

## COMPARISON OF INGUINAL AND INTRAVESICAL APPROACHES FOR OBTURATOR NERVE BLOCK IN TRANSURETHRAL BLADDER CANCER SURGERY

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**Background:** Transurethral resection of bladder tumors (TURBT) carries the risk of obturator nerve stimulation, leading to sudden adductor muscle contractions and potential bladder perforation. Obturator nerve block (ONB) is used to prevent these complications. This study compares the efficacy of the inguinal and intravesical approaches to ONB in reducing adductor muscle contractions and bladder perforations during TURBT. **Materials and Methods:** This retrospective observational study included 30 patients undergoing TURBT between January 2024 and January 2025. Patients were divided into two groups: Group 1 (inguinal approach, n=15) and Group 2 (intravesical approach, n=15). ONB was performed with 10 mL of 2% lidocaine, and outcomes such as adductor contractions, bladder perforations, and procedural efficiency were analyzed. **Result:** The inguinal approach demonstrated superior efficacy, with significantly fewer adductor contractions (13.3% vs. 33.3%, p=0.032) and a lower incidence of bladder perforations (13.3% vs. 26.7%, p=0.130) compared to the intravesical approach. Procedural efficiency was also higher in the inguinal group, with fewer interruptions due to involuntary muscle movements. **Conclusion:** Ultrasound-guided ONB via the inguinal approach is more effective than the intravesical approach in preventing obturator nerve-related complications during TURBT. Given its high success rate and reduced complication risk, it should be considered an essential adjunct to spinal anesthesia for TURBT.

**INTRODUCTION**

The obturator nerve is located near the inferolateral wall of the bladder. During transurethral resection of bladder tumors in this region, stimulation of the nerve may cause sudden adductor muscle contractions, increasing the risk of accidental bladder perforation. To prevent this, administering a local anesthetic block to the obturator nerve as it traverses the obturator canal effectively suppresses adductor spasms during spinal anesthesia.<sup>[1]</sup>

Bladder cancer is the fourth most prevalent malignancy in men worldwide. The primary diagnostic and treatment methods include endoscopic procedures such as cystoscopy and transurethral resection of bladder tumors (TURBT). TURBT has become the standard approach for managing bladder tumors. During this procedure, the bladder is distended with irrigation fluid, and due to the close proximity of the obturator nerve to the lateral bladder wall, inadvertent stimulation can trigger adductor muscle contractions. This sudden leg movement can

lead to extraperitoneal bladder wall perforation caused by the resectoscope loop. In severe cases, intraperitoneal perforation or rupture of the obturator artery may occur, sometimes requiring immediate laparotomy.

To minimize these risks, obturator nerve block (ONB) is frequently employed during TURBT to prevent muscle spasms and uncontrolled adductor contractions during electrocoagulation, thereby reducing the likelihood of bladder wall perforation.

**MATERIALS AND METHODS**

This retrospective observational study was conducted between January 2024 and January 2025, including a total of 30 patients, with 15 assigned to each group performed at Khanams Hospital and Nursing Home Srinagar and North End Hospital Pattan. Patients with coagulopathy, spinal abnormalities, or thrombocytopenia were excluded from the study. Following the administration of spinal anesthesia,

ONB was performed using either the inguinal approach (Group 1, n = 15) or the intravesical approach (Group 2, n = 15).

After proper consent before the procedure, an intravenous premedication of midazolam 1 mg i.v was given. In the operation theatre the patient received infusion of 10 ml/kg of RL and an antibiotic (3<sup>rd</sup> generation cephalosporin) in 100 ml of Normal saline. Constant monitoring of ECG, heart rate, and arterial blood saturation (pulse oximetry) was ensured. Non-invasive blood pressure measurements were taken every 5 min. Oxygen was delivered with the use of a facemask. Spinal anesthesia was performed with patients in the sitting position, most frequently in the L3 L4 or L4 L5 interspace using 0.5 % hyperbaric bupivacaine using 25–27 G Quinke's needles. After drug administration, the patient was placed in the supine position. The appropriate anesthesia level was T10, which blocks conduction in the sensory nerve fibers of the bladder.

With the patient supine, the thigh was slightly abducted and laterally rotated, the ultrasound linear probe (8 to 13MHz) was placed at the inguinal crease medial to the femoral vein perpendicular to the skin to identify the pectineus, adductor longus, adductor brevis, and adductor magnus muscles. Local anesthetic (Lignocaine 2 % 7 ml) was injected using 10 cm 22G insulated needle into the fascia between pectineus and adductor brevis muscles or adductor longus and adductor brevis muscles using in-plane ultrasound guidance to block the anterior branch of obturator nerve. Then a second injection of Lignocaine 2 % 7 ml was injected in the fascia between adductor brevis and adductor magnus to block the posterior branch of obturator nerve.

