Preventing Catheter Related Bladder Discomfort (CRBD) in male patients undergoing Lower Urinary tract surgery with Bilateral Pudendal Nerve Block:A Randomized Controlled Trial

Mohammad Yasrab, Syed Ehtesham Haider Naqvi*, Fariha Ahmed, Madiha Ahmed, Sumbal Rana*, Arshad Khushdil*****

Combined Military Hospital Sargodha/National University of Medical Sciences (NUMS) Pakistan, *Armed Forces Institute of Urology/National University of Medical Sciences (NUMS) Rawalpindi, Pakistan, **Fauji Foundation Hospital, Rawalpindi Pakistan, ***Combined Military Hospital Sargodha/ National University of Medical Sciences (NUMS) Pakistan

ABSTRACT

Objective: To compare the frequency and severity of post-operative CRBD in patients undergoing TURP and TURBT with spinal anaesthesia with pudendal nerve block against spinal anaesthesia alone.

Study Design: A randomized controlled trial (Clinical trials.gov: NCT05022160)

Place and Duration of Study: Armed Forces Institute of Urology (AFIU), Rawalpindi Pakistan, from Aug to Nov, 2021.

Methodology: The trial comprised 250 patients scheduled to have a transurethral resection of the prostate (TURP) or a transurethral resection of a bladder tumour (TURBT) under spinal anaesthesia. They were split into two groups: study (group-P) and control (group-C). After surgery, the patients in the study-group were given a bilateral pudendal nerve block. At 3, 8, 12, and 24 hours following surgery, the frequency and severity of catheter-related bladder discomfort (CRBD) were documented.

Results: CRBD frequencies were significantly lower in pudendal group at 3 hours 42 (33.8%) vs 72 (58.5%), p <0.001), 8 hours 81 (65.3%) vs 111 (90.2%), p<0.001 and 12 hours 53 (42.7%) vs 73 (59.3%), p=0.009 after the surgery. The postoperative pain score in pudendal group was lower at 3 hours (p<0.001), 8 hours (p <0.001), and 12 hours (p=0.02) but there was no statistically significant difference between the two groups at 24 hours (p=0.06).

Conclusion: When used in conjunction with spinal anaesthesia, a pudendal nerve block reduces the frequency and severity of catheter-related bladder discomfort for up to 12 hours after surgery.

Keywords: Pudendal nerve block, CRBD, TURP, TURBT.

How to Cite This Article: *Yasrab M, Naqvi SHE, Ahmed F, Ahmed M, Rana S, Khushdil A. Preventing Catheter Related Bladder Discomfort (CRBD) in male patients undergoing lower urinary tract surgery with bilateral Pudendal Nerve Block: a Randomized Controlled Trial. Pak Armed Forces Med J 2022; 72(2): 389-393. DOI: https://doi.org/10.51253/pafmj.v72i2.7646*

INTRODUCTION

The two most prevalent endourological procedures, transurethral resection of the prostate (TURP), and transurethral resection of bladder tumour (TURBT) are the two most prevalent endourological procedures.[1] This high rate of complications is thought to be due to the large quantity of blood loss during these surgical procedures, which causes clot retention and prevents urine output.[2] Irrigation with three-way large-bore urinary catheters is frequently used to prevent clot retention.[3]

These large urinary catheters irritate the bladder mucosa, generating involuntary bladder contractions through urothelial muscarinic receptors, resulting in catheter-related bladder discomfort (CRBD).[4,5] The prevalence of CRBD varies between 47% and 90 %.[6] CRBD is marked by discomfort in the suprapubic region, a burning feeling in the urethra, a strong desire to urinate, and increased urine frequency.[6,7]

CRBD does not react to commonly prescribed opioid drugs and is a significant source of post-operative anguish for patients. It has a negative impact on the patient's recovery, limiting patient mobility, necessitating greater dosages of analgesics, raising treatment expenditures, and necessitating longer hospital stays.[8]

