



Original Research Article

Intraperitoneal Instillation: Ropivacaine Vs Bupivacaine For Post Operative Pain Relief In Laparoscopic Cholecystectomy

Rakesh Babu^{1*}, Prithi Jain², Lulu Sherif²

¹Junior Resident, ²Associate Professor;
Department of Anaesthesiology, Father Muller Medical College, Mangalore -575002

*Correspondence Email: rakeshbabu47@yahoo.co.in

Received: 16/09/2013

Revised: 12/11/2013

Accepted: 19/11/2013

ABSTRACT

Objective: To compare the post operative pain scores after intraperitoneal instillation of 0.20% Ropivacaine with 0.25% Bupivacaine in patients undergoing laparoscopic cholecystectomy.

Methods: 60 elective cases posted for Laparoscopic cholecystectomy were included in the study. All patients were premedicated. Patients were given standard general anaesthesia. They were randomised into two groups. Group A: Patients received 20 ml of 0.2% ropivacaine (n = 30). Group B: Patients received 20 ml of 0.25% Bupivacaine (n =30) intraperitoneally at the end of surgery. Post operative pain was assessed with ten point VAS.

Statistical method: ANOVA test was used to compare the VAS in both the groups

Results: The age and sex distribution of both the groups was similar. The heart rate, systolic & diastolic blood pressure, mean blood pressure and mean trend of SpO₂ in both groups remained similar over the periods. There is a significant reduction in VAS over the 12 hour period in both the treatment groups. No statistically significant adverse effects were noted. Duration of hospital stay was also similar in both the study groups.

Conclusion: Intraperitoneal instillation of ropivacaine or bupivacaine is an effective method of post op pain relief in laparoscopic cholecystectomy. Both these drugs significantly reduced the post op pain. We conclude that intraperitoneal instillation of local anaesthetic is an easy, cheap, and non-invasive method which provides good analgesia in the immediate postoperative period after laparoscopic cholecystectomy. Ropivacaine in view of better cardiovascular safety profile can be an effective alternative for Bupivacaine, with similar post operative pain relief.

Key Words: Ropivacaine, Bupivacaine, laparoscopic cholecystectomy, post operative pain

INTRODUCTION

Laparoscopic cholecystectomy has become the standard technique for gall bladder surgeries. These surgeries have less post operative pain and smooth recovery than conventional open cholecystectomies.

Laparotomy results mainly in parietal pain (abdominal wall), whereas patients complain more of visceral pain after operative laparoscopy.^[1]

Shoulder pain secondary to diaphragmatic irritation as a result of CO₂

pneumoperitoneum is a frequent post operative observation after laparoscopic cholecystectomies. Abdominal pain following laparoscopic cholecystectomy can occur due to stretching of parietal peritoneum from insufflations of gas intraperitoneally, release of inflammatory mediators of pain and irritation produced by blood.

The reason for marked variation of pain between individuals remains unclear but could be due to multiple factors including duration of surgery, the degree of invasiveness of the procedure, the experience of surgeon and the amount of intra operative bleeding. It could also be influenced by the size of the trocars, the use of suction to remove any blood and insufflated gas at the end of surgery.

Given the expanding role of ambulatory surgery and need to facilitate an earlier hospital discharge, improving postoperative pain control has become an important issue for all anaesthesiologists.

Various methods have been tried for post operative analgesia in laparoscopic cholecystectomy like epidural catheters, intra muscular opioids, instillation of local anaesthetic solutions intraperitoneally by different authors with varying results.^[2]

The improved understanding of origin of abdominal and shoulder pain after laparoscopic procedures led to the use of intra peritoneal and port site instillation of local anesthetic to reduce post operative pain.

Bupivacaine is one such local anaesthetic which is long acting and free of side effects like gastritis due to NSAIDs or nausea and vomiting and fear of drug dependence as in opioids.^[3] Ropivacaine is a recently introduced long acting local anaesthetic with lower toxicity, fewer side effects and a longer duration of action than Bupivacaine. It has a better cardiovascular safety profile when compared to

Bupivacaine.^[4] Very few studies in literature have compared these two local anaesthetic solutions for intraperitoneal instillation.

