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Intraperitoneal vs Intraincisional Bupivacaine for Post Operative Pain Relief in Laparoscopic Cholecystectomy

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ABSTRACT

Introduction: Laparoscopic cholecystectomy has become the standard technique for gall bladder surgeries[1]. Given the expanding role of ambulatory surgery, effective post operative pain relief has become a greater challenge for Anaesthesiologists. New insights into our knowledge of the origins of abdominal and shoulder pain after laparoscopic procedures lead to the increasing use of intra peritoneal and port site instillation of local anesthetic for pain relief[2].
Methods: Patients fulfilling the inclusion criteria, followed a prospective randomized double blinded study in 100 patients, divided into 2 groups of 50 each; by Anaesthetist I: Group A- Bupivacaine (0.25%) 20ml intra-incisional. Group B- Bupivacaine (0.25%) 20ml intraperitoneal. After a thorough pre-anesthetic evaluation and obtaining an informed consent, the patient was made familiar with the 10-point visual analogue scale (VAS) and visual rating scale (VRS). All patients were asked to keep NPO as per guidelines. Premedicated with Tab Alprazolam 0.5mg and Tab Pantoprazole 40 mg orally the previous night of the surgery. After connecting monitors (ASA standard), an 18G peripheral cannula was secured and Lactated Ringer's solution initiated. Standard General Anesthesia with intubation and positive pressure ventilation was administered. After completion of surgery Bupivacaine was injected at: Group A: Intra-incisional (fascia, muscle and preperitoneal space); 5ml for each port (infiltration of four trocar sites, total- 20ml). Group B: Intraperitoneal, 10ml in hepato-diaphragmatic space, 5ml in gall bladder bed, 5ml into space between liver and kidney, in Trendelenburg position of 20 degree to facilitate dispersion of drug solution in sub hepatic region. All the operations were performed by the same team of laparoscopic surgeons. Patients were reversed adequately and extubated at the end of the procedure. Post operatively, pain using VAS & VRS was assessed by anesthetist II- blinded to the study groups; at first hour of surgery, hourly till four hours, 6, 8, 12 and 24 hours after the surgery. Shoulder tip pain, nausea, vomiting, need for rescue analgesia, any voiding problems, respiratory difficulties if any, was documented. Rescue analgesia was administered to a goal of VAS score ≤ 4.
Results: There was a statistically significant reduction in VAS and VRS scores at all time frames postoperatively in Group B (p value - ≤0.001), as compared to Group A. A reduction in heart rate was noted at all time frames in Group B, of which heart rate from 0 till 8 hours postoperatively was statistically significant (p value ≤0.001). There was also a statistically significant reduction in systolic blood pressure across all time frames in Group B which received intraperitoneal Bupivacaine instillation. Diastolic blood pressure showed no statistical

significance between the two groups. We also noted a statistically significant reduction in shoulder tip pain in Group B which received intraperitoneal Bupivacaine. The requirement for post operative pain relief rescue analgesia Inj. Diclofenac 75mg IV, was significantly higher in the patients who received intra-incisional local anaesthetic.

Conclusion: We conclude that intraperitoneal Bupivacaine 0.25% (20mls) instilled into the peritoneal cavity at the end of procedure, with the patient in Trendelenburg position is an effective way to alleviate post operative pain in laparoscopic cholecystectomy procedures up to 24 hours. It reduces shoulder tip pain, with a considerable reduction in rescue analgesic requirement as well. Effective analgesia also reduced post operative duration of hospital stay, having no adverse effect like nausea and vomiting, local anesthetic toxicity.

Keywords: Intraperitoneal, Local anaesthesia, pain relief, Bupivacaine, shoulder tip pain

INTRODUCTION

Laparoscopic cholecystectomy has become the standard technique for gall bladder surgeries[1]. The most important benefits of such procedures are less discomfort, shorter hospitalisation and earlier return to normal activity[3].

These surgeries have less post operative pain and smooth recovery than conventional open cholecystectomies[4]. Laparotomy results mainly in parietal pain (abdominal wall), whereas patients complain more of visceral pain after operative laparoscopy[4,5]. Shoulder pain secondary to diaphragmatic irritation as a result of carbon dioxide pneumoperitoneum is a frequent post operative observation after laparoscopic cholecystectomy[6].

