Original Article

Hemodynamic Comparison between modified saddle block and subarachnoid block for Transurethral Resection of Prostate

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Abstract

Introduction: Spinal anesthesia is often the mode of anesthesia in transurethral resection of prostate (TURP) albeit with risk of hypotension. However, hemodynamic derangement is often less pronounced in saddle block. This study was conducted to compare the mean fall in Mean arterial Pressure (MAP) and Heart rate (HR) between modified saddle block and subarachnoid block for TURP.

Objective: To compare the mean fall in MAP and HR between modified saddle block and subarachnoid block for TURP.

Materials and Methods: In this randomized controlled trial 120 patients undergoing elective TURP were included and divided into two groups. Group A Patients received subarachnoid block and Group B received modified saddle block. Baseline hemodynamics were recorded before and then at 5 minutes after anesthesia. All the collected data was entered into SPSS version 22 and analyzed. Quantitative data like age, BMI, ASA-PS score, duration of surgery and baseline hemodynamics were presented as means and standard deviations. The fall of mean arterial pressure (MAP) & heart rate (HR) were compared among groups by independent t test and P value < 0.05 was considered as statistically significant.

Results: Mean fall in MAP was 8.98±1.28 mmHg and 3.13±0.68 mmHg ($p<0.001$) in group A and B, respectively. Mean fall in HR was 7.17±0.98 and 2.78±0.59 ($p<0.001$) in group A and group B, respectively.

Conclusion: Modified saddle block resulted in significantly decreased fall in MAP and HR as compared with subarachnoid block for TURP.

Keywords: Modified Saddle Block; Subarachnoid Block; Mean Arterial Pressure.

Introduction

The prostate is a male reproductive organ that plays a role in male fertility. It liquifies the ejaculate by supplying prostatic secretions, which are made up of an alkaline solution and prostate-specific antigen. Prostatic secretions make up about 30% of the fluid in the ejaculate. Androgens activate the prostate, which is generated from the urogenital sinus. The prostate weighs about 33 grams on average. It is made up of three zones: central, peripheral, and transition, which surround the parenchyma. In benign prostate hypertrophy (BPH), the transition zone is where enlargement usually occurs. Fortunately, a Transurethral resection of prostate (TURP) can quickly resect the transition zone. Prostate cancer is frequently found in the peripheral zone. Stroma, ducts, and acini make up the prostate parenchyma.

Because of testosterone and ageing, the prostate enlarges. BPH is a condition that occurs when the prostate enlarges. When BPH creates urinary blockage, a TURP operation may be necessary[1].

BPH effects 50% of men over age of 50 and causes symptoms in 80% of the males over 80 years of age[2]. BPH causes symptoms by predominantly effecting the lower urinary tract. There are a number of treatment modalities for BPH including both medical and surgical. Medical management options include use of 5 alpha reductase inhibitors and alpha blockers[3]. Medical management frequently fails and thus patient commonly requires surgical intervention in the form TURP, Holmium laser enucleation of the prostate (HoLEP) and Prostatic urethral lift (PUL)[3].

In our resource limited settings TURP is the surgical option available to the patients providing adequate relief from symptoms of BPH. TURP is carried out under regional anesthesia/ neuraxial block. Neuraxial techniques include Sub-Arachnoid Block (SAB), Epidural anesthesia and Saddle block.

For TURP most commonly SAB is used. SAB also known as spinal anesthesia is used for surgical procedures involving lower abdomen, perianal region and lower limbs[4]. As the name implies the local anesthetics during SAB are administered in the Sub-arachnoid space. The spread of local anesthetic in the sub-arachnoid space determines the extent of block and is dependent upon position of patient, dose injected and baricity of the local anesthetic solution[5].

One of the side effects of SAB is sympathetic blockade due to cephalad spread of local anesthetic. This results in subsequent vasodilation and hypotension, which is especially harmful for elderly patients with cardiovascular co-morbids[5]. As already mention the patients presenting for TURP are elderly therefore sympathectomy associated with SAB can have grave consequences for them.

On the other hand, in saddle block, the patient is made to sit for 5 minutes after injection of local anesthetic in the sub-arachnoid space and the upper level of block is S1[5]. As saddle block spreads only up to S1, it is not associated with sympathectomy and adverse cardiovascular outcomes. Therefore, saddle block could prove to be an effective alternative to sub-arachnoid block for patients undergoing TURP as majority of the pain fibers from prostate are carried by pelvic sphlancic nerves which have S2-S4 root values.

