

PROSPECTIVE CONTROLLED STUDY OF FIELD BLOCK ANAESTHESIA FOR UNILATERAL INGUINAL HERNIA REPAIR WITH 0.5% BUPIVACAINE AND DEXMEDETOMIDINE VERSUS 0.375% ROPIVACAINE AND DEXMEDETOMIDINE

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Abstract

Background: Hernia is the word derived from Greek words “Hernons” an offshoot or bulge. It is defined by Sir Astley Cooper (1804) as “protrusion of any viscus or part of the viscus through an abnormal opening in the walls of its containing cavity. The performed choice of anaesthesia for all adult inguinal hernia repairs is local; it is safe, simple, effective, and economical, without anaesthetic side effects. Furthermore local anaesthesia administered before the incision produces longer postoperative analgesia because local infiltration, theoretically inhibits build of local nociceptive molecules and therefore, there is better pain control in the postoperative period. **Materials and Methods:** This was a randomized, prospective comparative clinical study conducted in the Department of Anesthesiology at Age between 30 and 60 years and only male cases, American Society of Anesthesiologists (ASA I and II) cases, weight 40-65 kg, elective surgeries (inguinal hernioplasty) were included. Patient refusal, known allergy, coagulopathy, patient on β blockers, long-term analgesic therapy, drugs which are known to interact with study drugs. **Result:** The two groups were matched in respect of their demographic characteristics such as age and weight. The baseline clinical variables such as ASA grade, pulse rate (PR), systolic blood pressure (SBP), diastolic blood pressure (DBP), sensory, and motor block were matched between the two groups [Table 1]. The baseline PR, SBP, and DBP were matched and shown in [Table 3]. The mean PRs between the two groups were not statistically significant ($86.9 \pm 8.9 \approx 84.5 \pm 9.3$ and $P > 0.05$). The mean SBPs between the two groups were not statistically significant ($121.3 \pm 8.3 \approx 120.3 \pm 5.9$ and $P > 0.05$). The mean DBPs between the two groups were not statistically significant ($78.6 \pm 4.4 \approx 79.3 \pm 2.6$ and $P > 0.05$) [Table 2]. **Conclusion:** Ropivacaine is a newer ideal, comfortable safe anesthetic of choice for field block in inguinal hernia surgery cases, ASA I and II and by adding dexmedetomidine, we get a prolongation of analgesia when compared with bupivacaine and dexmedetomidine.

INTRODUCTION

Hernia is the word derived from Greek words “Hernons” an offshoot or bulge. It is defined by Sir Astley Cooper (1804) as “protrusion of any viscus or part of the viscus through an abnormal opening in the walls of its containing cavity.”^[1] The performed choice of anaesthesia for all adult inguinal hernia repair is local, it is safe, simple, effective, and economical, without anaesthetic side effects. Furthermore, local anaesthesia administered before the incision produces longer postoperative analgesia because local infiltration, theoretically inhibits build of local nociceptive molecules and therefore, there is better pain control in the postoperative period.^[2]

Hernia repair can be performed under spinal, epidural, general and inguinal field block. Field block for inguinal hernia repair is the most cost-effective anaesthetic technique for our patients undergoing unilateral inguinal herniorrhaphy with respect to speed of recovery,^[3] patient comfort and associated incremental costs. These are not provided into a satisfactory level by the commonly employed techniques, such as general anaesthesia (GA) or centrineuraxial blockade.^[4,5] Hence to meet the above requirements the present study of field block for inguinal hernia repair is undertaken.

Objectives

- To evaluate the advantages of this field block for inguinal hernia repair.

- To study the duration and quality of analgesia by using 0.5% bupivacaine and dexmedetomidine versus 0.375% ropivacaine and dexmedetomidine.
- To study effects of inguinal field block with respect to speed of recovery & patients comfort.
- Other side effects pertaining to the inguinal field block.

MATERIALS AND METHODS

This was a randomized, prospective comparative clinical study conducted in the Department of Anesthesiology

Inclusion Criteria

Age between 30 and 60 years and only male cases, American Society of Anesthesiologists (ASA I and II) cases, weight 40-65 kg, elective surgeries (inguinal hernioplasty).

Exclusion Criteria

Patient refusal, known allergy, coagulopathy, patient on β blockers, long-term analgesic therapy, drugs which are known to interact with study drugs.

Spinal administration of drug mixture: Group 1 administered with 0.5% Bupivacaine and

Dexmedetomidine and Group 2 administered with 0.375% Ropivacaine and Dexmedetomidine.