Abdominal pain following laparoscopic cholecystectomy can occur due to stretching of parietal peritoneum or diaphragmatic irritation from insufflations of gas (carbon dioxide) intraperitoneally, release of inflammatory mediators of pain and irritation produced by blood[7].

Postoperative abdominal pain usually occurs during the first 24 hours, while shoulder pain most commonly appears the second day after laparoscopic cholecystectomy[2].

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 peri-operative bleeding[8]. 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[9].

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 an aesthetic solution intraperitoneally by different authors with varying results[9-15].

The improved understanding of origin of abdominal and shoulder pain after laparoscopic procedures lead to the use of intra peritoneal and port site instillation of local anesthetic to reduce post operative pain[9].

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[10].

Intraperitoneal and port site instillation of local anesthetic in combination with general anaesthesia has been investigated in several interventional studies during laparoscopic cholecystectomy[12-15].

Many trials have been carried out using intraperitoneal or incisional local anaesthetic infiltration, but the results relating to pain reduction and parenteral analgesic consumption are conflicting[3].

We compared two different methods of pain relief intraperitoneal instillation vs intraincisional injection of local anaesthetic

in different patients, to reduce local anaesthetic toxicity. In the present study, we aim to compare between the analgesic effectiveness of intraincisional injection vs intraperitoneal infiltration of bupivacaine for the management of early post-operative pain following laparoscopic cholecystectomy.

1. The aim of the study is to compare the analgesic effect of intraincisional injection vs intraperitoneal instillation of bupivacaine for laparoscopic cholecystectomy.
2. The primary objective of the study is to evaluate and compare the post operative pain relief in laparoscopic cholecystectomy patients, using intraincisional injection of bupivacaine vs intraperitoneal instillation of Bupivacaine
3. The secondary objectives are:

a) To compare the incidence of shoulder-tip pain among the study groups.
b) To compare the duration of hospital, stay in both the study groups.
c) To compare the side effects among the study groups

MATERIALS & METHODS

The Institutional ethics committee approval and written informed consent from patients was obtained.

STUDY SITE: Narayana Health Multi speciality Hospital, Bommasandra, Bangalore.

STUDY POPULATION: Study sample of 100 cases belonging to American society of Anaesthesiologists (ASA) physical status I and II, of either sex, aged between 18-60 years, undergoing elective laparoscopic cholecystectomy under general anaesthesia was studied.

STUDY DESIGN: Prospective randomized double blinded study.

Anaesthetist I: - Randomized using "lottery pick method", patients were allotted to either of the study groups.

Anaesthetist II: - Blinded to study groups, carried out the study.

Sample Size

The Visual analogue score mean difference between the intra incisional and intraperitoneal drug used by Bupivacaine is 1.0^2, effect size is 0.63^2, standard deviation is $1.0^2$and 2.18^2 respectively, 95% confidence interval assuming 80% power, allocation ratio is 1:1, the minimum required sample size is 45 in each group. (The final sample size considered is 50 + 50 = 100 sample size). The following formula has been used for estimated the sample size

Assumptions

- The outcome variable is continuous.
- The sampling distribution of the sample mean is approximately normal.
- The observations are independent.
- The variances in the two groups are similar

Formula

$$n = \frac{2S_p^2 \left[Z_{1-\alpha/2} + Z_{1-\beta/2}\right]^2}{\mu_d^2}$$

$$S_p^2 = \frac{S_1^2 + S_2^2}{2}$$

Where,

S_1^2 : Standard deviation in the first group

S_2^2 : Standard deviation in the second group

μ_d^2 : Mean difference between the samples

α: Significance level

1-β: Power

Inclusion Criteria:

1. Age 18-60 years
2. Patient belonging to either sex
3. Elective cases
4. ASA I or II physical status
5. Patients consenting for the study.