When it was necessary to perform a bilateral block, adrenaline in 1:200,000 dilution was added to the local anesthetic so that the lidocaine dose could be increased without the risk of toxic signs linked to drug overdose. In the case of unilateral blocks, the adrenalin addition was not administered to avoid unnecessary constriction of the obturator vein and artery, which are in the close vicinity of the nerve.

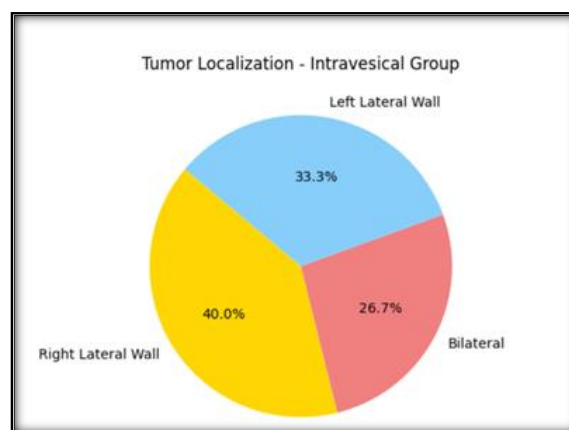
For the intravesical approach, the needle was inserted in the posterolateral bladder wall between the ureteral orifice and the bladder neck, and 10 ml of 2 % lidocaine was injected. We used a vesicoureteral reflux needle by Blueneem injecting lidocaine through the cystoscope. Urologist, performed ONB for intravesical approach.

## RESULTS

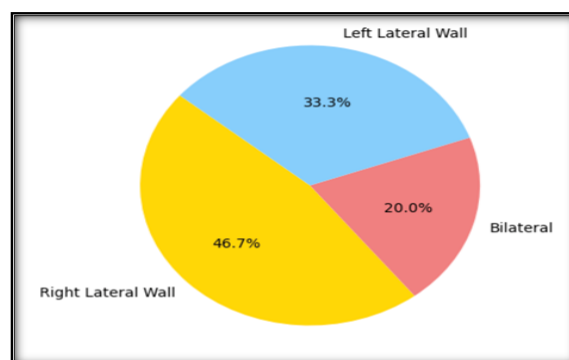
The mean age for patients in Group 1 was 63.55 years (range 44-76; SD 12.2), with an average tumor size of 22.44 mm (range 10-40 SD: 9.2) and an operation

duration of 28.5 minutes (range: 10–50 SD 16.55). In Group 2, the median age was 62.44 years (SD 7.716; range: 42–71), tumor size averaged 22.65 mm (range: 13–25 SD 4.23), and the procedure lasted 28.65 minutes (range: 23–45 SD 5.64). Both groups were similar in terms of age, tumor location, and tumor size. However, the efficacy of ONB was significantly greater in the inguinal approach group compared to the intravesical approach group (p = 0.032).

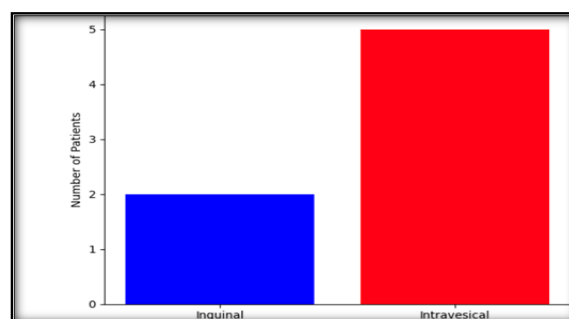
Bladder perforations occurred in two patients in Group 1, whereas four cases were reported in Group 2 (p = 0.130).



