International Journal of Medical Anesthesiology

E-ISSN: 2664-3774
P-ISSN: 2664-3766
www.anesthesiologypaper.com
IJMA 2024; 7(4): 14-16
Received: 02-10-2024
Accepted: 06-10-2024

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Post operative oxygen saturation in patients with intraperitoneal instillation of injection ropivacaine 0.375% versus placebo on postoperative analgesia for laparoscopic abdominal surgery: A comparative study

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DOI: https://doi.org/10.33545/26643766.2024.v7.i4a.504

Abstract
The main advantage of using local anaesthetics is that they do not have the adverse effects of opioids, which may delay recovery and discharge from hospital. These effects include postoperative nausea, vomiting, sedation, impairment of return of gastrointestinal motility and pruritus. Many local anaesthetics in various concentrations are used in practice including lignocaine, bupivacaine the latest being ropivacaine. Ropivacaine has shown to be less toxic to cardiac and central nervous system as compared to other drugs. Study was conducted on 60 adult Patients scheduled for elective laparoscopic abdominal surgery at Basaveshwara Medical College and Hospital, Chitradurga for 18 months. Trocar site infiltration and intraperitoneal instillation in the gallbladder fossa and subdiaphragmatic hepatic surface using ropivacaine (35 ml of 0.375%) and bupivacaine (35 ml of 0.25%) at the end of surgery as a part of multimodal analgesia provide safe and effective somato-visceral analgesia in patients undergoing LC. Ropivacaine provides a more profound and prolonged analgesia as compared to bupivacaine.

Keywords: Post operative oxygen saturation, ropivacaine, postoperative analgesia

Introduction

Laparoscopic abdominal surgeries are one of the most commonly performed elective day care procedures. Providing adequate postoperative pain relief is of importance to enhance recovery. Although pain following Laparoscopic surgery is less intense than open surgery it can occur due to stretching of the abdominal wall from insufflation of gas and release of inflammatory mediators, local dissection and irritation of the peritoneum produced by blood, CO_2 used for pneumoperitoneum. In laparoscopic abdominal surgeries the cause of pain are of somatic and visceral origin. Somatic pain is due to skin incision and the visceral pain is due to peritoneal distension and visceral irritation caused by creation of capnoperitoneum and surgical handling. Many patients complain of pain radiating to the right shoulder which is due to residual carbon dioxide post pneumoperitoneum irritating the diaphragm [1].

Pain relief is an important aim of any surgery. Different methods have been proposed to relieve postoperative pain after laparoscopy. [2]These include NSAIDS/opioids, intra peritoneal, port site infiltration of local anaesthetics, intraperitoneal saline, use of N20 in place of CO_2.

Intraperitoneal instillation of local anaesthetics at the end of laparoscopic procedures reduces post operative pain and lengthens the period of first postoperative analgesia requirement. Intraperitoneal local anaesthesia is a simple, cheap and safest method of providing postoperative analgesia after laparoscopic abdominal surgeries. The main advantage of using local anaesthetics is that they do not have the adverse effects of opioids, which may delay recovery and discharge from hospital. These effects include postoperative nausea, vomiting, sedation, impairment of return of gastrointestinal motility and pruritus [3]. Many local anaesthetics in various concentrations are used in practice including lignocaine, bupivacaine the latest being ropivacaine. Ropivacaine has shown to be less toxic to cardiac and central nervous system as compared to other drugs [4].

Materials and Methods

Study was conducted on 60 adult Patients scheduled for elective laparoscopic abdominal surgery at Basaveshwara Medical College and Hospital, Chitradurga for 18 months.

A comparative, Randomised study was conducted on 60 adult patients ASA 1 and ASA 2 undergoing elective laparoscopic abdominal surgeries under general anaesthesia for 18 months in Basaveshwara Medical college and hospital, Chitradurga, divided into 2 groups of 30 each, Group S - Intraperitoneal instillation with 40 ml of 0.9% normal saline and Group R - with 40 ml of 0.375% Ropivacaine.