Exclusion Criteria:

1. Age of ≤18 years and ≥60years,
2. Poor general condition
3. Emergency surgery
4. Recent MI (≤ 6months prior to surgery)
5. ASA III or IV Physical status

6. Acute cholecystitis
7. Patients allergic to local anaesthetics or specifically to Bupivacaine.

METHODOLOGY

Patients fulfilling the inclusion and exclusion criteria were randomly allocated using "lottery pick method" to two groups, by Anaesthetist I: A group for those who are to receive Bupivacaine (0.25%) 20ml intra-incisional instillation, and B group for those who are to receive Bupivacaine (0.25%) 20ml intraperitoneally. Patients were explained about the procedure and a thorough pre-anaesthetic evaluation was done to include history of ischemic heart disease (last attack >6 months back), co morbid illnesses like diabetes, hypertension, prior surgical and anaesthetic experience if any were elicited. The drug therapy for ischemia and co morbid illness if any, were ascertained. The patient was made familiar with the 10-point visual analogue scale.

During general examination, patient's general condition was assessed; weight, height and BMI, pulse and BP was measured. A detailed assessment of Airway, Respiratory System, Cardiovascular system and spine was carried out.

All patients were asked to keep NPO for at least 6 hours before the surgery. All patients were premedicated with T. Alprazolam 0.5mg and T. Pantoprazole 40 mg orally the previous night of the surgery.

After connecting the routine ASA standard monitoring (ECG, NIBP and pulse oximeter), an 18G peripheral cannula was secured and Lactated Ringer's solution for maintenance dose was initiated.

Patients were pre oxygenated and general anaesthesia given with 2mg/kg Propofol, 2µg/kg Fentanyl and 0.1mg/kg Vecuronium in both the study groups. Patients were intubated and anaesthesia maintained with Isoflurane, oxygen and air to maintain an FiO_2 of 0.5. Injection Fentanyl 50µg bolus was used for intraoperative analgesia per hour and 0.2mg/kg of Vecuronium to maintain paralysis in both the groups.

After completion of surgery the local anaesthetic solution was injected at the incision site/extra peritoneally; that is the fascia, muscle and preperitoneal space; 5ml for each port (infiltration of four trocar sites, thus using a total of 20ml) for patients belonging to group A and was sprayed intraperitoneally for those belonging to group B, as follows: 10ml of solution into the hepato-diaphragmatic space, 5ml in the area of the gall bladder, and 5ml into the space between liver and kidney; volume and dilution of the two drugs will be same in both groups. The drug was injected intra-peritoneally before the removal of trocar at the end of the surgery, in Trendelenburg position of 20 degree to facilitate dispersion of drug solution in sub hepatic region.

No abdominal drainage was inserted to any patient in the study.

All the operations were performed by one team of surgeons, experienced in laparoscopic surgery.

Patients were reversed from anaesthesia adequately by using Neostigmine (0.05mg/kg) and Glycopyrrolate (0.02mg/kg), at the end of surgery and extubated on recovery.

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

In the post operative room using the Visual analogue scale (VAS), Verbal rating Scale (VRS), 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 hours after the surgery. The time of arrival in the post operative recovery room was defined as zero-hour post operatively.

A detailed assessment of post operative problems like pain-location of pain, pain at rest, pain on deep inspiration and during coughing was made. The heart rate, blood pressure and respiratory rate was also be assessed at the above times. Nausea, vomiting, need of any rescue analgesics for pain, any voiding problems, respiratory difficulties if any, was documented in the proforma.

Injection Diclofenac 75mg IV was given as the rescue analgesia when the VAS score was ≥5.

STATISTICAL ANALYSIS

The Statistical analysis was performed by STATA11.1 (College Station TY USA). After completion of data collection, the data will be recorded into the master chart, histogram will be drawn to check the normality, student's t-test or Mann Whitney test will be used for assess the significance difference between the treatment groups with height, weight, duration of surgery, BMI, blood pressure, pulse rate, Hb, RBS, blood urea, serum creatinine, Spo2, Visual analogue score and VRS Score. Chi square or fisher exact test will be used for to measure the association between the treatment groups with gender, adverse event, Students paired t-test or Wilcoxon sign rank test will be used for the before and after treatment comparisons of Blood pressure, Respiratory rate, heart rate, Spo2, VAS score, VRS score, at baseline compared with 1 hour, 2hours, 3hours, 4 hours, 6hours, 8 hours, 12 and 24 hours. Continuous variables will be expressed as mean and standard deviation, categorical variables will be expressed as frequency and percentage, P<0.05 Considered as statistically significant.