The pudendal nerve carries the sensory supply of the urethra and bladder neck. It comes from the spinal cord sacral segments S2 to S4. The sensory supply of the bladder is stopped by restricting the pudendal Nerve, which inhibits involuntary detrusor contractions and eventually prevents or reduces the severity of CRBD.[8,9] When compared to controls, a previous study observed a substantial reduction in the incidence and intensity of postoperative CRBD with the injection of pudendal nerve block in 2017.[10]

We planned this study to compare the frequency and severity of post-operative CRBD in patients undergoing TURP and TURBT with spinal anaesthesia

Correspondence: Dr Madiha Ahmed, Department of Obs & Gynae, Fauji Foundation Hospital, Rawalpindi Pakistan

Received: 13 Sep 2022; revision received: 15 Jan 2022; accepted: 18 Jan 2022

with pudendal nerve block against spinal anaesthesia alone. Our findings will aid in determining the efficacy of pudendal nerve block in reducing CRBD in our group and improving evidence-based practices in patients undergoing TURP and TURBT.

METHODOLOGY

This was a randomized, double-blind, placebo-controlled experiment. The trial was registered at clinical trials.gov (NCT05022160) after receiving approval from the Institutional Review Board (Uro-Adm-Trg-1/IRB/2021/122). The study was carried out at the Armed Forces Institute of Urology, Rawalpindi, from August to November, 2021. Sample size was calculated by using WHO sample size calculator (power of test at 95%, level of significance at 5%,anticipated population proportion-1 = 63% anticipated population proportion-2=82%).[11] The Sampling technique was non-probability consecutive sampling.

Inclusion Criteria: Male patients aged 18 or older with an ASA class I, II, or III who were scheduled to have a TURP or TURBT under spinal anaesthesia were included in the study.

Exclusion Criteria: Patients with a history of ischemic heart disease, chronic obstructive lung disease, chronic pain, any coagulation issue, any psychiatric illness, and patients with an ASA class IV or V were excluded from the study.

All the patients were informed about the trial, catheter-related bladder discomfort (CRBD), and the numeric rating scale for pain (NRSP), and signed informed consent was obtained. The presence of discomfort or pain in the suprapubic or penile region and a burning feeling in the urethra was characterised as CRBD. Patients were taught how to use the NRSP to indicate their pain intensity by identifying a position along a 10cm straight line between two end-points ranging from 0 to 10, with 0 representing no pain and ten being the most significant pain conceivable. The participants were randomly assigned to two groups: control (group-C) or study (group-P).

Patients in group-*P* received spinal anaesthesia and a bilateral pudendal nerve block (PNB) with 0.25% Bupivacaine after surgery, whereas patients in group-C (control-group) had just spinal anaesthesia before undergoing TURP or TURBT. An ultrasound-guided method was used to give a pudendal nerve block. The block was operated by a single anaesthetist with over five years of experience in regional blocks. After palpating the is chial tuberosity, a high-frequency (15-6Mz) linear ultrasound probe was put in a slanting vertical orientation on the is chial tuberosity. Subsequently, the probe was transferred to the medial side, revealing the sacrotuberous ligament and internal pudendal artery. A 21G spinal needle was implanted in the plane medial to the internal artery, and 20ml 0.25% Bupivacaine was injected in 5 ml increments following negative aspiration. On the opposite side, the same technique was followed. The block time was reported as zero-hour.

Before the procedure, the patients' demographics were recorded. The on-duty nurse in the postoperative ward observed all of the patients at intervals of 3 hours, 8 hours, and 24 hours to develop any postoperative CRBD and its severity. The nursing staff in the postoperative ward who recorded the data were unaware of the patients' group. A pre-designed proforma was used to record the data.

Statistical Package for the social sciences (SPSS) version 23.00 was used to enter and evaluate the data. The quantitative variables, such as age, BMI, and NRSP score, were summarized as mean and standard deviation. Frequency and percentages were used to summarize qualitative characteristics such as the presence of CRBD. The Chi-square test was used to examine the frequency of CRBD in both groups, while the independent sample t-test was used to evaluate the average score of NRSP in both groups. The *p*-value of ≤0.05 was considered statistically significant

RESULTS

The study comprised 250 patients who met the inclusion criteria, with 125 participants in each group. The statistical analysis was omitted for three cases. After the procedure, two patients required spinal anaesthesia to be converted to general anaesthetic, and one patient required admission to intensive care. As a result, 247 cases were studied in the end.

