



A COMPARATIVE STUDY ON THE POSTOPERATIVE ANALGESIC EFFECTS OF THE INTRA PERITONEAL INSTILLATION OF ROPIVACAINE VERSUS BUPIVACAINE FOLLOWING LAPAROSCOPIC CHOLECYSTECTOMY.

Anaesthesiology

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ABSTRACT

Background and Aims: Laparoscopic cholecystectomy is widely performed, and has replaced open cholecystectomy as the gold standard for cholelithiasis. Postoperative abdominal and visceral pain after elective Laparoscopic Cholecystectomy is of prime concern to patients as it causes significant distress. The aim was to evaluate the benefit of intraperitoneal instillation of Ropivacaine versus bupivacaine on postoperative pain after Laparoscopic Cholecystectomy when used as a part of multimodal analgesia. **Material And Method:** After ethical committee approval and written informed consent, 60 patients of ASA1 and 2, aged between 18 to 60 years of either genders. Group Bupivacaine (B): received intraperitoneal instillation of 20 ml of plain bupivacaine 0.5%. Group Ropivacaine (R): received 20 ml of 0.75% ropivacaine. **Result:** There was statistically significant difference in VAS score at 2 and 4 hrs postoperatively ($p < 0.05$). The incidence of PONV was not statistically significant between the groups ($P = 0.1$ and $p = 0.09$, respectively). Shoulder pain was seen in 17 patients in Group B and seven patients in Group R, which was statistically significant ($P = 0.04$). **Conclusion:** We conclude that the intraperitoneal and sub diaphragmatic instillation of 0.75% ropivacaine is a safe and effective method for providing postoperative analgesia without significant side effects.

KEYWORDS

INTRODUCTION:

Laparoscopic cholecystectomy is widely performed, and has replaced open cholecystectomy as the gold standard for cholelithiasis^{1,2}. Postoperative pain is an important factor contributing to patient morbidity during recovery. Postoperative abdominal and visceral pain after elective Laparoscopic Cholecystectomy is of prime concern to patients as it causes significant distress. After laparoscopic cholecystectomy, pain can arise from the incision site (somatic pain), visceral structures (visceral pain)³, and shoulder tip (referred pain from the sub-diaphragmatic region). Visceral pain occurs due to the stretching of the parietal peritoneum, the release of inflammatory mediators of pain, and the irritation produced by blood. Referred shoulder pain is often mild and is due to the irritation of the diaphragm by residual gas⁴.

Various modalities are used for postoperative pain relief, including IV or IM NSAIDs and opioids, infiltration at the incision site with LA⁵, lignocaine, bupivacaine the latest being Ropivacaine. Bupivacaine is a long acting local anaesthetic routinely used. One of the major adverse effects associated with bupivacaine is its cardiotoxic potential. Ropivacaine has shown to be less toxic to cardiac and central nervous system as compared to Bupivacaine⁶.

The aim was to evaluate the benefit of intraperitoneal instillation of Ropivacaine versus bupivacaine on postoperative pain after Laparoscopic Cholecystectomy when used as a part of multimodal analgesia.

MATERIAL AND METHOD:

After ethical committee approval and written informed consent, a prospective observational study was carried out in Saraswathi Institute of Medical Sciences, Anwarpur, and Hapur (U.P) in patients undergoing elective laparoscopic cholecystectomy under General Anaesthesia.

Study Duration: six months (July 2021 to December 2021)

Sample collection: 60 cases were included in study (30 cases in each group)

Study design: prospective, observational study.

Group Bupivacaine (B): received intraperitoneal instillation of 20 ml of plain bupivacaine 0.5%

Group Ropivacaine (R): received 20 ml of 0.75% ropivacaine

Inclusion criteria:

Age group 18-60 years of both genders

Undergoing elective laparoscopic cholecystectomy. ASA 1 and 2 patients of either sex.

Exclusion criteria:

Allergy to local anaesthetics.
Pregnant or lactating patients
A body mass index (BMI) of > 40
Any patient who needed conversion to open cholecystectomy

All patients underwent through medical evaluation and investigations. Local anaesthetic sensitivity testing was performed on all patients one night prior to surgery. All the patients were counselled regarding general anaesthesia as well as the operative procedure. The Visual Analogue Scale (VAS) was explained to the patients during the preanaesthetic visit. All the patients were kept nil per oral as per the fasting guidelines. On arrival to the operating room, an 18-gauge intravenous (IV) cannula was secured and standard monitor were attached. All patients received standard premedication and general endotracheal anaesthesia. All surgical procedures were performed by and experienced surgeon. Standard 10mm trocar umbilical port and epigastric ports were used. CO₂ was used to institute pneumoperitoneum, and the intra-abdominal pressure was maintained between 12 and 14 mmHg. The patients were placed in a 15-30 degree reverse Trendelenburg position with a left lateral tilt. After removal of gallbladder and haemostasis, residual blood, fluid and CO₂ were thoroughly suctioned.

