

## Original Research

### Assessment of Intraperitoneal instillation of dexmedetomidine and nalbuphine as adjuncts to 0.25% ropivacaine for reduction of post-operative pain

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#### ABSTRACT:

**Background:** The present study was conducted to evaluate the postoperative analgesic efficacy of intraperitoneal 0.25% of ropivacaine with dexmedetomidine and 0.25% ropivacaine with nalbuphine and their role as postoperative analgesics. **Materials & methods:** 30 patients of either gender of age group between 20 – 55 years and ASA grade I and II undergoing elective laparoscopic cholecystectomy under general anaesthesia were enrolled in the study. All the patients were randomly allocated to one of the 3 groups of 10 each. In group 1, patients received 50ml solution having 49 ml of 0.25% ropivacaine with dexmedetomidine, Group 2 patients received 50 ml solution having 49 ml of 0.25% ropivacaine with nalbuphine, and group 3 patients received 50 ml solution having 0.25% ropivacaine with nalbuphine. Extubation was done after thorough oropharyngeal suctioning. The nasogastric tube was removed after recovery from anaesthesia. Visual analog scale (VAS), which consists of 10 cm scale representing varying intensity of pain from 0 cm (no pain) to 10 cm (worst imaginable pain). Postoperative pain was assessed using visual analog VAS score > 3 was managed with injection tramadol. **Results:** Mean VAS scores were lower in group 1 and significantly low at 3<sup>rd</sup> and 4<sup>th</sup> postoperative hour as compared to group 2 and group 3 (p value < 0.05). Thereafter, no significant difference was seen in VAS scores among all the three groups (p value > 0.05). In group 1, 50% patients required rescue analgesia whereas in group 2 90% and in group 3, 70% patients required rescue analgesia. This difference was statistically significant with p value < 0.05. In group 1, mean time to first dose of rescue analgesia was 7.79 hours whereas in group 2, it was 4.86 hours and in group 3, it was 4.21 hours which was statistically significant (p value < 0.05). **Conclusion:** Patients receiving 50ml solution having 49 ml of 0.25% ropivacaine with Dexmedetomidine demonstrated highest efficacy.

**Key words:** Ropivacaine, Dexmedetomidine

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#### INTRODUCTION

Gallstones are hardened deposits of the digestive fluid bile that can form within the gallbladder. To identify risk factors in a given population, epidemiological studies must first define the frequency of disease. Cholecystectomy is the most common intraabdominal surgical procedure performed in the United States. Laparoscopic removal is now the procedure of choice when cholecystectomy is indicated. Postoperative pain management remains a major challenge after laparoscopic procedures. Effective pain control encourages early ambulation, which significantly reduces the risk of deep vein thrombosis and pulmonary emboli (PE); enhances patient's ability to

take deep breaths to decrease the risk of pulmonary complications (e.g., atelectasis and pneumonia); and decreases the incidence of tachycardia and unnecessary investigations related to it. Pain after laparoscopic surgery has a visceral component, as a result of surgical handling and diaphragmatic irritation by dissolved carbon dioxide and a somatic component due to the holes made in the abdominal wall for the trocars. Although it is the belief of patients that laparoscopy has ushered a pain free era, the fact remains that patients complain more of visceral pain after laparoscopy in contrast to parietal pain experienced in laparotomy.<sup>1-3</sup>

Ropivacaine is a well tolerated regional anaesthetic effective for surgical anaesthesia as well as the relief of postoperative and labour pain. The efficacy of ropivacaine is similar to that of bupivacaine and levobupivacaine for peripheral nerve blocks and, although it may be slightly less potent than bupivacaine when administered epidurally or intrathecally, equi-effective doses have been established.<sup>4-6</sup>

Dexmedetomidine is found to be a vastly discriminating  $\alpha$ -2 adrenoreceptor agonist that is confirmed to possess both analgesic and sedative properties. Nalbuphine possesses the effect of maintaining or even augmenting the opioid  $\mu$  receptor centered analgesia and at the same time mitigating the  $\mu$ -opioid side effects. Also, it had been used successfully and safely in epidural and intrathecal blocks. The use of Dexmedetomidine in combination with ropivacaine is associated with prolongation of the LA effect either epidurally or intrathecally.<sup>3-5</sup> Hence; the present study was, therefore, conducted to evaluate the postoperative analgesic efficacy of intraperitoneal 0.25% of ropivacaine with dexmedetomidine and 0.25% ropivacaine with nalbuphine and their role as postoperative analgesics.