Aims and Objectives

To compare the post operative visual analogue scale in laparoscopic cholecystectomy patients receiving intraperitoneal instillation of Ropivacaine 0.20% and Bupivacaine 0.25%.

MATERIALS AND METHODS

A double blind randomised study was conducted in 60 Consenting elective cholecystectomy patients of either sex, between age group 18-65 years.

Exclusion criteria included patients with morbid obesity, age >65 yrs, recent myocardial infarction, ASA class 3 and 4.

A detailed pre anaesthetic evaluation was done and patients were made familiar with the 10 point visual analogue scale. Basic laboratory data, ECG, Chest- X ray and any other relevant investigation needed were reviewed.

All the patients were pre-medicated with oral diazepam 0.1mg/kg 2 hours prior, Inj. Morphine 0.1mg/kg and Inj Promethazine 1mg/kg IM, one hour prior to surgery. Anaesthesia was induced with 5mg/kg thiopentone, 2microgram /kg Fentanyl and Succinyl choline 1-2 mg/kg in both the study groups. Patients were intubated and anesthesia was maintained with isoflurane, oxygen and nitrous oxide (34/66%) and vecuronium bromide (0.06mg/kg). Injection Fentanyl 50 microgram was used for intraoperative analgesia in both the groups.

Intra operative monitors consisted of ECG, NIBP, end tidal CO₂ and pulse oximeter.

Patients were randomly allotted into two groups by anaesthetist 1 who decided which local anaesthetic was to be used for intraperitoneal infiltration. After completion of surgery and achieving hemostasis, the

local anaesthetic solution was injected intra-peritoneally before the removal of trocar at the end of the surgery, in trendelenburg's position 20degree to facilitate dispersion of drug solution in sub hepatic region.

Local anaesthetic solutions were given as follows: the surgeon sprayed 10 mL of solution into the hepato-diaphragmatic space, 5 mL in the area of the gallbladder, and 5 mL into the space between liver and kidney. Surgical wounds were not infiltrated with local anaesthetic solution.

At the end of surgery patients were reversed from anaesthesia adequately by using neostigmine (0.05mg/kg) and glycopyrrolate (0.02mg/kg) and extubated.

Further assessment was done in the postoperative room by the anaesthetist II blinded to the study groups.

In the post operative room using the Visual analogue scale (VAS), post operative pain was assessed starting from the first hour of surgery, hourly till four hours post op and thereafter at 6 hour, 8 hour, 12 hour and 24 hour after the surgery.

A detailed assessment of post operative problems like pain-location of pain, pain at rest, pain on deep inspiration and during coughing were made. The heart rate, blood pressure and respiratory rate were also assessed at the above times. Adverse effects, if any were noted.

Statistical analysis: All collected data were analysed using appropriate statistical methods. An Analysis of variance (ANOVA) was done for VAS in both the study groups over the time periods.

RESULTS

The two groups were comparable for age weight, height and sex. The vital parameters like heart rate, blood pressure and saturation were comparable between the groups.

The mean VAS over 24 hours was higher in the Ropivacaine group (mean 4.573) when

compared to the bupivacaine group (mean 4.185) but was statistically insignificant (Table1).

Table 1 :-Estimates of VAS Score across the two Treatment Groups

Drug	Mean	95% Confidence Interval	
		Lower Bound	Upper Bound
B	4.185	4.057	4.31
R	4.573	4.439	4.71

The difference in the VAS scores of the two Treatment Groups at the four time points(0,4,8 and 12) across the 12 hour time period is not significant (Figure 1), p value 0.702.

There is a significant reduction in VAS over the 12 hour period in both the treatment Groups (Table 2), p value less than 0.5.

