

Evaluation of Post-operative Analgesic effect of Intraperitoneal Ropivacaine with or without Tramadol in Laparoscopic Cholecystectomy

Rajan Babu P.K.¹

¹Associate Professor, Department of Anaesthesiology, Sree Narayana Institute of Medical Sciences, Chalakka, Ernakulam, Kerala, India.

Abstract

Background: Aim: To evaluate post-operative analgesic effect of intraperitoneal ropivacaine with or without tramadol in laparoscopic cholecystectomy. **Subjects and Methods:** A total of one hundred twelve adult patients age ranged 18-58 years of American Society of Anaesthesiologists physical status (ASA-PS) grade I/II planned for elective laparoscopic cholecystectomy were divided into 2 groups of 56 patients. Group I received 18 mL of 0.5% ropivacaine +2 mL of normal saline and group II received 18 mL of 0.5% ropivacaine IP with 100 mg (2 mL) tramadol. In all patients, the pain score was monitored using a numerical rating scale (NRS) every 30 min till 4 hours post operatively and then at 6 hours, 12 hours and 24 hours. **Results:** There were 36 males and 20 females in group I and 35 males and 21 females in group II. The mean weight in group I was 62.1 Kgs and in group II was 61.7 kgs. ASA grade I was seen in 30 in group I and 29 in group II and grade II in 26 in group I and 27 in group II. Duration of surgery was 74.3 minutes in group I and 75.2 minutes in group II. Patients needing rescue analgesia (Fentanyl) was 71% in group I and 45% in group II and total analgesic consumption was 1568.4 µg in group I and 794.2 µg in group II. A non-significant difference was seen ($P > 0.05$). The mean pain score was at 30 minutes was 2.65 and 2.45, at 1 hour was 2.50 and 2.40, at 2 hours was 1.98 and 1.95, 4 hours was 1.80 and 1.40, at 6 hours was 1.65 and 1.35, at 10 hours was 1.15 and 1.24 and at 12 hours was 1.10 and 1.15. A non-significant difference was seen ($P > 0.05$). **Conclusion:** Ropivacaine in combination with tramadol found to be effective in reducing the post-operative pain and analgesic requirement in post-operative period as compared to ropivacaine without tramadol in patient undergoing in elective laparoscopic cholecystectomy.

Keywords: Ropivacaine, laparoscopic cholecystectomy, Analgesic consumption, Tramadol.

Corresponding Author: Dr. Rajan Babu P.K., Associate Professor, Department of Anaesthesiology, Sree Narayana Institute of Medical Sciences, Chalakka, Ernakulam, Kerala, India.

Received: November 2019

Accepted: December 2019

Introduction

Laparoscopic cholecystectomy has been proven to reduce postoperative pain significantly and shorten the recovery period, therefore reducing discharge time from 1 to 3 days to same day discharge with an earlier return to normal activities.^[1] After laparoscopic cholecystectomy, 35 to 63% of patients complain more of visceral pain as a result of stretching of the intra-abdominal cavity, peritoneal inflammation, and phrenic nerve irritation caused by residual carbon dioxide in the peritoneal cavity. Postoperative abdominal pain usually occurs during the first 24 hours, while shoulder pain most commonly appears the second day after laparoscopic cholecystectomy.^[2]

Different modalities have been proposed to relieve post-operative pain after laparoscopy, for example, non-steroidal anti-inflammatory drugs (NSAIDs), opioids, intraperitoneal (IP) local anaesthetics, IP saline, removal of insufflations gas or gas drains, low-pressure abdominal insufflations, acetazolamide administration, use of nitrous oxide instead of

carbon dioxide, and so on.^[3] Intraperitoneal local anaesthetics alone or in combination with non-opioid analgesics have been used to reduce postoperative pain following laparoscopy.^[4] This might reduce adverse effects of opioids and postoperative pain as well. Therefore, including wound infiltration as part of a non-opioid, multimodal analgesic regime is recommended.^[5] The local anaesthetic agents provide antinociception by affecting nerve membrane associated proteins and by inhibiting the release and action of prostaglandins which stimulates the nociceptors and cause inflammation.^[6] The present study evaluated post-operative analgesic effect of intraperitoneal ropivacaine with or without tramadol in laparoscopic cholecystectomy.

Subjects and Methods

This study conducted in Department of Anaesthesiology, Mount Zion Medical College. A total of one hundred twelve adult patients age ranged 18-58 years of American Society of Anaesthesiologists physical status (ASA-PS) grade I/II planned for elective laparoscopic cholecystectomy were

enrolled. All gave their written consent for the participation of the study. Ethical approval was obtained before starting the study.

