Journal of Advanced Medical and Dental Sciences Research

@Society of Scientific Research and Studies ***NLM ID:*** *101716117*

Journal home page: www.jamdsr.com doi: 10.21276/jamdsr Index Copernicus value = 91.86

(e) ISSN Online: 2321-9599; (p) ISSN Print: 2348-6805

Original Research

Intraperitoneal administration of dexmedetomidine and nalbuphine as adjuncts to ropivacaine for post-operative pain relief in patient undergoing laparoscopic cholecystectomy

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ABSTRACT:

Background: To assess the effect of Intraperitoneal administration of dexmedetomidine and nalbuphine as adjuncts to ropivacaine for post-operative pain relief in patient undergoing laparoscopic cholecystectomy. **Materials & methods:** 60 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. Patients were randomly allocated to one of the 3 groups of 20 each. In group A, patients received 50ml solution having 49 ml of 0.25% ropivacaine with dexmedetomidine 1mcg/kg, Group B patients received 50 ml solution having 49 ml of 0.25% ropivacaine with 5 mg nalbuphine, and group C patients received 50 ml solution having 0.25% ropivacaine with 10 mg nalbuphine. Visual anlalog 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 Post-operative pain was assessed using visual analog VAS score > 3 was managed with injection tramadol 50 mg IV. All the results were analysed by SPSS software. **Results:** In postoperative period all the groups were comparable as regards to mean blood pressure with p value > 0.05 which was statistically not significant. Mean VAS scores were lower in group A and significantly low at 3rd and 4th postoperative hour as compared to group B and group C (p value < 0.05). Thereafter, no significant difference was seen in VAS scores among all the three groups (p value > 0.05). **Conclusion:** Patients receiving 0.25% ropivacaine with dexmedetomidine 1mcg/kg showed best results.

Key words: Nalbuphine, Dexmedetomidine, Ropivacaine

Received: 22 October, 2021 Accepted: 25 November, 2021

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This article may be cited as: Aron V, Singh R. Intraperitoneal administration of dexmedetomidine and nalbuphine as adjuncts to ropivacaine for post-operative pain relief in patient undergoing laparoscopic cholecystectomy. J Adv Med Dent Scie Res 2021;9(12):189-192.

INTRODUCTION

Caudal block is a well-accepted technique and proved to be a good alternative to general anesthesia in pediatric infra-umbilical surgeries. It provides excellent analgesia intraoperatively as well as during postoperative period. Usage of single local anesthetic agent via caudal route provides shorter duration of blockand requires often supplemental anesthetics. In order to decrease intra and postoperative analgesic requirements after single shot caudal epidural blockade, various additives, such as morphine, fentanyl, clonidine and ketamine, with local anesthetics have been investigated.[1, 2]

Dexmedetomidine has become of the frequently used drugs in anesthetic armamentarium, along with routine anesthetic drugs, due to its hemodynamic, sedative, anxiolytic, analgesic, neuroprotective and anesthetic sparing effects. Ropivacaine, a long-acting amide local anesthetic related structurally to bupivacaine, has been used for pediatric caudal anesthesia. It provides pain relief with less motor blockade and is less cardiotoxic than bupivacaine, which makes it a more suitable agent for caudal epidural analgesia, especially following day care surgery.[3- 5]Hence; the present study was conducted to assess the effect of Intraperitoneal administration of dexmedetomidine and nalbuphine as adjuncts to ropivacaine for post-operative pain relief in patient undergoing laparoscopic cholecystectomy.

MATERIALS & METHODS

The present study was conducted to assess the effect of Intraperitoneal administration of dexmedetomidine and nalbuphine as adjuncts to ropivacaine for post-operative pain relief in patient undergoing laparoscopic cholecystectomy. 60 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. Patients were randomly allocated to one of the 3 groups of 20 each. In group A, patients received 50ml solution having 49 ml of 0.25% ropivacaine with dexmedetomidine 1mcg/kg, Group B patients received 50 ml solution having 49 ml of 0.25% ropivacaine with 5 mg nalbuphine, and group C patients received 50 ml solution having 0.25% ropivacaine with 10 mg nalbuphine. In the operation theater, intravenous (IV) line was established. Standard multipara monitors were attached and base line parameters heart rate, noninvasive systolic blood pressure, diastolic blood pressure, mean blood pressure, oxygen saturation and ECG were recorded. Extubation was done after thorough oropharyngeal suctioning. The nasogastric tube was removed after recovery from anesthesia. Visual anlalog 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 Post-operative pain was assessed using visual analog VAS score > 3 was managed with injection tramadol 50 mg IV. All the results were analysed by SPSS software.