Figure 1

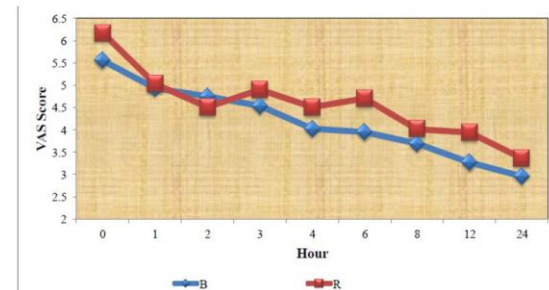


Table 2 :-VAS over the time periods 0 to 12 hour

Score	Time	Mean	Std. Error	F statistic	p-value
VAS	0 hour	5.867	0.072	136.181	< 0.001
	4 hour	4.283	0.097		
	8 hour	3.967	0.097		
	12 hour	3.617	0.094		

DISCUSSION

The present study shows that intra-peritoneal instillation of local anaesthetic as mentioned in previous studies, is beneficial as a method for post operative analgesia. Both bupivacaine 0.25% and ropivacaine 0.20% are equally effective in a volume of 20ml for post operative pain relief. We used the low doses of ropivacaine (0.20%) in accordance with the study of Labaille et al^[5] in which they concluded that low doses of ropivacaine was equally effective in

reducing the post op pain after laparoscopic cholecystectomy when compared to higher doses.

In the present study we found out that the difference in the VAS scores of the two treatment Groups at the four time points across the 12 hour time period is not significant (p value -0.702).

Almost all the studies available in literature compared either one of the commonly used local anaesthetic with a placebo like normal saline or the different concentrations of same local anaesthetic with each other. Some authors even tried to change the timing of intraperitoneal local anaesthetics like before the dissection of gall bladder bed or after the procedure. We used the intraperitoneal instillation of local anaesthetics at the end of the procedure in the trendelenburg position with the trocars intact. No local anaesthetics were instilled into the surgical wound created. Similar results with ropivacaine and placebo were obtained by Pasqualucci A et al,^[6] where they compared the effect of intraperitoneal ropivacaine (150 mg) in patients undergoing a laparoscopic cholecystectomy. They found that for preventing postoperative pain 150 mg ropivacaine instilled intraperitoneally was useful.

Using 20 ml of 0.5% bupivacaine, Pasqualucci et al noted a decrease in pain and consumption of analgesics probably due to a complete block of afferents using higher concentrations and volumes than used by other authors. They found out beneficial pain relief upto 24 hours post op. In the present study we used 20ml of 0.25% bupivacaine and we observed significant pain relief only upto 12 hours. This may be due to the fact that the concentration we chose was less when compared to Pasqualucci et al (0.25% Vs 0.5%) although the volume of local anaesthetic used by us was similar to their study. We instilled the local anaesthetic in the trendelenburg

position at the end of surgery which may have resulted in better dispersion of the drug and hence the beneficial effect upto 12 hour post op. Also instillation of local anaesthetics in the supine position prevented its flow over the coeliac plexus and phrenic nerve endings which can be an important pathway for post op pain relief.^[7]

In our study we found out that using ropivacaine also has beneficial effect in post op analgesia when compared to bupivacaine. We used a dose lesser than that used by Gupta et al^[8] and the duration we could get was also longer. This was surprising but can be attributed to the intermittent injections of 0.5% ropivacaine, as compared to the intraperitoneal instillation of 20 ml of 0.20% at a time used in our study.

The lower dose used for both the local anaesthetic agents proved better for post op analgesia when compared to previous studies, without any risk of systemic toxicity.

Only two cases complained of shoulder tip pain in our study, which was statistically insignificant. The adverse effects noted by us were nausea and vomiting, which were also similar in both the study groups. Similar adverse effects of nausea and vomiting were found in almost all the studies on post op pain relief in laparoscopic cholecystectomy.

