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Original Research

Intrathecal dexmedetomidine with low-dose bupivacaine spinal anaesthesia versus a higher dose of bupivacaine in patients undergoing TURP

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ABSTRACT:
Background: Benign prostatic hyperplasia (BPH) is a common chronic progressive disease resulting in the enlargement of the prostate gland and bladder outlet obstruction in aging men. The present study was conducted to compare intrathecal dexmedetomidine with low-dose bupivacaine spinal anaesthesia versus a higher dose of bupivacaine in patients undergoing TURP. **Materials & Methods:** 50 patients of American Society of Anesthesiologists (ASA) Grade I–III undergoing TURP. Patients were divided into 2 groups of 25 each. Group I received 7.5 mg of 0.5% hyperbaric bupivacaine hydrochloride and group II received 3 µg of dexmedetomidine hydrochloride combined with 6 mg of 0.5% hyperbaric bupivacaine hydrochloride. **Results:** Time to reach T10 sensory block (min) was 12.3 in group I and 10.1 in group II. Modified Bromage score at the end of surgery 1 was seen in 4 in group I, 2 in 8 in group I and 14 in group II, 3 seen 13 in group I and 11 in group II. VAS score at 1 hours was 2.4 and 1.6, 2 hours was 3.1 and 2.4, 3 hours was 2.0 and 1.9 and 4 hours was 1.1 and 1.4. Common side effects was nausea seen in 3 in group I and 2 in group II, vomiting 2 in group I and 1 in group II, pruritis 4 in group I and 3 in group II and hypotension 1 in group I and 2 in group II. The difference was non- significant (P> 0.05). **Conclusion:** Addition of 3 µg of dexmedetomidine added to 6 mg bupivacaine produced a faster onset and longer duration of sensory and motor block as well as prolonged perioperative analgesia.
Key words: bupivacaine hydrochloride, Hypotension, Perioperative analgesia

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INTRODUCTION

Benign prostatic hyperplasia (BPH) is a common chronic progressive disease resulting in the enlargement of the prostate gland and bladder outlet obstruction in aging men.[1] With the aging of society and extension of life expectancy, more and more patients are diagnosed with massive BPH. Transurethral resection of the prostate (TURP) has ever been known as the "gold standard" for BPH treatment. TURP still has certain restrictions such as bleeding, prostatic volume, transurethral resection syndrome (TURS), and so on.[2] Recently, transurethral bipolar plasmakinetic enucleation of the prostate (PKEP) has been introduced as the new method for massive BPH treatment. On the basis of TURP and suprapubic prostatectomy, PKEP was introduced to overcome the shortcomings of TURP.[3]

Spinal anaesthesia is the most routinely used procedure for transurethral resection of prostate (TURP). Sensory block up to T10 is considered favourable to abolish the discomfort caused by bladder distension. Sensory block cephalad to this hides the capsular signs associated with bladder perforation and may hamper its early diagnosis and treatment.[4] Moreover, because of the restricted cardiovascular and respiratory reserves in older patients undergoing TURP, it is important to limit the cephalad spread to lessen haemodynamic changes. Smaller doses of local anaesthetic in combination with additives provide the required sensory level with appropriate analgesia. Dexmedetomidine is the S-enantiomer of medetomidine with a high degree of specificity for α2-adrenoreceptor (α2:α1, 1620:1).[5] The present study was conducted to compare intrathecal dexmedetomidine with low-dose bupivacaine spinal anaesthesia versus a higher dose of bupivacaine in patients undergoing TURP.

MATERIALS & METHODS

The present study comprised of 50 patients of American Society of Anesthesiologists (ASA) Grade I–III undergoing TURP. All were enrolled in the study after they agreed to participate.

Data such as name, age etc. was recorded. Patients were divided into 2 groups of 25 each. Group I received 7.5 mg of 0.5% hyperbaric bupivacaine hydrochloride and group II received 3 µg of dexmedetomidine hydrochloride combined with 6 mg of 0.5% hyperbaric bupivacaine hydrochloride. Parameters such as regression time from peak sensory block level, assessment of the motor block scales, haemodynamic alterations as well as the intra- and post-operative analgesic requirements in both the groups were recorded. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Groups	Group I	Group II
Agent	7.5 mg of 0.5% hyperbaric bupivacaine hydrochloride	3 µg of dexmedetomidine hydrochloride combined with 6 mg of 0.5% hyperbaric bupivacaine hydrochloride
Number	25	25

Table I shows distribution of patients in 2 groups of 25 each.

