



Anaesthesiology

“CLINICAL COMPARISON OF EFFICACY OF PROPHYLACTIC ADMINISTRATION OF DEXMEDITOMIDINE VERSUS PARACETAMOL ON POSTOPERATIVE CATHETER RELATED BLADDER DISCOMFORT IN PATIENTS UNDERGOING PERCUTANEOUS NEPHROLITHOTOMY”

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ABSTRACT Catheter related bladder discomfort (CRBD) is caused by catheter induced bladder irritation because of involuntary bladder contractions due to stimulation of muscarinic receptor which are present in bladder mucosa and urothelium. Symptoms of CRBD are similar to Overactive Bladder(OAB). CRBD is an important factor that delays discharge of patients from post anaesthesia care unit.90 patients were divided into three groups, group D received dexmedetomidine 0.5mcg/kg, group P received Paracetamol 15mg/kg & group C received only 0.9%normal saline 20 ml over 10 min intravenously after induction.Incidence and severity of CRBD were assessed at 0,2,4 & 6 hours post operatively. We concluded that intravenous dexmedetomidine dose of 0.5mcg/kg provides satisfactory results for prevention of CRBD.

KEYWORDS : CRBD, Dexmedetomidine, Paracetamol

INTRODUCTION:

Catheter related bladder discomfort(CRBD) is defined as an urge to void or discomfort in the supra-pubic region, observed after operation in patients who are awakening from anaesthesia and had a urinary catheterization during operation. CRBD leads to post operative pain and discomfort. Incidence of CRBD is about 47-90%⁽⁹⁾. Smooth muscles of urinary bladder has predominant M2 & M3 muscarinic receptor cholinergic innervation by pelvic nerves and adrenergic innervation by hypogastric nerve⁽¹⁾. Agents with antimuscarinic properties such as atropine, oxybutynin, tolterodine and butylscopolamine are effective in reducing both the incidence and severity of CRBD).

Ketamine, tramadol, pregabalin, gabapentin, dexmedetomidine, paracetamol, COX-2 inhibitors, magnesium and intra-vesical administration of diluted bupivacaine are effective for prevention and treatment of CRBD^(3,4,5,6,8,10). All of these drugs are associated with some side effects. We evaluated and compared the efficacy of prophylactic administration of dexmedetomidine and paracetamol for CRBD in patients undergoing PCNL surgeries.

AIMS & OBJECTIVES:

Primary aim of our study was to know the incidence of CRBD and severity of post operative bladder discomfort. Secondary aim was assessment of hemodynamics, respiration, sedation, and other side effects postoperatively.

MATERIAL AND METHODOLOGY:

We conducted prospective, randomized, double blinded, placebo controlled study in 90 patients of either sex, ASA I/II, aged 18-65 years undergoing PCNL surgery under general anaesthesia in Urology OT in the year 2019-2021 at Civil Hospital Ahmedabad. Patient who refused for study, history of outflow obstruction/Overactive bladder, Transurethral resection of prostate for benign prostatic hyperplasia, history of bladder catheterization within last 6 months, morbid obesity, chemical substance abuse, Chronic pain, Patients with cardiovascular, hepatic, renal or any psychiatric disease, end stage renal disease were excluded. After confirming adequate NBM status & obtaining written informed consent, patient were taken on OT table and ECG, NIBP, SpO2 and ETCO2 monitors were applied. All the patients were pre-medicated with intravenous Glycopyrrolate 0.004mg/kg., Ondansetron 0.15mg/kg and Inj Fentanyl 1 mcg/kg.. After pre-oxygenation with 100% O2 for 3-5 minutes patients were induced with Inj Propofol 2-3 mg/kg and Inj Succinylcholine 2 mg/kg IV to facilitate intubation with appropriate sized endotracheal tube. Anaesthesia was maintained with 100% O2 mixture and Sevoflurane traces 1.5-2% and Inj Atracurium as per dose. Urinary catheterization was done. Patient were randomly divided based on computer generated randomization into 3 groups of 30 patients each, as per the drug injected.

GROUP C- received 0.9%NS 20ml

GROUP D- received Dexmedetomidine 0.5 mcg/kg in 20ml NS over 10 min.

GROUP P- received Paracetamol 15mg/kg in 20ml NS over 10 min.

These medications were administered by anaesthesia registrar who was not involved in the study. After the end of surgery, all the patients were reversed with Inj. Glycopyrrolate (0.008mg/kg) and Inj. Neostigmine (0.05mg/kg). All the patients were shifted to PACU. Bladder discomfort was assessed by an anaesthesia resident unaware of type of medication received by the patient on arrival to PACU immediately.

Severity of bladder discomfort was recorded on 4 point scale as:

- 1) NO bladder discomfort,
- 2) MILD: As reported by the patient on questioning,
- 3) MODERATE As reported by the patient without questioning,
- 4) SEVERE: As reported by the patient and accompanied by behavioural responses such as attempt to remove catheter, restlessness, extremity movements, strong vocal responses. We administered Inj. Diclofenac sodium 1.5-3mg/kg to the patient having moderate to severe bladder discomfort.

The patients were observed postoperatively at 0,2,4 and 6 hours for sedation, hemodynamics, post-operative pain, nausea and vomiting. Post-operative pain was assessed by VAS score in which 0-3 score was considered mild, 4-6 moderate and 7-10 as severe.

Data And Statistical Analysis

For statistical analysis we did One Way ANOVA for 3 group's mean comparison & p value <0.05 was considered as significant test results.

RESULTS:**Table 1: Demographic Characteristics (Mean ± Sd)**

All the patients were comparable in terms of Age, Gender and Weight in all 3 groups.