Demographic data of each patient was recorded. Two groups of 56 patients were formed. Group I received 18 mL of 0.5% ropivacaine + 2 mL of normal saline and group II received 18 mL of 0.5% ropivacaine IP with 100 mg (2 mL) tramadol. In all patients, the pain score was monitored using a numerical rating scale (NRS) every 30 min till 4 hours post operatively and then at 6 hours, 12 hours and 24 hours. The results of the study were compiled together and entered in MS excel sheet. SPSS version 19.0 was used for the study. Statistical analysis was performed using Mann Whitney U test. P value less than 0.05 was set as significant.

Results

Table 1: Patient distribution

Groups	Group I	Group II
Drug	0.5% ropivacaine + normal saline	0.5% ropivacaine IP + 2 mL tramadol
M:F	36:20	35:21

There were 36 males and 20 females in group I and 35 males and 21 females in group II [Table 1].

Table 2: Demographic profile of patients

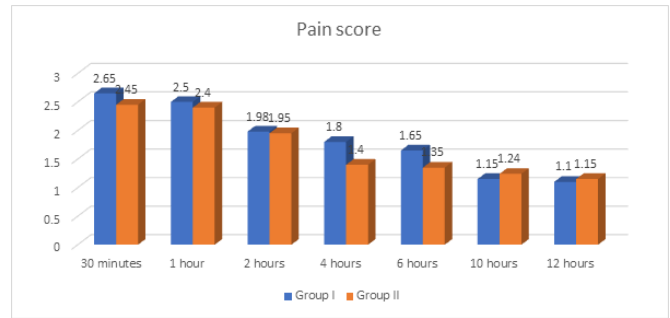
Characteristics	Group I	Group II	P value
Weight (Kgs)	62.1	61.7	>0.05
ASA (I/II)	30:26	29:27	>0.05
Duration of surgery (mins)	74.3	75.2	>0.05
Patients needing rescue analgesia (Fentanyl)	71%	45%	<0.05
Total analgesic consumption (Fentanyl in µg)	1568.4	794.2	<0.05

The mean weight in group I was 62.1 Kgs and in group II was 61.7 kgs. ASA grade I was seen in 30 in group I and 29 in group II and grade II in 26 in group I and 27 in group II. Duration of surgery was 74.3 minutes in group I and 75.2 minutes in group II. Patients needing rescue analgesia (Fentanyl) was 71% in group I and 45% in group II and total analgesic consumption was 1568.4 µg in group I and 794.2 µg in group II. A non- significant difference was seen (P> 0.05) [Table 2].

Table 3: Comparison of pain score in both groups

Time interval	Group I	Group II	P value
30 minutes	2.65	2.45	>0.05
1 hour	2.50	2.40	>0.05
2 hours	1.98	1.95	>0.05
4 hours	1.80	1.40	>0.05
6 hours	1.65	1.35	>0.05
10 hours	1.15	1.24	>0.05
12 hours	1.10	1.15	>0.05

The mean pain score was at 30 minutes was 2.65 and 2.45, at 1 hour was 2.50 and 2.40, at 2 hours was 1.98 and 1.95, 4 hours was 1.80 and 1.40, at 6 hours was 1.65 and 1.35, at 10 hours was 1.15 and 1.24 and at 12 hours was 1.10 and 1.15. A non- significant difference was seen (P> 0.05) [Table 3, Figure 1].



Discussion

Laparoscopic cholecystectomy has emerged over the open procedure as the gold standard for surgical treatment of symptomatic gallstones.^[7] Laparoscopic cholecystectomy results in better surgical outcome in terms of reduced postoperative pain, morbidity and duration of convalescence compared to open cholecystectomy, systemic complications and quality of life. Perioperative analgesia has traditionally been provided by opioid analgesics.^[8] However, extensive use of opioids is associated with a variety of perioperative side effects, such as respiratory depression, drowsiness, postoperative nausea and vomiting, ileus, and constipation that can delay hospital discharge.^[9]

In laparoscopic cholecystectomy because of gas insufflation and raised intraperitoneal pressure, there is peritoneal inflammation and neuronal rupture with a linear relationship between abdominal compliance and resultant severity of post-operative pain.^[10] Pain may be visceral or somatic, upper abdominal, lower abdominal or in shoulders as well. The type of pain after laparoscopic surgery differs considerably from that seen after laparotomy.^[11] Whereas laparotomy results mostly in parietal pain, patients after laparoscopic cholecystectomy complain more of visceral pain that results from the stretching of intra-abdominal cavity, peritoneal inflammation and phrenic nerve irritation caused by residual carbon dioxide in the peritoneal cavity.^[12] The present study evaluated post-operative analgesic effect of intraperitoneal ropivacaine with or without tramadol in laparoscopic cholecystectomy.