Table II Comparison of parameters

Parameters	Variables	Group I	Group II	P value
Time to reach T10 sensory block (min)		12.3	10.1	0.02
Modified Bromage score at the end of surgery	0	0	0	0.17
	1	4	0	
	2	8	14	
	3	13	11	
VAS (Hours)	1	2.4	1.6	0.03
	2	3.1	2.4	0.01
	3	2.0	1.9	0.51
	4	1.1	1.4	0.01

Table II, graph I shows that time to reach T10 sensory block (min) was 12.3 in group I and 10.1 in group II. Modified Bromage score at the end of surgery 1 was seen in 4 in group I, 2 in 8 in group I and 14 in group II, 3 seen 13 in group I and 11 in group II. VAS score at 1 hours was 2.4 and 1.6, 2 hours was 3.1 and 2.4, 3 hours was 2.0 and 1.9 and 4 hours was 1.1 and 1.4. The difference was significant ($P< 0.05$).

Table III Comparison of side effects

Side effects	Group I	Group II	P value
Nausea	3	2	0.15
Vomiting	2	1	
Pruritis	4	3	
Hypotension	1	2	

Table III shows that common side effects was Nausea seen in 3 in group I and 2 in group II, vomiting 2 in group I and 1 in group II, pruritis 4 in group I and 3 in group II and hypotension 1 in group I and 2 in group II. The difference was non- significant ($P> 0.05$).

DISCUSSION

Dexmedetomidine is a potent and selective α2 -adrenoreceptor agonist. The antinociceptive properties of intrathecal α2 -adrenoreceptor agonists are manifested by suppressing the release of C-fibre transmitters, hyperpolarisation of post-synaptic dorsal horn neurons and inhibition of release of substance P.[7] In addition, the effectiveness of α2 -adrenoreceptor agonist has been shown to correspond well with their binding affinity to spinal α2 -adrenoreceptors.[8] TURP for benign prostatic hyperplasia is frequently performed in elderly patients having cardiovascular limitations with various systemic diseases. We found that more than 65% of patients had more than one systemic disease.[9] Considering this, it is desirable to limit the spinal block level to as low as possible to avoid hypotension owing to high sympathetic block and also to maintain the adequate level of anaesthesia. In our study, both the plain bupivacaine and dexmedetomidine groups had a peak sensory block level of median T9 and did not produce serious hypotension or bradycardia perioperatively.[10]The present study was conducted to compare intrathecal dexmedetomidine with low-dose bupivacaine spinal anaesthesia versus a higher dose of bupivacaine in patients undergoing TURP.

We found that time to reach T10 sensory block (min) was 12.3 in group I and 10.1 in group II. Modified

Bromage score at the end of surgery 1 was seen in 4 in group I, 2 in 8 in group I and 14 in group II, 3 seen 13 in group I and 11 in group II. VAS score at 1 hours was 2.4 and 1.6, 2 hours was 3.1 and 2.4, 3 hours was 2.0 and 1.9 and 4 hours was 1.1 and 1.4. Chattopadhyay et al[11] conducted a double-blind, randomised trial that included sixty patients of American Society of Anesthesiologists Grade I–III scheduled for TURP. They were allocated into two groups: Group I receiving only hyperbaric bupivacaine intrathecally and Group II receiving dexmedetomidine with low dose bupivacaine. The time to regression of two dermatomes from the peak sensory block level was the primary outcome of the study. With comparable baseline and demographic attributes, both groups had similar peak sensory block levels (T9). Patients in Group II had quicker onset with the time to reach T10 being faster (10.72 ± 3.50 vs. 12.72 ± 3.90 min, P = 0.041), longer duration of motor block (200 ± 18.23 vs. 190 ± 10.15 min, P = 0.011) and increased time to first analgesic requirement (300 ± 25.30 vs. 220 ± 15.12 min, P = 0.0001).

We found that common side effects was nausea seen in 3 in group I and 2 in group II, vomiting 2 in group I and 1 in group II, pruritis 4 in group I and 3 in group II and hypotension 1 in group I and 2 in group II. The potentiation mechanism of motor block by dexmedetomidine is not well established, but is suggested to be an additive or synergistic effect to the local anaesthetics, or related to the interference with neuromuscular activity, or binding of α2 -agonists to motor neurons in the dorsal horn.[12]

CONCLUSION

Authors found that addition of 3 µg of dexmedetomidine added to 6 mg bupivacaine produced a faster onset and longer duration of sensory and motor block as well as prolonged perioperative analgesia.

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