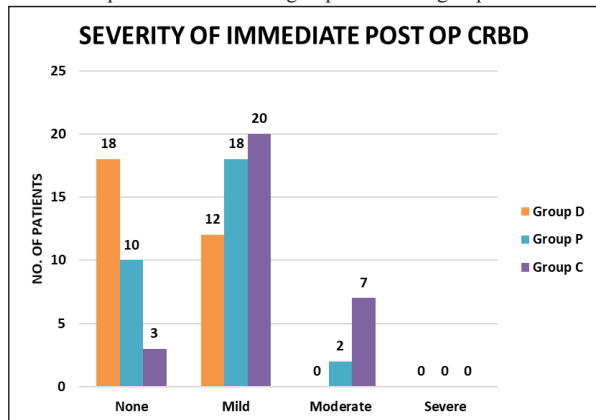
FACTORS	GROUP D(n=30)	GROUP P(n=30)	GROUP C(n=30)	P-VALUE
Age(in yrs)	43±9.99	41.6±9.71	47.10±10.38	0.8608
Gender(M:F)	18:12	13:17	17:13	-
Weight(kg)	61.2±7.13	62.17±7.09	63.03±5.7	0.5693

Table 2: Incidence Of Bladder Discomfort

Time	0 Hour			2 Hour			4 Hour			6 Hour		
	D	P	C	D	P	C	D	P	C	D	P	C
Total No. Of Cases	30	30	30	30	30	30	30	30	30	30	30	30

CRBD Observed In	9	18	22	12	22	23	9	19	27	0	15	24
No. Of Patients												
% Of Patients	30%	60%	73%	40%	73%	77%	30%	63%	90%	0%	50%	80%
P- Value	0.002		0.004			0.0001			-			

In our study, 30% of patients in group D, 60% of patients in group P and 73% of patients in group C had CRBD at arrival to PACU, Dexmedetomidine group had significantly lower incidence of CRBD as compared to two other groups (p value=0.002) at immediate postoperative period (0 hour). Even at 2, 4 & 6 hours postoperatively, Dexmedetomidine group showed significantly lower incidence of CRBD compared to Paracetamol group and control group.



18 patients (60%) in group D, 10 patients (33%) in group P & only 3 patients (10%) in group C had NO CRBD postoperatively. While 12 patients (40%) in group D, 18 patients (60%) in group P & 20 patients (67%) in group C reported MILD bladder discomfort. Also, no patients in group D but 7 patients (23%) in group C and 2 patients (7%) in group P reported MODERATE bladder discomfort. We did not observe any significant difference in hemodynamics in all three groups.

DISCUSSION:

The parasympathetic innervation by the sacral nerves, mainly pudendal nerve is responsible for urinary bladder function. Release of Acetylcholine, which is the main transmitter, causes smooth muscle contraction via muscarinic receptors mainly M2 and M3. Though M2 receptor is predominant, direct contraction of detrusor smooth muscle is also mediated by M3 receptor.⁽¹⁶⁾ Not only M2 and M3 receptors, animal studies show role of adrenoceptors for bladder contraction. α_2 adrenoceptors are present in more number in bladder neck and detrusor muscle than α_1 receptors. Stimulation of α_2 receptors by α_2 agonist agent inhibits Ach release from both postganglionic and parasympathetic nerve terminals.^(1,16) This is the reason why dexmedetomidine reduced the incidence and severity of CRBD by reducing the bladder contractility by α_2 adrenoceptor agonism and M2 receptor antagonism.⁽¹⁾

Symptoms of CRBD are same as OAB. In both cases there is elevated urinary levels of PGE2. Elevated PGE2 causes activation of cyclooxygenase 2 (COX 2) enzymes. Paracetamol (PCM) is COX-2 inhibitor.⁽¹⁸⁾ Thus by administering PCM, it inhibits PGE2 synthesis and thereby reduces or prevents symptoms of CRBD.⁽²⁾

Tapas Kumar Singh et al. observed that patient who received dexmedetomidine had lesser severity of CRBD compared to control group at 0, 2 & 4 hours post-operative in PACU.⁽¹⁾ Pinar Ergenoglu et al. observed that patients receiving Paracetamol experienced lower incidence of moderate discomfort as compared to placebo group at 1, 2, 4 & 6 hours post-operatively. He also observed that none of the patients who received Paracetamol had severe CRBD at all-time except only one patient.⁽²⁾

In our study 10% patients in dexmedetomidine group were sedated. Significant reduction in pain was also observed in dexmedetomidine group in immediate post operative period.

Tapas Kumar Singh et al. observed significantly lower pulse rate and MBP in dexmedetomidine group at 0 and 2 hours post operatively. Even RR was also reduced in dexmedetomidine group at 0 hour.⁽¹⁾ In our study, we administered inj. dexmedetomidine infusion immediately after induction, while Tapas Kumar Singh et al. in their study

administered dexmedetomidine infusion just 30 minutes before completion of surgery. The dose of dexmedetomidine infusion was 1mcg/kg. & our infusion dose for dexmedetomidine was 0.5 mcg/kg. This can be the reason of reduction in HR, BP & RR in post-operative period in their study.

CONCLUSION

Prophylactic administration of Dexmedetomidine and Paracetamol as infusion can lower the incidence of CRBD in early post-operative period. However, Dexmedetomidine is more effective in prevention of Catheter Related Bladder Discomfort (CRBD) as compared to Paracetamol. The IV dose of 0.5 mcg/kg of dexmedetomidine provides satisfactory results for prevention of CRBD. Further research with different doses of dexmedetomidine is recommended.

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