RESULT

1). Changes in Heart Rate in study group across 24h period.

	Group A	**Group B**	**P-Value**
	Mean ± SD	**Mean ± SD**	
0	91.78 ± 13.31	75.04 ± 6.22	<0.001
1	92.54 ± 8.28	73.16 ± 6.04	<0.001
2	91.58 ± 7.73	74.52 ± 5.14	<0.001
3	89.54 ± 4.85	74.52 ± 5.91	<0.001
4	90.26 ± 6.39	75.22 ± 4.33	<0.001
6	86.72 ± 7.07	70.98 ± 9.94	<0.001
8	79.78 ± 6.73	68.22 ± 4.52	<0.001
12	67.66 ± 6.08	65.70 ± 4.79	0.077
24	65.58 ± 5.79	62.3 ± 9.02	0.033

There is a statistical significantt reduction in the heart rate in Group group B as compared to Group A from the first hour till 8 hours post operatively.

At 12h post operatively, there was no statistically significant reduction in heart rate in both the groups.

Also, we noted a statistically significant reduction in heart rate in Group B at 24h post operatively.

The mean heart rate in both groups were calculated for the entire study period across all time points.

2) Changes in Systolic Blood Pressure in study group across in 24 hours period

	Group A	**Group B**	**P-Value**
	Mean ± SD	**Mean ± SD**	
Baseline	117.56 ± 16.59	111.28 ± 15.22	0.051
0	136.24 ± 9.76	121.80 ± 9.82	<0.001
1	132.96 ± 10.93	121.04 ± 8.53	<0.001
2	130.0 ± 9.25	119.52 ± 8.32	<0.001
3	127.28 ± 9.41	117.20 ± 8.08	<0.001
4	125.0 ± 8.45	115.76 ± 8.48	<0.001
6	121.40 ± 8.54	113.76 ± 8.73	<0.001
8	118.68 ± 8.77	111.36 ± 9.13	<0.001
12	117.12 ± 10.72	109.20 ± 9.16	<0.001
24	115.76 ± 9.55	106.72 ± 9.60	<0.001

We obtained a statistically significant change in systolic blood pressure at all time frames from 0 hours postoperatively till 24 hours.

3). Changes in Diastolic Blood Pressure in study groups across 24h period

	Group A	**Group B**	**P-Value**
	Mean ± SD	**Mean ± SD**	
Baseline	68.08 ± 9.94	68.84 ± 9.49	0.697

0	85.4 ± 10.08	84.34 ± 10.02	0.599
1	84.32 ± 10.39	82.60 ± 10.09	0.403
2	81.92 ± 8.19	81.02 ± 10.32	0.646
3	80.16 ± 8.54	78.94 ± 8.88	0.486
4	77.2 ± 7.81	75.22 ± 8.41	0.226
6	76.22 ± 7.24	72.18 ± 8.44	0.057
8	73.54 ± 8.06	71.88 ± 7.50	0.289
12	72.16 ± 7.84	74.16 ± 8.90	0.236
24	70.0 ± 7.73	69.94 ± 7.24	0..968

No statistical significant change was noted in the diastolic blood pressure across 24 hours postoperatively.

