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Original Research Article.

Subarachnoid Block and Saddle Block in Transurethral Resection of Prostate Surgery: A Comparative Randomised Prospective Study

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ABSTRACT

Background and Aims: Transurethral resection of the Prostate (TURP) is a commonly performed procedure in elderly males with Benign hypertrophy of prostate (BHP). Spinal anaesthesia is a widely accepted technique for TURP but is associated with significant hypotension and bradycardia. Saddle anaesthesia is low spinal anaesthesia, thereby limiting the haemodynamic fluctuations. This present study aims to compare the subarachnoid block and saddle block in TURP for haemodynamic fluctuations, vasopressor requirements, and adequate surgical conditions.

Materials and Methods: This study was performed on 80 patients of age group 55-75 years of ASA grade I or II scheduled for TURP divided into two groups of 40 patients each. Group A received the subarachnoid block with 2.2 ml of drug-containing 1.7 ml of 0.5% bupivacaine with 25 micrograms fentanyl whereas Group B received saddle block with the same drug. Intraoperative haemodynamic variables, the onset and duration of sensory block, motor block and vasopressor requirements in each group were also observed. Hypotension was corrected with the administration of mephentramine 6 mg as a single dose.

Results: Haemodynamic fluctuations were found to be significantly less in Group B patients with lesser vasopressor requirements. Delayed onset and decreased duration of sensory block was observed in group B patients along with partial motor blockade.

Conclusion: Saddle block is a safer technique for TURP in elderly patients with adequate surgical anaesthesia, stable haemodynamics and lesser vasopressor requirements. Motor blockade was also partial resulting in early ambulation of the patients.

Keywords: TURP, Haemodynamic Fluctuations, Spinal Anaesthesia, Saddle Block.

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INTRODUCTION

Transurethral resection of the prostate is the most common surgical procedure for bladder outlet obstruction due to benign prostatic hypertrophy in elderly males who usually have diminished physiological reserves, including long-term persistence of diseases and comorbidities. So the anaesthetic technique used should assure less morbidity and mortality with negligible impact on the organ systems.[1,2] A regional anaesthesia technique that limits higher levels of sensory analgesia and sympathetic blockade is therefore recommended in the elderly population.[3]

Spinal anaesthesia with a level of sensory blockade up to T10 dermatome is preferred over general anaesthesia due to its efficacy, rapidity, minimal effects on body physiology, and reduction in blood loss.[3] It minimally decreases myocardial contractility, causes a modest decrease in cardiac output and blood pressure. Also, provides post-operative analgesia, reduces blood loss during surgery, and prevents the need for tracheal intubation that may irritate the airway leading to coughing and straining which may exacerbate postoperative haemorrhage. The blood flow to the lower limbs is increased due to vasodilatation and chemical sympathectomy thereby reducing the chances of deep vein thrombosis. The patient also remains fully awake during regional anaesthesia; therefore, the chances of aspiration are quite less.[4,5]

The most common complication of the procedure is hypotension and bradycardia which is corrected either by administration of i/v fluids or by a vasopressor but liberal administration of fluids may be dangerous in the elderly population with compromised cardiopulmonary function.[6]

Saddle block is well-known method of low spinal anaesthesia that paralyzes the pelvic muscles and produces a block that is dense in sacral, lumbar and lower thoracic dermatomes.[7] With a lower level of block, it would prevent sympathetic blockade limiting the haemodynamic fluctuations, fluid requirement, and the chances of circulatory overload; therefore, preferred in elderly patients.[4]

MATERIALS AND METHODS

After the approval from the institutional ethical committee and obtaining informed written consent from the patients, a prospective, randomised study was carried out in 80 patients belonging to the age group of 55-75 years, ASA Grade I and II, the prostatic volume of 30-80 cc, BMI<30, operating time of 60-90 mins and normal coagulation profile scheduled for the TURP surgeries. The sample size was calculated by Yamane's formula and was found to be 27 in each group. 40 patients were taken in each group and those having any coagulation defect, local skin infection, cardiovascular disease, or abnormality of the spine were excluded from the study. Patients were randomly divided into two groups of 40 each using a sealed envelope technique to compare subarachnoid and saddle block in terms of haemodynamic variables, requirements of vasopressor, the onset of sensory blockade, motor blockade and postoperative complications. A thorough pre-anaesthetic evaluation performed on preoperative and operative day. In the operation room, after attaching routine monitors (electrocardiogram, non-invasive blood pressure, pulse oximeter), intravenous access was secured with an 18 G cannula. All patients were preloaded with 10 ml/kg Ringer's lactate solution. Under complete aseptic precautions, lumbar puncture was performed at L4-L5 intervertebral space using a midline approach with a 23-gauge Quincke's spinal needle. After ensuring a free and clear flow of CSF, patients in group A received subarachnoid block with 2.2ml of drug [1.7ml of hyperbaric bupivacaine 0.5% + 0.5ml (25mcg) of fentanyl] in sitting position and made supine immediately after injecting the drug intrathecally whereas patients in Group B received saddle block with same drug in sitting position and made to sit for 10 mins before making patients supine.