Table-I: Demographics, type of surgery and duration.

Parameters	Group-C n=123	Group n=124	*p*-value
Age (years)	55.47 ± 11.651	56.82 ± 9.75	0.321
BMI	29.99 ± 2.86	30.30 ± 2.80	0.106
ASA Class			
I	40 (32%)	26 (20.8%)	0.128
II	65 (52%	74 (59.2%)	
III	20 (16%)	25 (20%)	
Type of Surgery			
TURP	77 (62.6%)	90 (72.5%)	0.081
TURBT	48 (39%)	35 (28.2%)	
Duration of Surgery	42.07 ± 11.44	43.93 ± 10.37	0.183

The two groups were similar in terms of age, BMI, ASA status, and operation type. In addition, the average length of operation in the two groups was also similar (Table-I). In the study-group, 42 (33.8%) patients developed CRBD at 3 hours compared to 72 (58.5%) in the control group (*p*-value 0.001). At 3 hours following surgery, the intensity of CRBD, as measured by the mean NRSP score, was 5.47 ± 1.82 in the control group and 1.47 ± 1.21 in the study group, respectively. Patients who received pudendal nerve block had a considerably decreased frequency and severity of CRBD at 8 and 12 hours after surgery. These two values, however, were comparable across the two groups 24 hours after surgery (*p*-value 0.22 and 0.60 as shown the Table-II.

All the patients included in our study underwent spinal anaesthesia. For patients in the study-group (group-*P*), a special anaesthetist who was well-trained in pudendal block applied the block using the reference technique. Because of this, we avoided compromising results due to the different skills of anaesthetists. The nurse and resident physician in the postoperative room, who recorded the presence or absence of CRBD and its intensity in the specified periods, were blinded to the patient group. We could not identify a single surgeon or group of surgeons to perform the operations.

Different surgeons have different techniques, and although the average duration of surgery was similar in the two groups, these techniques can affect the level

Table-II: Frequency and severity of catheter related bladder discomfort.

Parameters	3 Hours			8 Hours			12 Hours			24 Hours		
	Group-C	Group-*p*	*p*-value	Group- C	Group- *p*	*p*-value	Group- C	Group- *p*	*p*-value	Group- C	Group-*p*	*p*-value
Total Number	123	124	-	123	124	-	123	124	-	123	124	-
CRBD Present n (%)	72 (58.5)	42 (33.8)	<0.001	111 (90.2)	81 (65.3)	<0.001	73 (59.3)	53 (42.7)		51 (41.5)	42 (33.8)	
None n (%)	51 (41.5)	82 (66.1)		12 (9.7)	43 (34.6)		50 (40.6)	71 (57.2)	0.009	72 (58.5)	82 (66.1)	0.22
Mean NRSP Score	5.43 ± 1.98	1.48 ± 1.21	<0.001	6.37 ± 1.63	2.60 ± 1.31	<0.001	2.83 ± 1.51	2.42 ± 1.21	0.020	2.58 ± 1.54	2.21 ± 1.52	0.60

DISCUSSION

We have found that when used in conjunction with spinal anaesthesia, a pudendal nerve block reduces the frequency and severity of catheter-related bladder discomfort for upto 12 hours after surgery.

Postoperative management of lower urinary tract surgery, particularly TURP and TURP, involves a wide channel catheter maintenance. It is important for postoperative recovery as it helps clean the bladder and removes blood clots that could otherwise block urine flow and damage the suture line in the bladder.[11-14] However, this catheter is a source of considerable discomfort to the patient. This discomfort is most significant in the first hour after the operation when performed under general anaesthesia. The intensity of the discomfort generally decreases over time.[15,16]

Applying a bilateral pudendal nerve block at the end of a TURP or TURB performed under spinal anaesthesia dramatically reduced the frequency and intensity of CRBD up to 12 hours following surgery, according to the findings of our study. There were no side effects, such as systemic absorption of the local anaesthetic, pudendal nerve lesions, bruising, or the formation of an abscess at the infiltration site.

of discomfort that the patient may experience in the postoperative period.