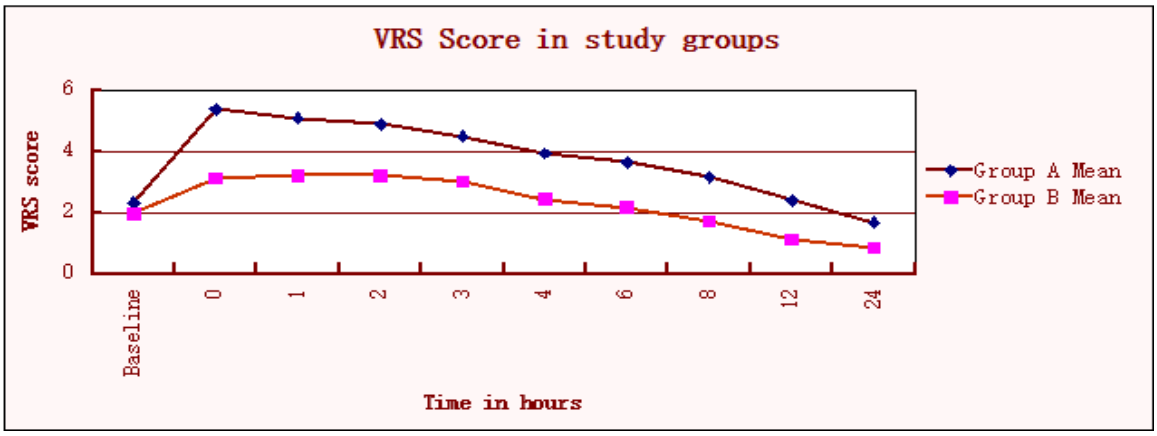
4). VAS Score in study group across 24h period:

	Group A	**Group B**	**P-Value**
	Mean ± SD	**Mean ± SD**	
Baseline	2.32 ± 1.11	1.96 ± 0.64	0.050
0	4.98 ± 1.46	3.12 ± 1.79	<0.001
1	4.36 ± 1.26	2.82 ± 1.62	<0.001
2	4.28 ± 1.11	2.72 ± 1.29	<0.001
3	3.90 ± 1.04	2.38± 1.01	<0.001
4	3.46 ± 1.05	1.94 ± 0.99	<0.001
6	3.12 ± 0.98	1.68 ± 0.79	<0.001
8	2.52 ± 1.11	1.26 ± 0.90	<0.001
12	1.78 ± 0.86	0.78 ± 0.76	<0.001
24	1.24 ± 0.94	0.50 ± 0.65	<0.001

We noted a statistically significant change in the VAS score across all time frames of 24 hours; suggesting better pain relief in group B as compared to group A

5). VRS Score in study groups across 24h period:

	Group A	**Group B**	**P-Value**
	Mean ± SD	**Mean ± SD**	
Baseline	2.32 ± 1.11	1.96 ± 0.64	0.050
0	5.36 ± 1.53	3.12 ± 2.21	<0.001
1	5.08 ± 1.29	3.20 ± 1.81	<0.001
2	4.88 ± 1.08	3.20 ± 1.51	<0.001
3	4.48 ± 1.18	3.00 ± 1.29	<0.001
4	3.92 ± 1.21	2.44 ± 1.09	<0.001
6	3.64 ± 1.26	2.16 ± 0.89	<0.001
8	3.16 ± 1.22	1.72 ± 1.07	<0.001
12	2.40 ± 0.99	1.12 ± 1.02	<0.001
24	1.68 ± 1.02	0.84 ± 0.99	<0.001



Similar to the VAS score, we also noted a statistically significant change in the VRS score across all time frames over 24 hours; suggesting that group B gives better pain relief in comparison to group A.

6). Presence of shoulder tip pain:

	Group A	**Group B**	**Total**	**P-Value**
Yes	28 (56%)	4 (8%)	32 (32%)	<0.001
No	22 (44%)	46 (92%)	68 (68%)	
Total	50	50	100	

There is a statistically significant change in the presence of shoulder tip pain among the study groups, showing that group B has statistically significant reduction in shoulder tip pain as compared to group A.

8). Duration of hospital stay:

	Group A	Group B	Total
D1	2	8	10
D2	20	33	53
D3	27	9	36
D4	1	0	1
Total	50	50	100

Among the 50 patients studied in group A, 27 patients were discharged on day 3 post surgery, 20 patients were discharged on day 2 post surgery, 2 patients were discharged day 1 post surgery and only 1 patient was discharged on day1 of the surgery.

Among the 50 patients studied in group B, 33 patients were discharged on day 2, 9 patients on day 3 and the remaining 8 patients on day 1 of the surgery.