#### MATERIALS & METHODS

The present study was undertaken for evaluating the postoperative analgesic efficacy of intraperitoneal 0.25% of ropivacaine with dexmedetomidine and 0.25% ropivacaine with nalbuphine and their role as postoperative analgesics. Ethical approval was obtained from institutional ethical committee and written consent was obtained from all the patients after explaining in detail the entire research protocol. 30 patients of either gender of age group between 20 – 55 years and ASA grade I and II undergoing elective laparoscopic cholecystectomy under general anaesthesia were enrolled in the study. All the patients were randomly allocated to one of the 3 groups of 10 each. In group 1, patients received 50ml solution having 49 ml of 0.25% ropivacaine with

dexmedetomidine, Group 2 patients received 50 ml solution having 49 ml of 0.25% ropivacaine with 5 mg nalbuphine, and group 3 patients received 50 ml solution having 0.25% ropivacaine with 5 mg nalbuphine. Extubation was done after thorough oropharyngeal suctioning. The nasogastric tube was removed after recovery from anaesthesia. Visual analog scale (VAS), which consists of 10 cm scale representing varying intensity of pain from 0 cm (no pain) to 10 cm (worst imaginable pain). Postoperative Postoperative pain was assessed using visual analog VAS score > 3 was managed with injection tramadol. All the results were analyzed by SPSS software version 17.0. Chi- square test and Mann Whitney U test were used for assessment of level of significant. P- value of less than 0.05 was taken as significant.

#### RESULTS

Mean age in group 1 was  $46.15 \pm 10.43$  years, in group 2 was  $45.70 \pm 9.05$  years while in group 3, it was  $45.75 \pm 9.08$  years. All the groups were statistically comparable as regards to age with p value > 0.05 which was statistically not significant. There were 30% males and 70% females in group 1. In group 2, there were 20% males and 80% females and in group 3 there were 30% males and 70% females. Results showed that three groups were comprised of different number of male and female subjects with female predominance. Mean VAS scores were lower in group 1 and significantly low at 3<sup>rd</sup> and 4<sup>th</sup> postoperative hour as compared to group 2 and group 3 (p value < 0.05). Thereafter, no significant difference was seen in VAS scores among all the three groups (p value > 0.05). In group 1, 50% patients required rescue analgesia whereas in group 2 90% and in group 3, 70% patients required rescue analgesia. This difference was statistically significant with p value < 0.05. In group 1, mean time to first dose of rescue analgesia was 7.79 hours whereas in group 2, it was 4.86 hours and in group 3, it was 4.21 hours which was statistically significant (p value < 0.05).

**Table 1: Age distribution of subjects of different study groups**

Parameter	Group 1	Group 2	Group 3	P- value
Mean age (years)	45.28	47.13	46.25	0.887
SD	12.45	11.58	12.38	

**Table 2: Comparison of VAS at different time intervals**

VAS ( hours)	Group 1	Group 2	Group 3	p-value
0	1.12	1.25	1.35	0.12
1	1.28	1.36	1.56	0.35
2	1.16	1.21	1.39	0.45
3	1.12	2.39	1.92	0.00*
4	1.11	3.75	2.87	0.00*
8	1.37	1.25	1.12	0.75
12	1.46	1.52	1.94	0.68
24	1.82	1.93	1.87	0.85

\*: Significant

**Table 3: Number of patients requiring rescue analgesia**

Analgesic profile	Group 1	Group 2	Group 3	p- value
Number of patients given rescue analgesia	5 (50%)	9 (90%)	7 (70%)	0.003*