Oxygen was administered via a venturi mask. Assessment of haemodynamic parameters was done after every 5 minutes for the first 30 minutes and then after every 15 minutes till the end of the surgery. Fall in Heart Rate to < 60 was treated with an intravenous dose of 0.6 mg Atropine whereas fall in SBP >30% or SBP< 90 mm Hg was treated with an intravenous bolus dose of mephentramine 6mg as a single dose and repeated if required. The onset of sensory block and duration of sensory block was noted. The level of the sensory neural blockade was assessed by the pinprick method every 5 mins over the dermatomes and on the midclavicular line bilaterally using a visual analogue scale after giving the block. Motor blockade was assessed using the Modified Bromage Scale. Postoperative complications like nausea, vomiting, hypotension, bradycardia, respiratory depression, headache, urinary retention was also observed.

The data was analyzed using SPSS version 22 and Microsoft Excel. Categorical variables were analyzed with the help of the Chi Square Test and Fisher Exact Test. Continuous variables were analyzed with t-test and Mann-Whitney U test where applicable. Statistical significance was taken as $p<0.05$. Descriptive statistics were done for all data and were reported in terms of mean, standard deviation, and percentage.

Table 1: Vasopressor requirement

Requirement		Group A		Group B		P- Value	Significance
		YES	NO	YES	NO		
Vasopressor	No.	27	13	7	33	<0.001	HS
	%age	67.5%	32.5%	17.5%	82.5%		

Table 2: Duration of sensory block (mins)

Groups	Mean	S.D	P Value
Group A	124.08	3.32	<0.001
Group B	120.05	4.15	

Table 3: Onset of sensory block (mins)