Our study will compare the hemodynamic effects of both modified saddle block and SAB in patients undergoing TURP.

Materials and Methods

This double blind randomized controlled trial was conducted by the Department of anesthesia at Benazir Bhutto Hospital, Rawalpindi (RMU & Allied Hospitals) from 02-12-2020 till 01-05-2021. Sample size was calculated using WHO standard EPI calculator with confidence interval of 95% margin of error 5 and population proportion to be 50. A total of 120 patients fulfilling the inclusion criteria and undergoing elective TURP were included in the study. They were equally divided into two groups using computer generated numbers. Group A Patients received subarachnoid block and Group B received saddle block.

Inclusion criteria

- Age: 50 -70 years
- ASA-PS (American Society of Anesthesiologist physical status) I, II, III undergoing TURP

Exclusion criteria

- ASA-PS IV and above
- Failed/partial Subarachnoid Block
- Failed/partial Modified Saddle Block
- Contraindication of regional anesthesia (local site infection, spine deformities, coagulopathy, and neurological disorder)

After approval from the RMU ethical committee, the patients fulfilling the inclusion criteria underwent elective TURP in the Urology Operation Theatre, Benazir Bhutto Hospital, Rawalpindi. Patients were divided into two groups using computer generated numbers. An informed consent was obtained after

counseling the patients regarding SAB or Saddle block to be performed. The demographic variables were recorded. Standard American Society of Anesthesiology (ASA) monitoring was attached. Vitals were recorded every 5 minutes till the end of surgery.

Group A patients received subarachnoid block with 2 ml of 0.75 % hyperbaric bupivacaine at L3-L4 or L4-L5 inter-vertebral space via midline or paramedian approach in sitting position after ensuring free flow of cerebrospinal fluid and patients were placed supine with one pillow after administration of the drug in the subarachnoid space.

While Group B patients received modified saddle block with 2 ml of 0.75 % hyperbaric bupivacaine in the same manner as Group A, but remained in the sitting position for 10 minutes and then were made supine with one pillow under the head.

All the patients were given same standard intra-operative care and post-operative care. Baseline systolic BP, diastolic BP and mean arterial pressure (MAP), heart rate (HR), pulse oxygen saturation (SpO2) were recorded before administration of the anesthetic drugs and then at 5 minutes interval during the intraoperative period. If MAP falls >20% of baseline value intravenous phenylephrine at a dose of 50 mcg bolus was administered and repeated, if required. If HR less than 60/min, Atropine (0.6 mg) IV was given. The level of sensory and motor block was noted in both groups for adequate surgical anesthesia on a pre-designed proforma. All the collected data was entered into SPSS version 22 and analyzed. Quantitative data like age, BMI, ASA-PS score, duration of surgery and baseline SBP, DBP, MAP, HR & SpO2 were presented as means and standard deviations. The fall of MAP & HR were compared among groups by independent t test. P value < 0.05 was considered as statistically significant. Data was stratified with age, BMI, ASA-PS score and duration of surgery. Post stratification independent sample t test was applied to check the significance.

Results

Out of 60 patients for transurethral resection of prostate in group A, there were 39 (65.0%) males in the age group 50 – 60 years and 21 (35.0%) patients belonged to age group 61 – 70 years. The mean age of the patients was 59.10±4.21 years. Out of 60 patients for transurethral resection of prostate in group B, there were 42 (70.0%) males in the age group 50 – 60 years and 18 (30.0%) patients were in the age group 61 – 70 years. The mean age of the patients was 57.06±3.05 years.

Distribution of patients by BMI, ASA-PS score, duration of surgery and hemodynamic variables are tabulated below in tables 1-6 respectively.

Table 1: Distribution of Patients by BMI (n=120)

BMI (Kg/m²)	Group A (n=60)		Group B (n=60)	
	No. of patients	Percentage (%)	No. of patients	Percentage (%)
<18.5	1	1.67	2	3.34
18.5-24.9	9	15.0	6	10.0
25-29.9	37	61.67	33	55.0
≥30	13	21.67	19	31.67
Mean ± SD	28.98 ± 2.46 Kg/m²		27.61 ± 1.98 Kg/m²	
P-Value*	0.623**			

* Chi-Square test

** Not significant

Table 2: Distribution of Patients by ASA-PS SCORE (n=120)

ASA-PS Score	Group A (n=60)		Group B (n=60)	
	No.	%	No.	%
I	9	15.0	7	11.67
II	31	51.67	36	60.0
III	20	33.34	17	28.33
P value*	0.763**			