This present study confirms earlier evidence that, in patients with gallbladder diseases undergoing Laparoscopic cholecystectomy, intra peritoneal local anaesthetic infusion is more effective when applied at the end of an operation than at the start.^[9]

Although the mean VAS score was less in bupivacaine groups in the present study, it was not statistically significant. It may be due to the fact that bupivacaine is slightly greater in potency when compared to ropivacaine. It can also be due to the fact that the number of cases we studied was less

and may be a larger study will show a statistical significance.

Both the drugs were equally effective in providing pain relief upto 12 hour post op. The adverse effects as well as duration of hospital stay were similar in both the groups. Shoulder tip pain was statistically insignificant in both the study groups. No cases in the present study had any signs or symptoms of local anaesthetic toxicity in any manner.

Since none of the available studies compared two different local anaesthetics at almost similar concentration in a similar volume (20 ml) our study stands unique. We noted that both bupivacaine 0.25% and ropivacaine 0.20% were equally effective for intraperitoneal instillation at the end of laparoscopic cholecystectomy for post op pain relief upto 12 hours. The study agrees with the previous studies of intraperitoneal local anaesthetic instillations with regard to post op pain relief.

Both the drugs are equally effective for post operative pain relief, without any adverse effects. Ropivacaine 0.20% is an equally effective alternative for Bupivacaine 0.25% with the added advantage of cardiovascular safety.

CONCLUSION

Intraperitoneal instillation of ropivacaine or bupivacaine is an effective method of post op pain relief in laparoscopic cholecystectomy. Both these drugs significantly reduced the post op pain. We conclude that intraperitoneal instillation of local anaesthetic is an easy, cheap, and non-invasive method which provides good analgesia in the immediate postoperative period after laparoscopic cholecystectomy. Ropivacaine in view of better cardiovascular safety profile can be an effective alternative for Bupivacaine, with similar post operative pain relief.

REFERENCES

1. Alexander JJ. Pain after laparoscopy. *Br J Anaesth* 1997; 79:369-78.
2. Boddy AP, Mehta S, Rhodes M. The effect of intraperitoneal local anesthesia in laparoscopic cholecystectomy: a systematic review and meta-analysis. *Anesth Analg* 2006;103:682-8.
3. Joris J, Thiry E, Paris P, Weerts J, Lamy M. Pain after laparoscopic cholecystectomy: characteristics and effect of intraperitoneal bupivacaine. *Anesth Analg* 1995;81:379-84.
4. Moller R & Covino B. Cardiac electrophysiological properties of bupivacaine and lidocaine, compared with those of ropivacaine, a new amide local anaesthetic. *Anesthesiology* 1990;72: 322-329
5. 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.
6. Pasqualucci A, De Angelis V, Contardo R, et al. Preemptive analgesia: intraperitoneal local anesthetic in laparoscopic cholecystectomy. *Anesthesiology* 1996;85:11-20.
7. Narchi P, Benhamou D, Fernandez H. Intraperitoneal local anaesthetic for shoulder pain after day case laparoscopy. *Lancet* 1991;338:1569-70.
8. Gupta A, Thorn 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
9. Bhardwaj Neerja, Sharma Vikas,
Chari Pramila. Intraperitoneal

bupivacaine instillation for
postoperative pain relief after
laparoscopic cholecystectomy. Indian
J. Anaesth. 2002; 46 (1): 49-52.

How to cite this article: Babu R, Jain P, Sherif L. Intraperitoneal instillation: ropivacaine vs bupivacaine for post operative pain relief in laparoscopic cholecystectomy. Int J Health Sci Res. 2013;3(12):42-47.

International Journal of Health Sciences & Research (IJHSR)

Publish your work in this journal

The International Journal of Health Sciences & Research is a multidisciplinary indexed open access double-blind peer-reviewed international journal that publishes original research articles from all areas of health sciences and allied branches. This monthly journal is characterised by rapid publication of reviews, original research and case reports across all the fields of health sciences. The details of journal are available on its official website (www.ijhsr.org).

Submit your manuscript by email: editor.ijhsr@gmail.com OR editor.ijhsr@yahoo.com