Our study revealed that there were 36 males and 20 females in group I and 35 males and 21 females in group II. Bahram et al,^[13] compared the effectiveness of intraperitoneal ropivacaine hydrochloride installation with intramuscular tramadol injection for postoperative pain. In this study, 400 patients of either sex in the age group of 23 to 62 years with American Society of Anesthesiologists grade I and II, who were scheduled to undergo elective laparoscopic cholecystectomy, were allocated to two groups of 200 patients each with regard to postoperative analgesia. In group I (n=200) the patients received ropivacaine (0.5%), instilled in gallbladder bed and the under surface of diaphragm and infiltration of port wounds. In group II (n=200) the patients were provided with postoperative analgesia with tramadol (100 mg) given intramuscularly (IM) at the completion of procedure. The intensity of postoperative pain using visual analogue scale (VAS) and shoulder pain was evaluated and also other pain-related sequelae were recorded. Both VAS and shoulder pain score had significantly improved

postoperatively in group I in comparison with group II. At the same time, ropivacaine instillation in group I lowers significantly postoperative nausea and vomiting resulting from either postoperative pain or tramadol injection.

We observed that the mean weight in group I was 62.1 Kgs and in group II was 61.7 kgs. ASA grade I was seen in 30 in group I and 29 in group II and grade II in 26 in group I and 27 in group II. Duration of surgery was 74.3 minutes in group I and 75.2 minutes in group II. Patients needing rescue analgesia (Fentanyl) was 71% in group I and 45% in group II and total analgesic consumption was 1568.4 μ g in group I and 794.2 μ g in group II. Kalsotra et al,^[14] conducted a study in which 123 patients undergoing laparoscopic cholecystectomy were divided into three groups: Intraperitoneal Ropivacaine 50 ml 0.2% +5 ml normal saline (NS): Group R (n=37), Intraperitoneal Ropivacaine 50 ml 0.2% + Tramadol 1 mg/kg (diluted in 5 ml NS): Group RT (n=41) and intraperitoneal Ropivacaine 50 ml 0.2%+ Dexmedetomidine 1 μ g/kg (diluted in 5 ml NS): Group RD (n=45) before removal of trocar at the end of surgery. The quality of analgesia was assessed by visual analogue scale score (VAS), time to first request of analgesia and total dose of analgesic in the first 24 hrs. Hemodynamic parameters and adverse effects in three groups over 24 hrs were also noted. The mean of VAS pain score after 0.5,1, 2, 4, 6, 12 and 24 hrs of surgery was less in RD group compared to other two groups, and the difference was statistically significant (P < 0.05). Mean time of 1st request of analgesia was 63.7 min in group R, 116.9 min in group RT and 141.8 min in group RD which was statistically significant (P < 0.05). The mean total rescue analgesia consumption of inj. diclofenac in group RD was 81.70 mg, 109.80 mg in group RT and 140.60 mg in group R in 24 hours after surgery which was statistically significant (P < 0.05). There were no statistically significant differences in the secondary outcomes.

We observed that the mean pain score was at 30 minutes was 2.65 and 2.45, at 1 hour was 2.50 and 2.40, at 2 hours was 1.98 and 1.95, 4 hours was 1.80 and 1.40, at 6 hours was 1.65 and 1.35, at 10 hours was 1.15 and 1.24 and at 12 hours was 1.10 and 1.15. Kumari et al,^[15] in their study eighty patients undergoing laparoscopic cholecystectomy were randomised into two groups. Group R received 0.5% ropivacaine 18 mL with normal saline (NS) 2 mL and Group RT received 0.5% ropivacaine 18 mL with tramadol (100 mg, 2 mL) at the end of surgery intraperitoneally through the port. The pain score was monitored using a numerical rating scale (NRS) every 30 min till 4 h post operatively and then at 6 h, 12 h and 24 h. The pain score in Group RT was significantly lower than Group R at 2.5 h to 24 h (P = 0.005). Only 42.5% in Group RT demanded rescue analgesia as compared to 75% in Group R (P = 0.003). Total analgesic consumption of fentanyl was also reduced in the tramadol group (785 μ g vs 1800 μ g). No significant adverse effects were found.

Conclusion

Ropivacaine in combination with tramadol found to be effective in reducing the post-operative pain and analgesic requirement in post-operative period as compared to ropivacaine without tramadol in patient undergoing in elective laparoscopic cholecystectomy.