The surgeon instilled 20 ml of test drug into sub-diaphragmatic space and intraperitoneally under direct vision and patient were placed in trendelenburg position. The intensity of postoperative pain was recorded immediately on arrival in Post Anaesthesia Care Unit for all patients using the visual analog scale (VAS) score at 0, 2, 4, 6, 8, 12, and 24 hours. Post-operative analgesia duration was noted.

Pain parameters including visceral, parietal, and shoulder pain were assessed utilizing visual analog scale (VAS) score where 0 was considered as no pain and 10 as intense pain and rescue analgesic was given at VAS ≥ 4 H. In patients that complained of moderate to severe pain, 100 mg of tramadol was administered IV as a rescue analgesia treatment, and the time interval to the first request for rescue analgesia was noted. Adverse effect of nausea, vomiting and shoulder pain over the course of 24 hours was noted.

Statistical Analysis:

The collected data was entered in Ms excel and was imported in IBM SPSS vs. 25.0. The collected data was analysed by appropriate statistical tools and techniques. Tests such as mean $\pm$ SD, graphical representation of data, frequency distribution chi-square test, $P < 0.05$ was taken as statistically significant.

RESULT:

VAS SCORES	GROUP B	GROUP R	p-VALUE
0 h	1.9	0.6	0.441
2h post -op	3.4	1.5	0.022
4hr post -op	3.0	2.3	0.046
6hr post -op	2.5	2.7	0.226
8hr post -op	2.7	2.3	0.094
12hr post -op	2.5	2.1	0.550
24hr post -op	2.6	1.7	0.381

There was statistically significant difference in VAS score at 2 and 4 hrs postoperatively ($p < 0.05$)

	GROUP B	GROUP R	P-VALUE
NAUSEA	2 (6%)	1(3%)	0.1
VOMITTING	3 (10%)	2(6%)	0.09
SHOULDER PAIN	17 (56%)	7(23%)	0.04

The incidence of PONV was not statistically significant between the groups ($P = 0.1$ and $p = 0.09$, respectively). Shoulder pain was seen in 17 patients in Group B and seven patients in Group R, which was statistically significant ($P = 0.04$)

Post-operative analgesia duration was 320 ± 20.3 mins in group R and 280 ± 20.3 mins in group B ($p < 0.001$)

All patients remained hemodynamic ally stable and no major complications were observed.

DISCUSSION:

Many clinical trials have been carried out to assess analgesic effects of LA instilled intraperitoneally into sub diaphragmatic space ⁷The rationale for this route is that the peritoneum is exposed to block the visceral nociceptive conduction from the area of tissue damage and the peritoneum, thereby providing an additional mechanism of analgesia ⁸ Bupivacaine is the most commonly used local anaesthetic for intraperitoneal infiltration since 1991 ⁹⁻¹¹. Ropivacaine, is an attractive alternative to bupivacaine.

In a study conducted by Porika et al ¹² mean time taken for administration of rescue analgesia was 8.23 ± 0.5 hours in patients receiving intraperitoneal ropivacaine which was significantly more as compared to 7.6 ± 0.52 hours in patients receiving intraperitoneal bupivacaine.

In a recent study conducted By Sharan et al ¹³ similar results were obtained where the mean time for requirement of first rescue analgesic was 150.00 ± 86.40 min with bupivacaine as compared to 162.22 ± 124.16 min with ropivacaine but the difference between the two groups was statistically non-significant. Our finding of a more efficacious pain relief by intraperitoneal ropivacaine over bupivacaine. Ropivacaine group had stable hemodynamic and this can be attributed to the better analgesia over bupivacaine and had less cardio toxicity.

Limitation:

The limitation of our study is that the sample size is small and therefore the power of study is less. A large sample size will establish further conclusive evidence.

CONCLUSION:

In our study, we found that ropivacaine reduces postoperative pain and prolongs the requirement time of rescue analgesia. It also reduces the incidence of shoulder pain after laparoscopy. We conclude that the intraperitoneal and sub diaphragmatic instillation of 0.75% ropivacaine is a safe and effective method for providing postoperative analgesia without significant side effects.

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