RESULTS

Mean age in group A was 48.45 years, in group B was 46.3 years while in group C, it was 44.7 years. All the groups were statistically comparable as regards to age with p value > 0.05 which was statistically not significant. In the present study, there were 25% males and 75% females in group A. In group B, there were 20% males and 80% females and in group C there were 15% males and 25% females. Preoperatively, all the groups were comparable as regards to mean heart rate with p value > 0.05 which was statistically not significant. Also postoperatively, throughout 24 hours period, no significant differences were observed among all the groups (p value > 0.05).No significant differences were observed among all the groups preoperatively (p value > 0.05) in terms of BP. Also; in postoperative period all the groups were comparable as regards to mean blood pressure with p value > 0.05 which was statistically not significant. Mean VAS scores were lower in group A and significantly low at 3rd and 4th postoperative hour as compared to group B and group C. Thereafter, no significant difference was seen in VAS scores among all the three groups.

Table 1: Comparison of VAS at different time intervals

VAS (hours)	Group A	Group B	Group C	p- value
0	1.01	1.2	1.1	0.774
1	1.01	1.3	1.5	0.241
2	1.3	1.9	1.4	0.956
3	1.4	2.4	1.9	0.001 (Sig)
4	1.4	3.9	2.8	0.002 (Sig)
20	1.8	2.9	2.1	0.648
24	1.8	1.90	2.3	0.865

DISCUSSION

Epidural anesthesia is the most commonly used technique for providing not only peri-operative surgical anesthesia but post-op analgesia in lower abdominal and limb surgeries. Early postoperative mobilization and rehabilitation with minimally associated pain and discomfort is the most desirable feature in modern orthopaedic surgery. Many a time for achieving desired peri-operative anaesthetic effect, invariably large volumes of local anaesthetics are used, thereby increasing the possibilities of local anaesthetic toxicity and deleterious haemodynamic consequences. The new amide local anaesthetic Ropivacaine has minimal cardio-vascular and central nervous system toxicity as well as a lesser propensity of motor block during post-operative epidural analgesia. Opioids like fentanyl have been used traditionally as an adjunct for epidural administration in combination with a lower dose of local anaesthetic to achieve the desired anaesthetic effect. The addition of opioid does provide a dose sparing effect of local anaesthetic and superior analgesia but there is always a possibility of an increased incidence of pruritis, urinary retention, nausea, vomiting and respiratory depression. Also the incidence of motor block after epidural analgesia with amide local anesthetics (LA) and opioids is approximately 4-12% which itself defeats the novel purpose of early rehabilitation.[6-9]Hence; the present study was conducted to assess the effect of Intraperitoneal administration of dexmedetomidine and nalbuphine as adjuncts to ropivacaine for post-operative pain relief in patient undergoing laparoscopic cholecystectomy.

Mean age in group A was 48.45 years, in group B was 46.3 years while in group C, it was 44.7 years. All the groups were statistically comparable as regards to age with p value > 0.05 which was statistically not significant. In the present study, there were 25% males and 75% females in group A. In group B, there were 20% males and 80% females and in group C there were 15% males and 25% females. Preoperatively, all the groups were comparable as