Groups	Mean	S.D	P Value
Group A	2.725	0.092	<0.001
Group B	5.738	0.255	

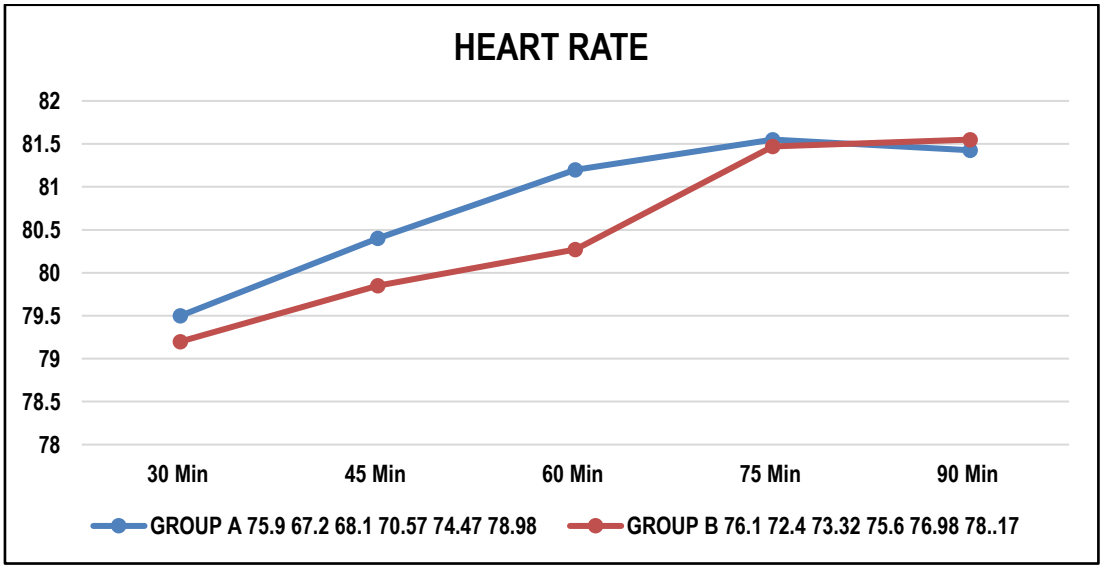

Fig 1: Heart Rate

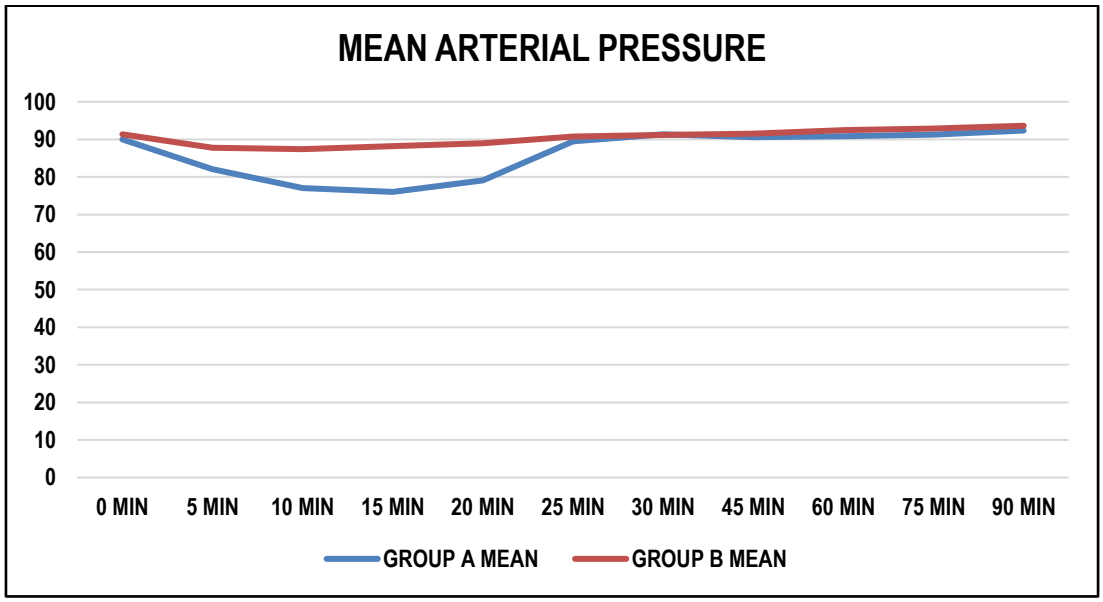

Fig 2: Mean arterial pressure

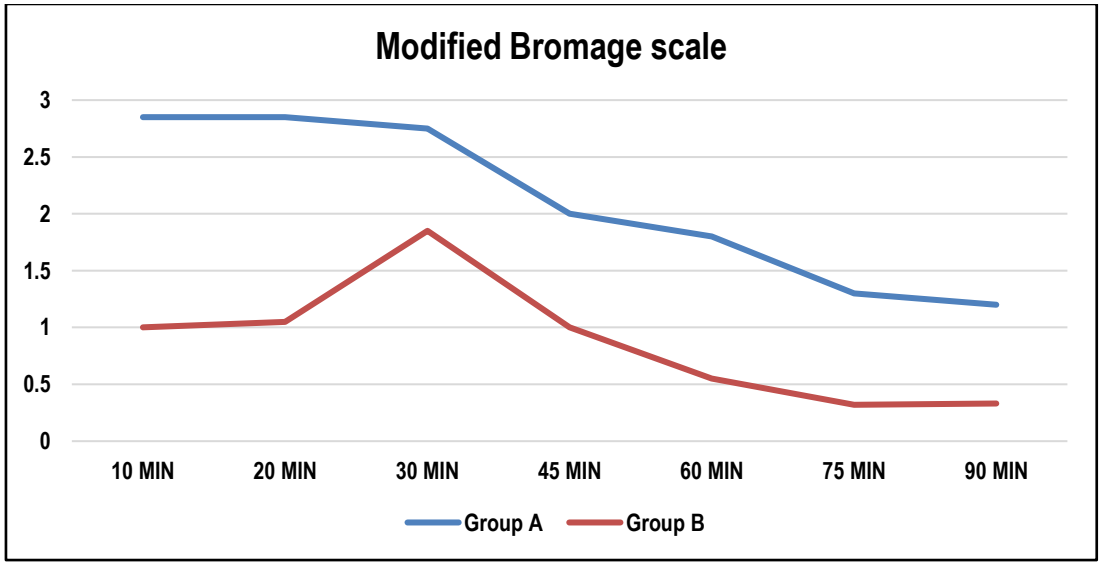

Fig 3: Modified Bromage scale

RESULTS

Age and baseline haemodynamic parameters like heart rate, systolic and diastolic blood pressure, mean arterial pressure, respiratory rate, SPO2 were also comparable in both groups. A statistically significant fall in heart rate and increased incidence of bradycardia was observed in Group A in comparison to Group B (figure 1). Significant fall in systolic and diastolic blood pressure and mean arterial pressure was found in Group A (figure 2) with greater vasopressor requirements (table 1) in comparison to Group B. Postoperative complications were comparable in both the groups. Time taken to achieve the sensory block upto T10 was delayed in group B decreased duration of the sensory block. (Table 2,3). Complete motor blockade was demonstrated in Group A patients whereas Group B patients observed partial motor blockade. (figure3)