A randomised comparative double blind study will be carried out on 60 ASA physical status grade I and II patients of either sex between 18-60 years of age, scheduled for elective laparoscopic abdominal surgeries under general anaesthesia. The study will be conducted in the department of Anaesthesiology, BMCH, Chitradurga. After the approval by the institutional Ethical committee, written informed consent will be obtained from all the patients before being included in the study. The study population will be subdivided randomly into 2 groups each consisting of 30 patients:

Group S (n=30) and Group R (n=30).

Both the groups baseline parameters will be noted.

- General condition of the patient
- Airway assessment using Mallampati grading and Rule of 1- 2 – 3.
- A general physical examination including height, weight and BMI
- A detailed examination of the cardiovascular, respiratory, per abdomen and CNS systems.

The following investigations will be done in patients as required

- Haemoglobin estimation
- Coagulation Profile
- Blood sugars (FBS, PPBS)
- Blood urea, serum creatinine and electrolytes
- Liver function test
- Standard 12 lead ECG
- Screening chest x ray

The procedure of general anaesthesia will be explained to the patient and written informed consent will be taken. Preparation will include overnight fast according to ASA nil per oral status before the surgery. Anaesthetic machine and all the equipments will be checked and kept ready along with the crash cart.

The study population was subdivided randomly into 2 groups by the use of random number generator each consisting of 30 patients:

Group S (n=30) and Group R (n=30).

The study is carried out as a randomised, prospective, double blind and controlled trial.

Patients undergoing laparoscopic abdominal surgery and who gave written informed consent to participate in the trial are allocated into two groups (S and R) of 30 patients each using computer generated random numbers.

Group S (n= 30) - These patients receives intraperitoneal instillation with 40 ml of 0.9% normal saline

Group R (n=30) - These patients receives intraperitoneal instillation with 40 ml of 0.375% ropivacaine

Inclusion Criteria

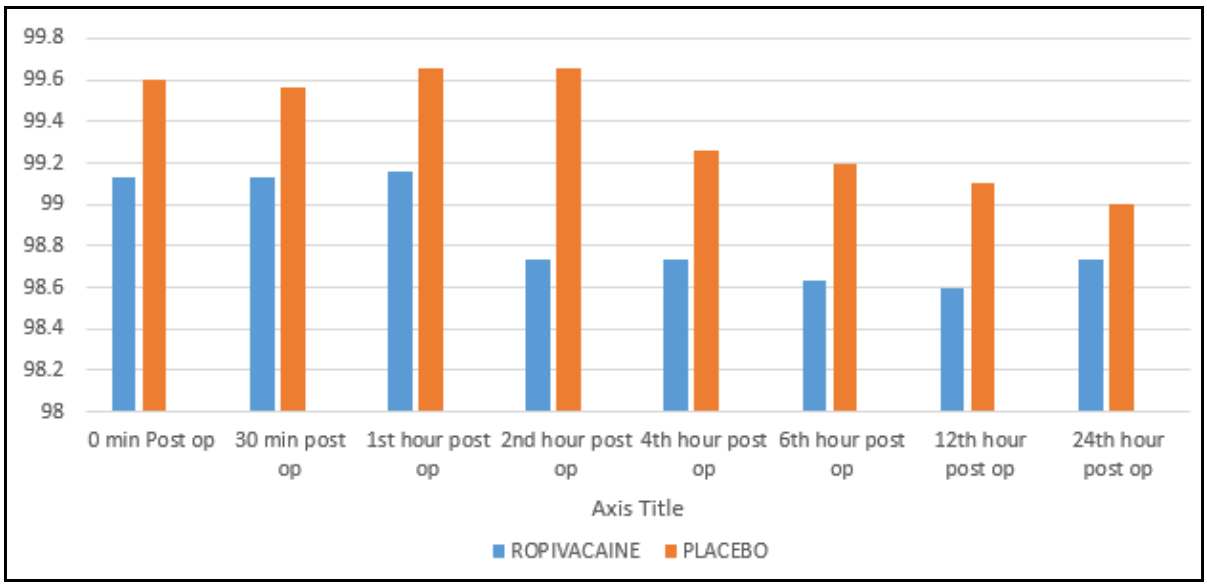
- Patients willing to participate in the study.
- ASA 1 & 2 posted for elective laprotomy abdominal surgeries
- Age between 18 to 60 yrs
- Patient weight between 50 to 80 kgs