Our findings were comparable to those of Xiaoqiang *et al*, who discovered that pudendal nerve block successfully lowered CRBD after 30 minutes, 2 hours, and 8 hours after surgery, but there were no significant differences at 12 and 24 hours.[12] All of the surgeries in that study were done under general anaesthesia, whereas our patients had TURP and TURP done under spinal anaesthesia. The effect of the pudendal nerve was prolonged with regional anaesthesia, and the intensity and frequency of the CRBD were reduced 12 hours after the procedure. Agarwal *et al*, looked into the effects of Oxybutynin and Tolterodine on CRBD. Both medicines were proven to reduce CRBD, although they came with antimuscarinic side effects like dry mouth and blurred vision.[17] Tramadol, an opioid given intravenously, has been proven to help reduce CRBD, but it also increases the risk of postoperative nausea and vomiting and a small risk of decreased oxygen saturation and the requirement for oxygen therapy 18. When compared to controls, Ketamine reduced the incidence of CRB after 2 and 6 hours and the severity of CRB after 1 hour, although it was

linked with a higher incidence of sedation without additional significant consequences.[19] Agarwal *et al*, in another study looked at the effects of gabapentin in lowering postoperative CRBD and discovered that it had a positive effect.[20] The patients in this study were undergoing percutaneous nephrolithotomy, and they were catheterised with a,[16] Fr Foley catheter after the procedure (compared to the larger Foley catheters used in patients with lower urinary tract surgery).

Our study found that pudendal block is an effective method to reduce CRBD. This reduction in discomfort helps the patient accept the Foley catheter, get mobilised early, and reduce the need for opioids, leading to sedation and excessive nausea and vomiting, which can lead to prolonged hospitalisation and delayed recovery. Pudendal nerve block requires special skills but can be learned quickly.[21] The best way to apply a block is with the help of a nerve stimulator that will guide the appropriate depth and location so that the infiltration of the local anaesthetic achieves an optimal response, but we lack this capacity in our configuration.

In our country, more studies are needed to investigate the effect of pudendal nerve block using various local anaesthetics in patients with lower urinary tract surgery to have more solid evidence and its role in the length of hospital stay, the need for additional analgesics. Its long-term effects, such as abscess formation or numbness at the distribution point of the pudendal nerve, can be seen. We also need to carry out studies to compare its effectiveness with other active substances, especially those administered orally, such as gabapentin.

LIMITATIONS OF STUDY

We could not use the gold standard pudendal nerve block method, which involves injecting local anaesthetic around the nerve while monitoring it using a nerve stimulator.

CONCLUSION

When used in conjunction with spinal anaesthesia, a pudendal nerve block reduces the incidence and severity of catheter-related bladder discomfort for up to 12 hours after surgery. However, further research is needed to validate this effect.

Conflict of interest: None**.**

Authors' Contribution

MY: Conception and design, SEHN: Acquisition of data, FA: Analysis and interpretation of data, MA: Drafting of article, SR: Critical revision of article, AK: Draftingand critical revision of the article.