**Figure 1: Pie Chart depicting tumor localisation in intravesical group**



**Figure 2 Pie Chart depicting tumor localisation in Inguinal group**



**Figure 3: Bar graph depicting Adductor Contractions in both groups**

**Table 1: Pre-procedure characteristics in both groups.**

Group	Age (years)	Tumor Size (mm)	Operation Time (min)	p-value
Inguinal (n=15)	63.55 ± 12.2	22.44 ± 9.2	28.5 ± 16.55	0.556
Intravesical (n=15)	62.44 ± 7.716	22.65 ± 4.23	28.65 ± 5.64	0.144

**Table 2: Adductor contractions in Inguinal and Intravesical groups**

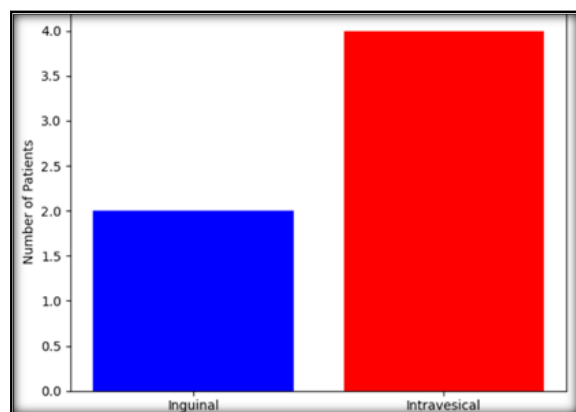
Group	Total Patients	Patients with Adductor Contractions	Percentage (%)	P Value
Inguinal	15	2	13.3%	0.032
Intravesical	15	5	33.3%	

**Table 3: Tumour location in both groups**

Group	Total Patients	Right Lateral Wall	Bilateral	Left Lateral Wall
Inguinal	15	7	3	5
Intravesical	15	6	4	5

**Table 4: Total number of perforations in each group**

Group	Total Patients	Patients with Bladder Perforations	Percentage (%)	P value
Inguinal	15	2	13.3%	0.130
Intravesical	15	4	26.7%	

**Figure 4: Bar graph Bladder perforations in both groups**

## DISCUSSION

The obturator nerve plays a crucial role in transurethral resection of bladder tumors (TURBT), especially when tumors are located in the lateral bladder wall. Sudden contractions of the adductor muscles due to inadvertent obturator nerve stimulation can significantly hinder the procedure, leading to complications such as bladder perforation and excessive bleeding. Our study compared the effectiveness of the inguinal approach and the intravesical approach for obturator nerve block (ONB) in preventing these complications.<sup>[2-7]</sup>

Our results indicate that the inguinal approach is more effective in minimizing adductor muscle contractions during TURBT. In Group 1, where ONB was performed via the inguinal route, 86.7% of patients had no or minimal adductor contractions, while in Group 2, using the intravesical approach, only 66.7% of patients exhibited similar responses. This suggests that the inguinal approach provides a more consistent and effective nerve blockade.

Bladder perforation is a serious concern during TURBT, particularly when adductor contractions are not adequately controlled. Our findings showed that 13.3% of patients in Group 1 experienced bladder perforation, whereas this rate was significantly higher in Group 2 at 26.7%. This supports previous literature suggesting that Ultrasound guided ONB provides better control over muscle contractions, reducing the risk of bladder injury.

In addition to reducing intraoperative complications, ONB also impacted procedural efficiency. In the inguinal group, transurethral resection was completed without significant interruptions. This aligns with prior studies that highlight the importance of an effective obturator nerve blockade in improving procedural outcomes.

Tumor location was another factor influencing the efficacy of ONB. In Group 1, 46.7% of tumors were located in the right lateral bladder wall, 20% were bilateral, and the remaining were in the left lateral wall. In Group 2, 40% of tumors were in the right lateral wall, 26.7% were bilateral, and the rest were in the left lateral wall. Given the high-risk nature of lateral wall tumors for obturator reflex-related complications, our study highlights the necessity of a reliable ONB technique.

Our findings align with previous studies demonstrating the superiority of Ultrasound guided ONB over blind or transvesical approaches. Research by Prentiss et al.<sup>[8]</sup> and Parks and Kennedy,<sup>[9]</sup> reported success rates of 83.8% to 85.7% with nerve stimulation techniques, while ultrasound-guided ONB has been reported to achieve success rates more than 90%.<sup>[10]</sup>

Furthermore, our study corroborates findings by Kuo and Khorrami et al.<sup>[11]</sup> who reported that transvesical ONB using intravesical lidocaine resulted in significant reductions in obturator reflex. However, in our study, the inguinal approach demonstrated superior efficacy in preventing adductor muscle contractions compared to the intravesical method.

## CONCLUSION

In conclusion, our study demonstrates that the inguinal approach for ONB, particularly when guided by Ultrasound, significantly reduces obturator reflex-induced complications, improves procedural success, and minimizes intraoperative blood loss. Given its high success rate (96.66%) and minimal associated complications, Ultrasound guided ONB should be considered an essential component of spinal anesthesia for TURBT. Future research should explore larger patient cohorts and compare ultrasound-guided ONB to further refine optimal nerve blockade techniques for TURBT.

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