There was no incidence of post operative nausea and vomiting or any adverse event in any of the 50 patients studied.

DISCUSSION

In this study we compared the post operative pain relief in laparoscopic cholecystectomy cases using Bupivacaine 0.25% as the local anaesthetic using two different methods of analgesic administration: intraincisional and intraperitoneal. A total of 100 cases were studied. Intraincisonal and intraperitoneal instillation of local anaesthetic was given at the end of the procedure in the supine position and 20° Trendelenburg position, respectively. We observed VAS, VRS, vital parameters, shoulder pain, nausea and vomiting or any adverse event in post operative ward. Postoperative pain is multi factorial in origin, and therefore, multimodal therapy may be needed to optimize pain relief.

Many researchers have suggested the combination of somatovisceral local anaesthetic treatment reduces incisional, intra-abdominal and shoulder pain in laparoscopic cholecystectomy[16]. Improved postoperative pain management using opioid sparing regimens may facilitate a high success rate of outpatient laparoscopic cholecystectomy, thus avoiding the side effects of opioids like post operative nausea and vomiting, sedation, impairment of return of gastrointestinal motility and pruritis. The accurate assessment of pain is difficult because of its individual threshold, subjectivity, and difficulty in measurement.

A significant number of trials have examined the intraperitoneal administration of local anaesthetics in laparoscopic cholecystectomies as regards to post operative pain and narcotic analgesia consumption, with promising results[17]. However, other studies indicate that the post operative analgesia and narcotic usage was not significantly different in the groups that received local anaesthesia[18]. We observed a statistically significant difference in the vital parameters, which include heart rate, respiratory rate and systolic blood pressure between the two groups; favouring the use of intraperitoneal instillation of local anaesthetic for laparoscopic cholecystectomy as a better treatment modality than intraincisional administration of local anaesthetic; for post operative pain relief. The VAS and VRS score was statistically significant, with a p value <0.001, at all time frames recorded from arrival to postoperative ward till 24 hours post operatively; suggesting that intraperitoneal instillation has lower VAS and VRS score postoperatively.

In our study we used Bupivacaine (20 ml of 0.25%), the most commonly used local anaesthetic for prolonged post operative pain relief in both the groups. We used a lower concentration of 0.25% in accordance with the study of Chundigar et al[20]; in which they concluded that dose of 0.25% bupivacaine was effective in reducing post operative pain after laparoscopic cholecystectomy.

We used 20 ml as the volume in both study groups with reference to the previous successfully conducted studies by Neerja et al.[19]. With maximal increased dose a concentration of more than 4µg/ml has been

reported, (considered as a level of potential toxicity)[21].

Most studies done on intraperitoneal instillation of local anaesthetic have not specified the correct position of the patient while administering the local anaesthetic and some studies have given the drug in supine position. Since laparoscopic cholecystectomy surgeries are done in reverse Trendelenburg position for easy visualization of the structures, there is a tendency to administer the drug when in such a position. These methods will not ensure proper drug administration at the required surgical site; having a greater possibility of the drug to trickle down the paracolic gutter and thus insufficient time to act at the sub diaphragmatic, sub hepatic and gall bladder bed. We ensured proper positioning of all the patients to 20° Trendelenburg in our study, during and after the local anaesthetic instillation intraperitoneally to give adequate time to act on the coeliac plexus, phrenic nerves and the visceral peritoneum, which is the proposed mechanism of action of intraperitoneal use of bupivacaine.

Studies performed of laparoscopic cholecystectomy patients showed that postoperative abdominal pain usually occurs during the first 24 hours, while shoulder pain most commonly appears the second day after laparoscopic cholecystectomy[22]. Concurrent to this observation, in our study too we noted that the VAS score and VRS score, also the vital parameters reached baseline levels of reduced pain after 8 hours of the surgery in both the study groups which may suggest that the maximum pain after laparoscopic cholecystectomy is felt in the first 8 hours post-surgery, which reduced thereafter.