* Chi-Square test

** Not significant

Table 3: Distribution of Patients by Duration of Surgery (n=120)

Duration of surgery (Min.)	Group A (n=60)		Group B (n=60)	
	No.	%	No.	%
≤ 60	42	70.0	39	65.0
>60	18	30.0	21	35.0
Mean±SD	49.09±6.49 min.		58.01±3.06 min.	
P value*	0.830**			

* Chi-Square test

** Not significant

Table 4: Baseline Mean Hemodynamic Variables (n=120)

Baseline hemodynamic variables	Group A (Mean±SD)	Group B (Mean±SD)	p-value*
Mean SBP (mmHg)	118.14 ± 5.89	119.01 ± 5.18	0.791**
Mean DBP (mmHg)	86.33 ± 2.69	85.96 ± 3.01	0.855**
Mean MAP (mmHg)	88.76 ± 4.07	87.93 ± 4.94	0.681**
Mean HR	91.66 ± 5.13	92.18 ± 5.89	0.846**

* Independent t test

** Not Significant

Table 5: Mean Hemodynamic Variables at 5 Min (n=120)

Hemodynamic variables at 5 Min.	Group A (Mean±SD)	Group B (Mean±SD)	p-value*
Mean SBP (mmHg)	99.32 ± 6.38	110.11 ± 7.13	0.001**
Mean DBP (mmHg)	78.13 ± 3.93	83.44 ± 4.17	0.003**
Mean MAP (mmHg)	81.54 ± 3.66	86.25 ± 3.89	0.00**
Mean HR	83.32 ± 4.32	91.97 ± 4.66	0.00**

* Independent t test

** Significant

Table 6: Mean Fall in MAP & Heart Rate (n=120)

Mean fall	Group A (Mean±SD)	Group B (Mean±SD)	p-value*
MAP (mmHg)	8.98 ± 1.28	3.13 ± 0.68	0.00**
HR	7.17 ± 0.98	2.78 ± 0.59	0.00**

* Independent t test

** Significant

Discussion

In this prospective clinical study of 120 patients, we compared the mean fall in mean arterial pressure (MAP) and heart rate (HR) between modified saddle block and subarachnoid block for TURP.

Majority of patients for transurethral resection of prostate in our study i.e., 51.67% and 60.0% patients in groups A and B respectively, had ASA-PS Score II, however results were not statistically significant (p>0.05).

In our study, the mean duration of transurethral resection of prostate were 49.09±6.49 minutes and 58.01±3.06 minutes in group A and group B, respectively. However, results were not statistically significant (p=0.830). However, in a study by Bhattacharyya S et al[6], the mean duration of surgery was 82.49±1.53 minutes and 82.27±1.01 minutes (p= 0.419) in group A and B, respectively. The duration of the surgery can have an impact on the mode of anesthesia.

In our study there was no statistical difference between baseline hemodynamic parameters between two groups however at 5 minutes after the onset of block, there were statistical difference between two groups i.e. p value < 0.05. Patient receiving modified saddle block had better hemodynamic profile with mean SBP of 110.11 ± 7.13 vs 99.32± 6.38 and DBP of 83.44 ± 4.17 vs 78.13 ± 3.93. Similarly mean heart rate was higher in group B as compared to group A; 91.97 ± 4.66 vs 83.32 ± 4.32. Our findings are supported by a number of studies; which showed standard saddle block lead to better intra-operative hemodynamics as compared to SAB among patients undergoing TURP[6-9].

In our study, among group B the mean fall in MAP was 3.13 ± 0.68 and HR was 2.78 ± 0.59. This was significantly lower than group A patients (p-value <0.05). In a study by Bhattacharyya S et al the mean fall in MAP 6.73 ± 3.396 and in HR was 4.76±2.01 among the patients receiving saddle block[6]. This shows that modified saddle block is even more hemodynamically stable than standard saddle block and is as effective as SAB for providing adequate regional analgesia for TURP. Similarly comparison with other studies shows that modified saddle block provides better hemodynamics as compared to SAB and standard saddle block [7-10].

Similarly patients receiving saddle block was found to have better hemodynamic profile as compared to SAB or epidural, while undergoing HoLEP[10].

Conclusion

There is statistically significant difference in fall in Mean arterial Pressure (MAP) and Heart rate (HR) between modified saddle block and subarachnoid block for transurethral resection of prostate. Fall in Mean arterial Pressure (MAP) and Heart rate (HR) were more pronounced in subarachnoid block as compared with modified saddle block.

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