\*: Significant

**DISCUSSION**

In the present study, Mean age in group 1 was 46.15±10.43 years, in group 2 was 45.70±9.05 years while in group 3, it was 45.75±9.08 years. All the groups were statistically comparable as regards to age with p value > 0.05 which was statistically not significant. There were 30% males and 70% females in group 1. In group 2, there were 20% males and 80% females and in group 3 there were 30% males and 70% females. Results showed that three groups were comprised of different number of male and female subjects with female predominance. Bindra TK et al studied the efficacy of preemptive analgesia with intraperitoneal instillation of ropivacaine in laparoscopic cholecystectomy (LC). Hundred patients were randomly divided into two groups of fifty each. In Group A, patients received 3 mg/kg of ropivacaine intraperitoneal instillation in 100 ml normal saline (NS) before creation of pneumoperitoneum and in Group B patients received 3 mg/kg of ropivacaine intraperitoneal instillation in 100 ml NS after completion of surgery. Postoperative visual analog scale score for abdominal and shoulder tip pain alongwith requirement of rescue analgesic were recorded for 24 h. Significantly lower visual analog scores for pain were observed in Group A versus Group B. Group A reported significantly lower pain at 0 h (P < 0.001), 1 h (P = 0.003), 3 h (P = 0.006), 6 h (P = 0.003), and 12 h (P = 0.001) postoperatively, but the difference was not statistically significant after 12 h. The mean time of first rescue analgesic was 472.8 ± 26.32 min in Group A, as compared with 189 ± 11.87 min in Group B. A significantly lower analgesic requirement was observed in Group A versus Group B throughout the entire study period (P < 0.05). The preemptive analgesia with intraperitoneal instillation of ropivacaine before creation of pneumoperitoneum is much more effective for postoperative pain relief in comparison to intraperitoneal instillation of ropivacaine after completion of surgery.<sup>10</sup>

In the present study, mean VAS scores were lower in group 1 and significantly low at 3<sup>rd</sup> and 4<sup>th</sup> postoperative hour as compared to group 2 and group 3 (p value < 0.05). Thereafter, no significant difference was seen in VAS scores among all the three groups (p value > 0.05). In group 1, 50% patients required rescue analgesia whereas in group 2 90% and in group 3, 70% patients required rescue analgesia. This difference was statistically significant with p value < 0.05. In group 1, mean time to first dose of rescue analgesia was 7.79 hours whereas in group 2, it was 4.86 hours and in group 3, it was 4.21 hours which was statistically significant (p value < 0.05). Das NT et al compared the analgesic efficacy of intraperitoneally instilled equipotent concentrations of

bupivacaine and ropivacaine versus placebo in relieving postoperative pain after laparoscopic cholecystectomy when used as a part of multimodal analgesia. In this randomised, prospective, double blind, placebo controlled study, 90 ASA Class I or II patients were randomly divided into three groups of 30 each. Group S received intraperitoneal infiltration with 35 ml of 0.9% normal saline, Group B with 35 ml of 0.25% bupivacaine and Group R with 35 ml of 0.375% ropivacaine. All groups received standard general endotracheal anaesthesia and analgesia with IV paracetamol 15 mg/kg and diclofenac 1.5 mg/kg. Numerical Rating Scale (NRS) score of analgesia at rest and on cough/movement, duration of analgesia, haemodynamic parameters, need for a rescue analgesic (IV tramadol 1 mg/kg) was recorded and adverse effects of procedure and drugs if any were monitored. The mean NRS was <5 till only four hours in Group S, till eight hours in Group B and till 16 hours in Group R. The duration of analgesia was 13.47±1.38 hours in Group R, 7.93±1.44 hours in Group B and 4.47±0.86 hours in Group S. Intraperitoneal infiltration of LA significantly reduces pain intensity scores in the early postoperative period after LC surgery and helps in improving the postoperative recovery profile and outcome.<sup>11</sup> Elnabity AM et al conducted a study to compare the postoperative pain when intraperitoneal bupivacaine is administered alone versus the addition of dexmedetomidine to it in children undergoing a laparoscopic appendectomy. 52 children were randomly allocated to Group B who received intraperitoneal bupivacaine 0.25% (2 mg/kg) or Group BD who received intraperitoneal bupivacaine 0.25% (2 mg/kg) plus dexmedetomidine (1 mcg/kg) for postoperative analgesia in children undergoing laparoscopic appendectomy. Postoperative pethidine consumption at day 1 was recorded and considered the primary outcome of the study. Patients were evaluated for pain scores at 0, 2, 4, 6, 12, and 24 h, time to first request of pethidine, sedation scores at 0, 2, 4, and 6 h, length of hospital stay, and parents' satisfaction. Postoperative visual analog scale scores were lower in Group BD at 2, 4, and 6 h (mean = 3, 3, 3, respectively) compared with Group B (mean = 4, 5, 4, respectively) (P < 0.05). Patients in Group BD had more sedation scores at 0, 2, and 4 h (P < 0.05), longer time to first rescue analgesia (P = 0.03), lesser rescue analgesic consumption (P = 0.02), shorter length of hospital stay (P = 0.02), and higher parents' satisfaction (P = 0.01).<sup>12</sup>