DISCUSSION

The present prospective study was carried out to compare the subarachnoid block and saddle block in patients undergoing transurethral resection of the prostate. As Benign hypertrophy of prostate interferes with the quality of life and is symptomatic in 40 % of the individuals after 60 yrs and 80 % of individuals after 80 yrs[8]; transurethral resection is the common procedure done to treat it. The prostate derives its nerve supply from the inferior hypogastric plexus with its sympathetic fibres originating from T11 to L2 and parasympathetic fibres from S2-S4. T11-L2 sympathetic fibres carry pain from the prostate, prostatic urethra and bladder mucosa[4], surgical anaesthesia up to T10 is therefore considered optimal for the procedure. Epidural anaesthesia although has gradual haemodynamic fluctuations but surgical anaesthesia is inadequate owing to sacral sparing in the procedure. Spinal anaesthesia is the most preferred technique but causes significant hypotension and bradycardia which may be detrimental in the elderly population. The saddle block provides adequate anaesthesia with minimal fluctuations in haemodynamics.

The present study demonstrated that hemodynamic fluctuations were frequently seen in the group receiving subarachnoid block (Group A). Statistically, significant fall in heart rate, systolic and Diastolic blood pressure and mean arterial pressure after the intrathecal administration of bupivacaine was observed in Group A; Although the baseline parameters were comparable in both the groups. Delayed onset and reduced duration of sensory block was

found in Group B. Complete motor blockade was seen in patients receiving subarachnoid block whereas those with saddle block achieved partial motor blockade resulting in early ambulation of patients after surgery.

Susmita bhattacharya et al. observed a statistically significant fall in Heart rate was in Group A(spinal) (11.84±5.85) than Group B(saddle) (4.76±2.01). Fall of SBP, DBP, MAP was less in Group B (saddle) than Group A (spinal) which was statistically significant.[4] Results also showed similarity to a study by Critchley et al. as they observed systolic arterial pressure decreased by 25 % as early as 6 to 9 mins following the subarachnoid block. It was found that 69% of the elderly patients suffered hypotension and required treatment for the same.[9]

Spinal anaesthesia is associated with increased incidence of hypotension and vasopressor requirement after the intrathecal injection of bupivacaine due to sympathetic blockade and vasodilatation. It was seen that in group A, 67.5% of the patients required the vasopressor and the total requirement of vasopressor was 204 mg whereas only 17.5% of the patients in Group B required vasopressor and the total requirement of vasopressor was 42 mg.

Both the groups achieved adequate dermatomal block up to T10 level, but the time required to achieve the same dermatomal blockade was prolonged in the group receiving saddle blockade. Duration of sensory blockade was found to be less in patients receiving saddle blockade. Revathy bejoy et al**.** concluded that although both the groups attained the same dermatomal level, but the time taken to attain that sensory level was delayed in the saddle block group. They also observed that haemodynamic fluctuations were more in the spinal group.[10] In a study by Neeta S. et al on-Saddle block spinal anaesthesia and its effects on Haemodynamic status and analgesia it was observed that the duration of sensory blockade was decreased by increasing the duration of sitting position. These results also corroborated the findings of our study.[5]

Urological procedures like TURBT require complete motor block whereas for the procedures like TURP partial motor blockade is sufficient. Patients receiving spinal blockade achieved dense motor blockade (Modified Bromage scale 3) whereas those receiving saddle block achieved partial motor blockade (Modified Bromage scale 1). A study by Ozmen S et al. on the selection of the regional anaesthesia in the Transurethral Resection of Prostate (TURP) surgery observed that there was a statistically significant difference between the groups (epidural, spinal, and saddle) in terms of motor block values. They found that the majority of the patients in Group E (epidural) and Group SP (spinal) achieved Bromage 3 of motor blockade whereas the majority of the patients achieved a Bromage score of 1 in Group SA (saddle).[11] Respiratory rate, SPO_2, and postoperative complications were found to be comparable in both groups.

CONCLUSIONS

Saddle block is a safer technique in the elderly patients undergoing TURP as it provides optimal anaesthesia, stable haemodynamics with minimal hypotension and vasopressor requirement; also motor blockade was partial resulting in early ambulation of patients.

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