RESULTS

The two groups were matched in respect of their demographic characteristics such as age and weight. The baseline clinical variables such as ASA grade, pulse rate (PR), systolic blood pressure (SBP), diastolic blood pressure (DBP), sensory, and motor block were matched between the two groups [Table 1].

The two groups were not significantly differed in respect of their mean ages ($45.1 \pm 8.6 = 45.0 \pm 4.9$). Similarly, they were also not significantly differed between the mean weights of two groups ($51.3 \pm 5.3 \approx 49.6 \pm 4.0$ and $P > 0.05$) [Table 1].

The baseline PR, SBP, and DBP were matched and shown in [Table 3]. The mean PRs between the two groups were not statistically significant ($86.9 \pm 8.9 \approx 84.5 \pm 9.3$ and $P > 0.05$). The mean SBPs between the two groups were not statistically significant ($121.3 \pm 8.3 \approx 120.3 \pm 5.9$ and $P > 0.05$). The mean DBPs between the two groups were not statistically significant ($78.6 \pm 4.4 \approx 79.3 \pm 2.6$ and $P > 0.05$) [Table 2].

Table 1: Comparison of age between 2 groups

Age in years	N (%)	
	Group 1	Group 2
30-39	20 (34.5)	10 (17.2)
40-49	12 (20.7)	34 (58.6)
50-59	26 (44.8)	14 (24.2)
Total	58 (100)	58 (100)
Mean \pm SD	45.6 \pm 8.3	45.0 \pm 4.8

Table 2: Comparison of base line PR, SBP, and DBP between two groups

Variables	Mean \pm SD		P Value
	Group 1	Group 2	
Pulse rate	86.9 \pm 8.9	84.5 \pm 9.3	>0.05
SBP	121.3 \pm 8.3	120.3 \pm 5.9	>0.05
DBP	78.6 \pm 4.4	79.3 \pm 2.6	>0.05

Table 3: Comparison of sensory level between two groups

Sensory level	Group 1	Group 2	P Value
T7	12	20	
T8	46	38	>0.05
Total	58	58	

Table 4: Comparison of ASA grade between two groups

ASA Grade (American Society of Anesthesiologists)	Group 1	Group 2	P Value
I	50	52	
II	8	6	>0.05
Total	58	58	

Table 5: Onset of sensory blockade (T10) and motor blockade (2) between two groups

Blockade	Mean \pm SD		P Value
	Group 1	Group 2	
Sensory	8.0 \pm 1.8	5.58 \pm 3.56	<0.0001
Motor	10.14 \pm 5.2	5.37 \pm 3.6	<0.0001

Table 6: Comparison of pulse rate at different interval between the two groups

Intervals	Mean \pm SD		P Value
	Group 1	Group 2	
3 min	91.8 \pm 13.8	92.0 \pm 13.5	>0.05

6 min	89.3±13.7	83.4±12.9	>0.05
15 min	79.8±14.4	75±17.2	>0.05
30 min	81.1±12.8	76.9±14.3	>0.05
1 h	82±9.0	81.1±5.2	>0.05
2 h	86.3±10.3	83.9±7.3	>0.05
4 h	113.6±9.0	89.8±8.0	<0.0001
8 h	107.2±7.3	112.3±11.3	<0.05

Table 7: Comparison of SBP at different interval between the two groups

Intervals	Mean ± SD		P Value
	Group 1	Group 2	
3 min	121.4±9.8	120.5±6.8	>0.05
6 min	118.9±8.6	115.2±4.2	>0.05
15 min	111.9±10.1	108.8±1.9	>0.05
30 min	109.0±9.7	106.8±2.7	>0.05
1 h	111.2±6.2	109.5±2.5	>0.05
2 h	112.5±5.7	113.9±4.5	>0.05
4 h	128.3±4.9	114.7±4.0	<0.0001
8 h	117.4±5.6	128.9±5.0	<0.05

Table 8: Comparison of DBP at different interval between the two groups

Intervals	Mean ± SD		P Value
	Group 1	Group 2	
3 min	77.2±7.0	76.9±5.4	>0.05
6 min	75.5±6.9	76.6±4.8	>0.05
15 min	70±7.6	70±0.0	>0.05
30 min	71±6.6	66.6±4.8	>0.05
1 h	69.7±4.9	69.7±1.8	>0.05
2 h	70.4±4.4	73.1±4.7	>0.05
4 h	78.4±7.4	73.1±4.7	<0.0001
8 h	73.0±6.1	83.4±4.8	<0.05

Table 9: Comparison of rescue analgesia between two groups

Variable	Mean ± SD		P Value
	Group 1	Group 2	
Rescue analgesia	217.2±17.5	453.2±20.2	<0.0001

Table 10: Comparison of two segment regression and S2 regression between the groups

