23 G spinal needle through L3 –L4 spinal inter space. After spinal anaesthesia was given, patient was made to lie supine for period of 10 minutes. The onset of sensory and motor block was tested every 2 minutes. In Group I after the 10 minutes and adequate sensory and motor anaesthesia achieved, Lithotomy position was given and surgical procedure started.

In Group II patients, after spinal anaesthesia was given Unilateral or bilateral Obturator Nerve block was given depending on site of tumor by

Nerve Stimulation technique using 10 ml of 0.75 % Ropivacaine. The patient was in supine position, with limb to be blocked at 30 degree abduction. The pubic tubercle is identified by palpation and a 1.5 cm long line drawn laterally and caudally at 45 degree. Nerve stimulation is began using 3mA (1Hz) and reduce to 0.4-0.6 mA before injecting 10 ml of 0.75% Inj Ropivacaine after negative aspiration⁵.

Intra operative all patient are monitor by Multipara monitor (ECG, NIBP and SpO2 parameters). 15 minutes after giving the subarachnoid block and confirming sensory and motor blockage lithotomic position was given.

In both the group TURBT procedure was started using cystoscope and resection of bladder tumor was perform using Bipolar cautery to resects the tumor with the loop .

During the operative procedure, the primary endpoint of the study was resectability of the tumor, whether it hampered or unhampered by adductor reflex under spinal anaesthesia. Adductor reflex defined as jerky adduction, and external rotation of the thigh at hip joint and number of interruptions. Bleeding and bladder perforation were the secondary endpoints. All patients who had unresectibility due to adductor jerk were managed under general anesthesia with muscle relaxation. Intraoperative complication like bladder perforation and requirement of blood transfusion due to bleeding is noted.

Statistical analysis was performed using SPSS software. The data were tabulated as a mean \pm standard deviation and significance was analyzed by using independent sample t test and Chi-square test. Statistical significance was set at $P < 0.05$.

Observations and Results

Table No 1: Patients demographic Data

Variables	Group I (N=30)	Group II (N=30)	P Value
Age (yrs)	65.65 \pm 12.15	64.25 \pm 14.65	P value >0.05
Male	24(80%)	22(73.33%)	
Female	6(20%)	8(26.66%)	
ASA I	8(26.66%)	6(20.00%)	
ASA II	20(66.66%)	24(80.00%)	
ASA III	2(6.66%)	0	
Duration of surgery (min) -	45.33 \pm 15.18	44.16 \pm 14.93	0.5508 (>0.05)

Table no. 1 show the demographic profiles of patients in both Group I and Group II. Patients in both the groups were comparable with regards to age, sex , ASA Status and duration of surgery and difference was statistically not significant ($p > 0.05$). Both the groups have older patients with average age around 65 yrs and nearly 60% patients belong to ASA grade II. This indicate most of patients posted for TURBT are older and had increase risk of anaesthesia and surgery.

Table No 2: Obturator Nerve Stimulation during TURBT

Event	Group I (N=30)	Group II (N=30)	P Value
No/minimum Adductor Jerk	5 (16.66%)	29 (96.66%)	P value<0.01
Requirement of General anaesthesia due to Adductor Jerk	25 (83.33%)	1 (3.33%)	
Bladder perforation	2(6.6%)	0	
Requirement of Blood Transfusion	5(16.66%)	2(6.66%)	

From the Table no 2 we can conclude that the patients in Group I which does not received the Obturator nerve block, only 5 (16.66%) patients have no or minimum adductor muscle jerk in intraoperative period and 25(83.33%) patient had significant adductor muscle jerk and required general anaesthesia with muscle relaxation for continuation of procedure. In Group II in which the Obturator nerve block is given after spinal anaesthesia only one patient required general anaesthesia and majority of patients that is 29 (96.66%) patients get operated in spinal anaesthesia with Obturator nerve block. The incidence of bladder perforation which is a serious complication was 6.6% in Group I and there is no incidence of bladder perforation in Group II. Total requirement of blood product are significantly more in Group I (16.66%) as compare to Group II (2.66%).The difference in the two groups was statistically highly significant. This indicates the importance to block the Obturator nerve in Transurethral resection of bladder tumor (TURBT) under spinal anaesthesia.