References

1. Singh A, Mathur SK, Shukla VS. Postoperative analgesia with intraperitoneal ropivacaine with and without fentanyl after laparoscopic cholecystectomy: A randomized double-blind controlled trial. *OA Anaesthetics* 2013;1:1-9.
2. Shukla U, Prabhakar T, Malhotra K, Srivastava D, Malhotra K. Intraperitoneal bupivacaine alone or with dexmedetomidine or tramadol for post-operative analgesia following laparoscopic cholecystectomy: A comparative evaluation. *Indian J Anaesth* 2015;59:234-9.
3. Yadava A, Rajput SK, Katiyar S, Jain RK. A comparison of intraperitoneal bupivacaine-tramadol with bupivacainemagnesium sulphate for pain relief after laparoscopic cholecystectomy: A prospective, randomised study. *Indian J Anaesth* 2016;60:757-62.
4. Kim TH, Hyun K, Park JS, Chang I, Park SG. Intraperitoneal ropivacaine instillation for postoperative pain relief after laparoscopic cholecystectomy. *J Korean Surg Soc* 2010;79:130-6.
5. Pratap V, Parappa Bellad A. Analgesic efficacy of intraperitoneal tramadol vs. placebo for postoperative pain relief following laparoscopic appendicectomy: A double-blinded 1-year randomized control trial: Single centric, hospital based study. *J Evol Med Dent Sci* 2016;5:2390-7.
6. Labaille T, Mazoit JX, Paqueron X, Franco D, Benhamou D. The clinical efficacy and pharmacokinetics of intraperitoneal ropivacaine for laparoscopic cholecystectomy. *Anesth Analg* 2002;94:100-5.
7. Gupta A, Thörn SE, Axelsson K, Larsson LG, Agren G, Holmstrom B, et al. Postoperative pain relief using intermittent injections of 0.5% ropivacaine through a catheter after laparoscopic cholecystectomy. *Anesth Analg* 2002;95:450-6.
8. Trikoupi A, Papavramidis T, Kyurdzhieva E, Kesisoglou I, Vasilakos D. Intraperitoneal administration of ropivacaine during laparoscopic cholecystectomy. *Eur J Anaesthesiol* 2010;27:222.
9. Bakhamees HS, El-Halafawy YM, El-Kerdawy HM, Gouda NM, Altemyatt S. Effect of dexmedetomidine in morbidly obese patients undergoing laparoscopic gastric bypass. *Middle East J Anaesthesiol.* 2007; 19: 537-51.
10. Singh A, Mathur SK, Shukla VK. Postoperative analgesia with intraperitoneal ropivacaine with and without fentanyl after laparoscopic cholecystectomy; *OA anaesthetic journal* 2013; may 1;1(1):9.
11. Ahmed B, Md Ashraf, Elmawgoud AA, Doaa R. Antinociceptive effect of (α_2 adrenoceptor. agonist) dexmedetomidine vs meperidine, topically, after laproscopic gynecologic surgery. *J Med Sci* 2008;8:400-4.
12. Srinivas Rapolu, K Anil Kumar, Syed Ali Aasim. A comparative study on intraperitoneal bupivacaine alone or with dexmedetomidine for post-operative analgesia following laparoscopic cholecystectomy. *IAIM*, 2016; 3(12): 33-40
13. Bahram MA. Ropivacaine Hydrochloride Instillation vs Parenteral Analgesia (Tramadol) for Pain Control following Laparoscopic Cholecystectomy. *World.* 2016 Jan;9(1):25.
14. Kalsotra S, Kant V, Rather MA. Intra peritoneal installation of Ropivacaine compared to Ropivacaine plus Tramadol and Ropivacaine plus Dexmedetomidine for analgesic efficacy in laparoscopic cholecystectomy. *JMSCR* 2019; 7: 894-901.
15. Kumari A, Acharya B, Ghimire B, Shrestha A. Post-operative analgesic effect of intraperitoneal ropivacaine with or without tramadol in laparoscopic cholecystectomy. *Indian J Anaesth* 2020;64:43-8.

Copyright: © the author(s), publisher. Academia Anesthesiologica International is an Official Publication of “Society for Health Care & Research Development”. It is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

How to cite this article: Babu RPK. Evaluation of Post-operative Analgesic effect of Intraperitoneal Ropivacaine with or without Tramadol in Laparoscopic Cholecystectomy. Acad. Anesthesiol. Int. 2019;4(2):362-365.

DOI: [dx.doi.org/10.21276/aan.2019.4.2.82](https://doi.org/10.21276/aan.2019.4.2.82)

Source of Support: Nil, **Conflict of Interest:** None declared.