Variable	Mean ± SD		P Value
	Group 1	Group 2	
2 segment regression	89.0±18.2	131.7±11.4	<0.001
2 segment regression	243.1±20.2	297.9±25.3	<0.001

DISCUSSION

Field block is a simple, frequently used technique which provides very effective analgesia in lower abdominal surgeries. Ropivacaine is a newer drug with a more safety margin with reduced risk of cardiotoxicity. Dexmedetomidine is an α_2 agonist which is very much used nowadays as an additive with local anesthetics. It gives intraoperative and post-operative analgesia with a single dose of subarachnoid block.^[6] Moreover, it is devoid of opioid side effects but may produce sedation, bradycardia, and hypotension. The onset of sensory and motor block was early in Group 2 patients than Group 1 (Group 2 $5.58 \pm 3.56 > 8.0 \pm 1.8$ in Group 1) with the $P < 0.05$. In Bogra et al.'s study, the addition of ropivacaine intrathecally produces a prolongation in the duration of the motor and sensory block. Bradycardia and hypotension are the known features of subarachnoid block.^[7] In our study in Group 2 patients out of 29 patients 2 patients were developed bradycardia with hypotension, they required atropine and ephedrine.

Al-Ghanem et al, have reported the use of dexmedetomidine to be associated with decrease in heart rate and blood pressure.^[6] No patients have developed any nausea or vomiting in both groups. But in Group 2, patients were free of anxiety and they were comfortable.^[8]

Both groups did not require any sedation intraoperatively. Postoperatively Group 2 patients had delayed two segment regression and S2 segment regression, than Group 1 patients ($P < 0.0001$).^[9] Motor block duration was more with Group 2 patients than Group 1 ($P > 0.05$). Time of getting rescue analgesia is very much delayed in Group 2 than Group 1 ($P < 0.0001$). Yaksh and Reddy studied that a powerful analgesia can be produced by selectively activating adrenergic, opiate, and baclofen receptor systems in the spinal cord.^[10]

CONCLUSION

Ropivacaine is a newer ideal, comfortable safe anesthetic of choice for field blocks in inguinal hernia surgery cases, ASA I and II and by adding

dexmedetomidine, we get a prolongation of analgesia when compared with bupivacaine and dexmedetomidine.

REFERENCES

1. Yamashita A, Matsumoto M, Matsumoto S, Itoh M, Kawai K, Sakabe T. A comparison of the neurotoxic effects on the spinal cord of terracaine, lidocaine, bupivacaine, and ropivacaine administered intrathecally in rabbits. *AnesthAnalg* 2003; 97:512-9.
2. Onttonen T, Pertovaara A. The mechanical antihyperalgesic effect of intrathecally administered MPV-2426, a novel alpha 2- adrenoceptor agonist, in a rat model of postoperative pain. *Anesthesiology* 2000; 92:1740-5.
3. Martin E, Ramsay G, Mntz J, Sum-Ping ST. The role of the alpha 2-adrenreceptor agonist dexmedetomidine in post-surgical sedation in the intensive care unit. *J Intensive Care Med* 2003;18:29-34.
4. Takano Y, Yaksh TL. Characterization of the pharmacology of intrathecally administered alpha 2-agonists and antagonists in rats. *J Pharmacol Exp Ther* 1992; 261:764-72.
5. Kalso EA, Poyhia R, Rosenberg PH. Spinal antinociception by dexmedetomidine, a highly selective a2-adrenergic agonist. *Pharmacol Toxicol* 1991;68:140-3.
6. Talke P, Xu M, Paloheimo M, Kalso E. Effects of intrathecally administered dexmedetomidine, MPV-2426 and tizanidine on EMG in rats. *ActaAnaesthesiologicaScand* 2003; 47:347-54.
7. ukishima K, Nishimi Y, Mori K, Takeda J. Effect o epidurally administered dexmedetomidine on sympathetic activity and postoperative pain in man. *AnesthAnalg* 1996;82:S121.
8. Talke P, Tayefeh F, Sessler DI, Jeffrey R, Noursalehi M, Richardson C. Dexmedetomidine does not alter the sweating threshold, but comparably and linearly reduces the vasoconstriction and shivering thresholds. *Anesthesiology* 1997;87:835-41.
9. Al-Mustafa MM, Abu-Halaweh SA, Aloweidi AS, Murshidi MM, Ammari BA, Awwad ZM, et al. Effect of Dexmedetomidine added to spinal bupivacaine for urological procedure. *Saudi Med J* 2009;30:365-70.
10. Eisanach JC, De Kock M, Klimscha W. a2 adrenergic agonists for regional anesthesia. *Anesthesiology* 1996;85:655-74.