Discussion

Bladder cancer has high prevalence and a low mortality, being largely a chronic disease. Data on environmental and genetic factors involved in the disease outcome are inconclusive⁶.

Carcinoma of urinary bladder occurs mainly in older people. About 9 out of 10 people with this cancer are over the age of 55 years. The average age at the time of diagnosis is 73 years and men are about 3 to 4 times more likely to get bladder cancer during their lifetime than women⁷. In this study the average age of patients are 65 years and 65% to 80% patients belong to ASA grade II. In view of the older patients having multi systemic disorder and as TURBT is shorter duration of surgery, spinal anaesthesia has advantage over general anaesthesia. The only shortcoming with subarachnoid block is sparing of the Obturator nerve which passed close to lateral wall of bladder tumor can get stimulate due to electric current resulting sudden adductor muscle contraction with a potential complication of bladder rupture or injury during transurethral resection of bladder (TURBT). As the subarachnoid block act on the spinal nerve roots and not on neuromuscular junction. There are several mechanisms for preventing the Obturator reflex. Pharmacologic paralysis can reliably inhibit thigh adduction. Spinal anesthesia does not reliably prevent the Obturator reflex. Regional anesthesia is another potential treatment modality to prevent the Obturator reflex during TURBT. Motor blockade of the Obturator nerve will prevent this adduction in the event of inadvertent nerve stimulation. Peripheral blockade of the Obturator nerve can be combined with either general or spinal anesthesia. Various methods have been described in literature to block Obturator nerve. Prentiss et al⁸ and later Parks and Kennedy⁵ described nerve stimulation technique with a success rate between 83.8% and 85.7%. The success rate with nerve stimulation was very high in our study (96.66%). More recent studies have reported that the use of sonography which was associated with higher success rates of 97.2% in ultrasound-guided ONB procedures^{9,10}.

This is slightly higher than nerve stimulation technique but availability of USG machine is a problem. According to Augspurger and Donohue¹¹, effectiveness of abolishing Obturator jerk with blind anatomic approach was 83.8% which is lower to nerve stimulation and ultrasound-guided techniques described above. As per Gasparich et al¹² and Kobayashi et al¹³ when the nerve stimulation method use, the effectiveness reaches between 89.4% and 100%. Kuo¹⁴ and Khorrami et al.¹⁵ described the transvesical blockade of Obturator nerve with 10 ml 1% Lignocaine injected through cystoscope along with spinal anesthesia (thirty patients) and compared it with spinal anesthesia only group (thirty patients). In the intervention group, 34 ONB were performed. They observed a significant jerk in the control group (16.5%) compared to the intervention group (3%).

In our study, we found that patients in Group I, only 16.66% patients had no or minimum adductor jerk and TURBT procedure can perform under spinal anaesthesia, where as 83.33% patients required general anesthesia with muscle relaxation for completion of surgery.

In Group II Patients in which Obturator nerve block was given with nerve stimulator, the success rate of block was 96.66% and only one patient require general anaesthesia for TURBT procedure. The incidence of bladder perforation which is a serious complication was 6.6% in Group I and there is no incidence of bladder perforation in Group II. Total requirement of blood product are significantly more in Group I (16.66%) as compare to Group II (2.66%). This indicates that In Group II patients due to blockage of Obturator nerve Transurethral resection of bladder tumor was perform without any interruption and there was no incidence of bladder perforation and lesser requirement of blood transfusion.

Conclusion

Transurethral resection of the bladder tumor (TURBT) can be perform successfully under spinal anaesthesia if it is supplemented with

Obturator Nerve block using nerve stimulation technique with minimum side effect. Thus, Obturator nerve block has become an essential component of spinal anesthesia for TURBT.

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