regards to mean heart rate with p value > 0.05 which was statistically not significant. Also postoperatively, throughout 24 hours period, no significant differences were observed among all the groups (p value > 0.05). No significant differences were observed among all the groups preoperatively (p value > 0.05) in terms of BP. Cruz JJ et al evaluated the effectiveness of intraoperatively applied local ropivacaine added to standard analgesic therapy in reducing postoperative pain intensity and opioid requirement under routine hospital conditions. In this prospective controlled cohort study, 303 consecutive patients receiving a gynaecological laparoscopic intervention at the Jena University Hospital were included. The study cohort (n=168) received, in addition to standard pain management, a port-site (PS) infiltration with ropivacaine prior to incision and intraperitoneal (IP) instillation at the end of surgery. On the first postoperative day patients answered a validated questionnaire, and requirement of rescue analgesics was assessed. Pain intensity was assessed on an 11-point numeric rating scale (NRS) from 0=no pain to 10=most severe pain. Reported pain intensity for movement-related pain was significantly lower (p=.001) in the study group compared with the control group (4.4 (SD 2.4) vs. 5.3 (SD 2.2) respectively). Minimal pain intensity after operation was also significantly lower in the study cohort (2.6 (SD 1.7) vs. 2.1 (SD 1.8), (p=.007)). Significantly fewer patients required rescue opioids for analgesia in the ropivacaine cohort (p=.001). The requested dose of rescue opioid (piritramide) in this cohort was also lower (p=.035) with 6.5mg (SD 4.9) vs. 8.7mg (SD 6.6), and demanded later (p=.001) with 4.3h after surgery vs. 3.1h. Patients in the study cohort experienced less nausea (p=.046). Higher satisfaction scores with pain management were reported in the ropivacaine group 12.7 (SD 2.5) vs. 11.6.[9]

Also in postoperative period all the groups were comparable as regards to mean blood pressure with p value > 0.05 which was statistically not significant. Mean VAS scores were lower in group A and significantly low at 3rd and 4th postoperative hour as compared to group B and group C (p value < 0.05). Thereafter, no significant difference was seen in VAS scores among all the three groups (p value > 0.05).Jyothi B et al conducted a study titled "A comparison of analgesic effect of different doses of intrathecal nalbuphine hydrochloride with bupivacaine and bupivacaine alone for lower abdominal and orthopedic surgeries". Hundred patients of both sexes under American Society of Anaesthesiologists I and II were enrolled in the study. They were randomly allocated into four groups I, II, III, IV. It was a double blind randomized controlled study. Prior to SAB, monitors like ECG, pulse oximetry, non invasive blood pressure (NIBP) were connected and base line values were recorded. Patients were preloaded with 500ml of RL solution. Subarachnoid block was performed using 25G Quincke needle in L3-L4 interspace with 15mg bupivacaine + 0.5ml NS(Group I) or 15mg of bupivacaine with either of nalbuphine 0.8mg, 1.6 and 2.5mg (Group II,III and IV). The time to two segment regression of sensory blockade and the duration of analgesia was significantly prolonged in nalbuphine groups. The postoperative pain scores were drastically reduced in group II to IV than group I (3.4±0.4 vs 4.08±0.5). The authors concluded addition of 0.8mg nalbuphine to bupivacaine 0.5% intrathecally provides excellent analgesia without any side effects. Nalbuphine exhibits analgesic ceiling effect at 0.8mg dosage, further increase in dose did not rise the analgesic efficacy.[10]Zhang Y et al evaluated the hypothesis that adding dexmedetomidine to ropivacaine prolongs axillary brachial plexus block. Forty-five patients of ASA I~II and aged 25-60 yr who were scheduled for elective forearm and hand surgery were randomly divided into 3 equal groups and received 40 ml of 0.33% ropivacaine + 1 ml dexmedetomidine (50 μg) (Group DR1), 40 ml of 0.33% ropivacaine + 1 ml dexmedetomidine (100 μg) (group DR2) or 40 ml of 0.33% ropivacaine + 1 ml saline (group R) in a double-blind fashion. The onset and duration of sensory and motor blocks and side effects were recorded. The demographic data and surgical characteristics were similar in each group. Sensory and motor block onset times were the same in the three groups. Sensory and motor blockade durations were longer in group DR2 than in group R (P < 0.05). There was no significant difference in the sensory blockade duration between group DR1 and group R. Bradycardia, hypertension and hypotension were not observed in group R and occurred more often in group DR2 than in group DR1. Dexmedetomidine added to ropivacaine for an axillary brachial plexus block prolongs the duration of the block. However, dexmedetomidine may also lead to side effects such as bradycardia, hypertension, and hypotension.[11]

CONCLUSION

Patients receiving 0.25% ropivacaine with dexmedetomidine 1mcg/kg showed best results.

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