Exclusion criteria

- Patient with severe systemic disease
- Pt with morbid obesity, heart block, hepatorenal disease.
- Surgeries converted to open,
- Patient on chronic use of analgesics
- Pregnancy
- Patient with hypersensitivity for local anesthetics.

Results

Demographic data between the groups being statistically insignificant Hemodynamic data between the grs being statistically insignificant. The Mean NRS was <5 till only for 4 hrs in groups, till 8 hrs in group B, 16 hrs in group



Graph 1: Oxygen Saturation

Table 1: Post operative oxygen saturation

	Ropivacaine	Placebo	P value
0 min Post op	99.13±0.33	99.6±0.48	<0.0001
30 min post op	99.13±0.33	99.56±0.49	0.0002
1st hour post op	99.16±0.37	99.66±0.47	0.0002
2nd hour post op	98.73±0.72	99.66±0.47	<0.0001
4th hour post op	98.73±0.69	99.26±0.77	<0.0001
6th hour post op	98.63±0.70	99.2±0.79	<0.0001
12th hour post op	98.6±0.66	99.1±0.78	<0.0001
24th hour post op	98.73±0.62	99±0.81	<0.0001

Discussion

The duration of postoperative analgesia was counted from the first reading in PACU to the time of administration of rescue analgesia. Rescue analgesia was administered when the NRS score was >5 in the form of IV tramadol (1 mg/kg). The mean of duration of analgesia in Group S was 4.47+0.86 hours, in Group B 7.93+1.44 hours and in Group R 13.47+1.38 hours during the postoperative period. Thus, the mean duration of analgesia in Group R was almost double the duration of analgesia observed in Group B and three times the duration of analgesia observed in Group S. This difference was statistically as well as clinically significant.

This shows that the duration of analgesia was longer in the local anaesthesia groups where intraperitoneal local anaesthetic infiltration in the gallbladder fossa and suprahepatic surface was provided. Use of ropivacaine significantly prolonged and improved the analgesia as assessed by NRS score. No patient from our study complained of shoulder pain.

Intraperitoneal infiltration in gallbladder fossa and suprahepatic surface with bupivacaine and ropivacaine also helped in maintaining better haemodynamic profile in the postoperative period. Ropivacaine had a more profound and longer duration of analgesia as compared to bupivacaine.

We observed for various complications like nausea, vomiting, bradycardia, respiratory depression, hypotension and sweating in all patients. No patient from the entire study population had any incident of any of these complications. This shows that intraperitoneal instillation of ropivacaine and bupivacaine in the volume and dose used in our study is not associated with any adverse effects.

Conclusion

Trocar site infiltration and intraperitoneal instillation in the gallbladder fossa and subdiaphragmatic hepatic surface using ropivacaine (35 ml of 0.375%) and bupivacaine (35 ml of 0.25%) at the end of surgery as a part of multimodal analgesia provide safe and effective somato-visceral analgesia in patients undergoing LC. Ropivacaine provides a more profound and prolonged analgesia as compared to bupivacaine.

This technique of providing postoperative analgesia is simple, effective and will help in improving the postoperative recovery profile of the patient and help in making it a truly out-patient based surgery.

Conflict of Interest

Not available

Financial Support

Not available

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How to Cite This Article

Gowda A, Megha GH. Post operative oxygen saturation in patients with intraperitoneal instillation of injection ropivacaine 0.375% versus placebo on postoperative analgesia for laparoscopic abdominal surgery: A comparative study. International Journal of Medical Anesthesiology. 2024;7(4):14-16.