REFERENCES

1. Patel HD, Ball MW, Cohen JE, Kates M, Pierorazio PM, Allaf ME. Morbidity of urologic surgical procedures: an analysis of rates, risk factors, and outcomes. Urology 2015; 85(3): 552-559.
2. Kumar M, Pandey S, Aggarwal A, Sharma D, Garg G, Agarwal S, et al. Unplanned 30-day readmission rates in patients undergoing endo-urological surgeries for upper urinary tract calculi. Inves Clin Urolo 2018; 59(5): 321-327.
3. Frede T, Rassweiler JJ. Management of postoperative complications following TURP. InPractical Tips in Urology Springer, London; 2006; 50(5): 969-979.
4. Li JY, Liao R. Prevention of catheter-related bladder discomfort - pudendal nerve block with ropivacaine versus intravenous tramadol: study protocol for a randomized controlled trial. Trials 2016; 17(1): 448.
5. Ryu JH, Hwang JW, Lee JW, Seo JH, Park HP, Oh AY, et al. Efficacy of butylscopolamine for the treatment of catheter-related bladder discomfort: a prospective, randomized, placebo-controlled, double-blind study. Br J Anaes 2013; 111(6): 932-937.
6. Li SY, Song LP, Ma YS, Lin XM. Predictors of catheter-related bladder discomfort after gynaecological surgery. BMC Anesthesiol 2020; 20(1): 1-6.
7. Bai Y, Wang X, Li X, Pu C, Yuan H, Tang Y, et al. Management of catheter-related bladder discomfort in patients who underwent elective surgery. J Endourol 2015; 29(6): 640-649.
8. Kim HC, Lee YH, Jeon YT, Hwang JW, Lim YJ, Park JE, et al. The effect of intraoperative dexmedetomidine on postoperative catheter-related bladder discomfort in patients undergoing transurethral bladder tumour resection: a double-blind randomised study. Eur J Anaesthesiol 2015; 32(9): 596-601.
9. Eylert MF, Nambiar AK. Bladder and Urethra Structure and Function. Blandy's Urology, 3rd Edition. 2019: 349-58.
10. Shermadou ES, Rahman S, Leslie SW. Anatomy, Abdomen and Pelvis, Bladder. In: StatPearls. Treasure Island (FL): StatPearls Publishing; 2022. [Internet] Available at: https://www.ncbi.nlm.nih.gov/books/NBK482438/
11. Wagner KR, Bird ET, Coffield KS. Urinary Catheterization: a Paradigm Shift in Difficult Urinary Catheterization. Curr Urol Rep 2016; 17(11): 82.
12. Xiaoqiang L, Xuerong Z, Juan L, Mathew BS, Xiaorong Y, Qin W, et al. Efficacy of pudendal nerve block for alleviation of catheter-related bladder discomfort in male patients undergoing lower urinary tract surgeries: a randomized, controlled, double-blind trial. Medicine (Baltimore) 2017; 96(49): e8932
13. Okorie CO. Is continuous bladder irrigation after prostate surgery still needed?. World J Clin Urolog 2015; 4(3): 108-114.
14. Scholtes S. Management of clot retention following urological surgery. Nurs Times 2002; 98(28): 48-50.
15. Ding A, Cao H, Wang L, Chen J, Wang J, He B. A novel automatic regulatory device for continuous bladder irrigation based on wireless sensor in patients after transurethral resection of the prostate: A prospective investigation. Medicine (Baltimore) 2016; 95(52): e5721.
16. Agarwal A, Raza M, Singhal V, Dhiraaj S, Kapoor R, Srivastava A, et al. The efficacy of tolterodine for prevention of catheter-related bladder discomfort: a prospective, randomized, placebo-controlled, double-blind study. Anesth Analg 2005; 101(4): 1065-1057.
17. Agarwal A, Dhiraaj S, Singhal V, Kapoor R, Tandon M. Comparison of efficacy of oxybutynin and tolterodine for prevention of catheter related bladder discomfort: a prospective, randomized, placebo-controlled, double-blind study. Br J Anaesth 2006; 96(3): 377-380.

18. Agarwal A, Yadav G, Gupta D, Singh PK, Singh U. Evaluation of intra-operative tramadol for prevention of catheter-related bladder discomfort: a prospective, randomized, double-blind study. Br J Anaesth 2008; 101(4): 506-510.
19. Agarwal A, Gupta D, Kumar M, Dhiraaj S, Tandon M, Singh PK. Ketamine for treatment of catheter related bladder discomfort: a prospective, randomized, placebo controlled and double blind study. Br J Anaesth 2006; 96(5): 587-589.
20. Agarwal A, Dhiraaj S, Pawar S, Kapoor R, Gupta D, Singh PK. An evaluation of the efficacy of gabapentin for prevention of catheter-related bladder discomfort: a prospective, randomized, placebo-controlled, double-blind study. Anesth Analg 2007; 105(5): 1454-1457.
21. Kim SH, Song SG, Paek OJ, Lee HJ, Park DH, Lee JK. Nerve stimulator guided pudendal nerve block by pararectal approach. Colorectal Dis 2012; 14(5): 611-615.

.....