## CONCLUSION

Patients receiving 50ml solution having 49 ml of 0.25% ropivacaine with Dexmedetomidine demonstrated highest efficacy.

## REFERENCES

1. Jawaher Masmoudi, Rim Sellami, Uta Ouali, LeilaMnif, Ines Feki, Mariam Amouri, et al. Quality of Life in Alopecia Areata: A Sample of Tunisian Patients. *Dermatology Research and Practice* Volume 2013, Article ID 983804, 5 pages <http://dx.doi.org/10.1155/2013/983804>.
2. Seetharam KA. Alopecia areata: An update. *Indian J Dermatol Venereol Leprol* 2013;79:563-75.
3. Plunkett, A., Marks, R. A. Review of the epidemiology of psoriasis vulgaris in the community. *Australias Journal of Dermatology* 1998;39:25- 32.
4. Richards, H. L., Fortune, D. G., Griffiths, C. E. M., Main, C. J. The contribution of perceptions of stigmatization to disability in patients with psoriasis. *Journal of Psychosomatic Research* 2001;50:11-15.
5. Farber, E. M., Nall, L. Psoriasis: a stress-related disease. *Cutis* 1993; 51: 322-6.
6. Dogra S, Yadav S. Psoriasis in India: Prevalence and pattern. *Indian J Dermatol Venereol Leprol* 2010;76:595-601.
7. Corina Ioana VLĂDUȚ, Éva KÁLLAY. Psychosocial Implications Of Psoriasis - Theoretical Review. *Cognition, Brain, Behavior. An Interdisciplinary Journal* 2010;14:23-5.
8. Ruiz-Doblado, S., Carrizosa, A., García-Hernández, M. J. Alopecia areata: psychiatric comorbidity and adjustment to illness. *International Journal of Dermatology* 2003; 42: 434-37.
9. Botchkarev. Stress and the Hair Follicle: Exploring the Connections *AJP* 2003;162:709-12.
10. Bindra TK1, Kumar P1, Rani P1, Kumar A2, Bariar H1. Preemptive Analgesia by Intraperitoneal Instillation of Ropivacaine in Laparoscopic Cholecystectomy. *Anesth Essays Res.* 2017 Jul-Sep;11(3):740-744. doi: 10.4103/aer.AER\_7\_17.
11. Das NT1, Deshpande C2. Effects of Intraperitoneal Local Anaesthetics Bupivacaine and Ropivacaine versus Placebo on Postoperative Pain after Laparoscopic Cholecystectomy: A Randomised Double Blind Study. *J Clin Diagn Res.* 2017 Jul;11(7):UC08-UC12.
12. Elnabtity AM, Ibrahim M. Intraperitoneal dexmedetomidine as an adjuvant to bupivacaine for postoperative pain management in children undergoing laparoscopic appendectomy: A prospective randomized trial. *Saudi journal of anaesthesia.* 2018 Jul;12(3):399.