Narchi et al.[21] found intraperitoneal instillation of local anaesthetic to be more effective in reducing pain up to 48 hours post operatively in patients undergoing diagnostic laparoscopy. Subsequent studies failed to demonstrate the beneficial effects of intraperitoneal instillation of local anaesthetics in patients undergoing laparoscopic cholecystectomy. Utilizing 20 ml of either 0.25% Bupivacaine or 0.5% lidocaine; Rademaker et al.[114] failed to demonstrate, any reduction in post operative pain. A possible explanation of the failed effect given by them was the small amount (20ml) of local anaesthetics used, as compared to Narchi et al.[21] who used 80 ml but with a smaller concentration of 0.125% Bupivacaine. Also instillation of local anaesthetics in the supine position prevented its flow over the coeliac plexus and phrenic nerve endings.

Using 20 ml of 0.5% bupivacaine, Pasqulucci et al.[10] 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 up to 24 hours post op. similar results were noted in our study, although we used a lower concentration of Bupivacaine 0.25%, using the same volume of drugs in both the study groups. Hence from our study, as compared to the other studies who used a much higher concentration of local anaesthetic; we can also deduce that a lower concentration of drug 0.25% does provide adequate analgesia for at least 24hours.

Chundrigar et al.[20] noted pain relief only up to 2 hours post operatively with the intraperitoneal administration of 0.25% bupivacaine, although in the present study we could note pain relief up to at least 24 hours post operatively. This may be because 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 effects up to 24 hour post operatively. Also, any local anaesthetic instilled in the supine position prevents its flow over the coeliac plexus and phrenic nerve endings which can be an important pathway for post operative pain relief.

Inan et al [90] in 2004 conducted a study on 142 patients; 46 patients received 0.5% Bupivacaine at the end of the study, concluding that local anaesthetic given at the end of the study at the port site, reduces post operative analgesic requirement and pain intensity. Possibly a higher concentration of

the local anaesthetic is required to provide adequate pain relief.

The highest mean VAS score noted over the 24-hour time frames monitored was 4.98 + 1.46, which was recorded in the first hour post-surgery. Subsequent reduction in pain scores was seen and at 8 hours post operatively the pain felt was mild, with a mean of 2.52 + 1.11. But again, when compared to intraperitoneal instillation the mean VAS score observed at 0 hours and 8 hours post operatively was 1.96 ± 0.64 and 1.26 ± 0.90 respectively; with a statistical significance of p value <0.001. In the present study we noted a difference in the study groups with respect to the rescue analgesic consumption post operatively over 24 hours; the requirement of analgesia was more in the intraincisional group; favouring the use of intraperitoneal instillation of local anaesthetic which gives better pain relief in the post operative ward after laparoscopic cholecystectomy.

We also noted a statistically significant reduction in shoulder tip pain in the intraperitoneal group as also noted by Cunniffe et al.[6] which supports the use of intraperitoneal local anaesthetic for reduction of shoulder tip pain.

No adverse events like nausea or vomiting were noted in any of the patients included in this study. This present study confirms earlier evidence that, in patients with gall bladder diseases undergoing Laparoscopic cholecystectomy, intra peritoneal local anaesthetic instillation is more effective when applied at the end of an operation. 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 intraperitoneal instillation and intraincisional injection of bupivacaine using the same concentration and volume in both the study groups, our study stands unique.

CONCLUSION

We conclude that intraperitoneal Bupivacaine 0.25% instilled into the peritoneal cavity in a volume of 20 ml at the end of procedure, with the patient in a Trendelenburg position is an effective way to alleviate post operative pain in laparoscopic cholecystectomy procedures.

Intraperitoneal instillation of Bupivacaine is effective to alleviate pain up to 24 hours post operatively and also reduce shoulder tip pain, with a considerable reduction in rescue analgesic requirement. Effective analgesia also reduced post operative duration of hospital stay, having no adverse effect like nausea and vomiting, local anaesthetic toxicity.

Intraperitoneal local anaesthetics form a cheap, relatively simple and an adequate means of post-operative analgesia for laparoscopic cholecystectomy. Lower doses of Bupivacaine can be equally effective for pain relief up to 24-hour post operatively. It can sufficiently reduce the analgesic consumption in the immediate post operative period.

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