ORIGINAL RESEARCH PAPER
Volume - 12 | Issue - 03 | March - 2023 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

A COMPARATIVE STUDY OF PORT SITE INFILTRATION OF ROPIVACAINE VERSUS CONVENTIONAL ANALGESICS IN CONTROLLING POSTOPERATIVE PAIN FOLLOWING LAPAROSCOPIC SURGERIES

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ABSTRACT

Background: Laparoscopic surgeries are not totally pain free and are associated with early postoperative pain. Although the intensity is lesser than that of open surgery, few patients have pain till postoperative day 3(up to 72 hours) which can ultimately lead to longer hospital stay, need for rescue analgesics and other associated complications which nullifies the main advantages of laparoscopic surgery. **Methods:** A prospective randomised clinical trial was done of 100 patients undergoing laparoscopic surgeries between February 2021 and December 2022 at our hospital. Test group of 50 patients received 0.2 % ropivacaine around port sites and other 50 in the control group received diclofenac injections thrice a day. Pain was assessed using Visual Analogue Scale. **Results:** Majority of patients were female(65%), more belonged to the 26-35 years age group(39%) and most common surgery performed was laparoscopic cholecystectomy(47%). VAS score at 1hr, 6hrs and 24hrs after surgery was significantly lower in test group when compared to control group(p value <0.005) **Conclusion:** Ropivacaine instillation around port sites was found to be effective in reducing post-operative pain significantly when compared to the control group at 1hr, 6hrs and 24hrs after the surgery.

KEYWORDS

laparoscopic surgeries, ropivacaine, local anaesthesia, analgesics, pain

INTRODUCTION

In comparison with open surgery, laparoscopic surgery has the advantage of lesser pain but it is not totally pain-free in the early post-operative period. Post-operative pain can have varied nature, duration and severity and is one of the main factors for increased length of hospital stay, increased healthcare expenditure which nullifies the advantages of laparoscopic surgery.

The cause for this postoperative pain in laparoscopic surgery is due to various factors such as abdominal wall damage, visceral trauma, inflammation and peritoneal irritation due to capno-peritoneum. The duration of this pain is usually short and lasts up to 12hours (but may extend up to 3 days). If this pain is managed efficiently, length of hospital stay can be reduced and recovery can be sped up.

Conventional analgesics include NSAIDs [1] and narcotics which offer effective pain control but have adverse effects such as respiratory depression, drowsiness, sedation, postoperative nausea and vomiting, ileus and constipation which can in turn lead to delayed discharge from hospital. Joint commission on Accreditation of Health Organizations has suggested excessive use of opioids and NSAIDs in the postoperative period leads to reduced patient satisfaction.

Local anaesthetic injections are increasingly being used intra operatively for pain control. Port site infiltration of local anaesthesia is an effective method with minimal adverse effects. [2] Our study aims to compare postoperative pain following laparoscopic surgeries in patients receiving conventional analgesics and those receiving port site infiltration of Ropivacaine.

Aim Of The Study

To study the analgesic effect of port site infiltration of Ropivacaine and compare it with efficacy of conventional analgesics in laparoscopic surgeries.

METHODOLOGY

The study was initiated only after obtaining permission from the Institutional Ethics Committee, J. J. M. Medical College, Davangere.

Randomised prospective clinical study between February 2021 and December 2022.

100 patients randomised consecutively to study group and control group after fulfilling the inclusion criteria.

Inclusion Criteria

1. Uncomplicated symptomatic cholelithiasis.
2. Acute appendicitis.
3. Inguinal/Umbilical hernia repair.
4. Age >16 years and <65 years.
5. ASA I and II.

Exclusion Criteria

1. ASA III and more.
2. Allergy to NSAIDs or local anesthetics.
3. Age <16 years and > 65 years.
4. Pregnancy and lactation.
5. Previous extensive abdominal surgery.
6. Conversion to open surgery.
7. Inability to understand and use VAS scale.

Informed written consent for infiltration of Ropivacaine at the port site was obtained from all the patients in the study group. Test dose of Ropivacaine was given for all the patients in the study group prior to the Surgery

Group A: 1-50 patients were given 0.2% Ropivacaine at port site following Laparoscopic suregry. 6ml for 10mm ports and 4ml for each 5mm working port. No conventional analgesics were given to the patients in the study group.

Group B: 51-100 patients were given conventional analgesics (control) Diclofenac TID.

The post-operative pain was evaluated at 1, 6 and 24 hours using VAS visual analogue Scale. A visual analogue scale with a 10 cm vertical score ranged from “no pain” to “worst Possible pain” was used to assess post-operative pain when the patient awakens in Operating room (1 hour after surgery), then after 6 and 24 hours. The patients were asked to score the pain as either mild (1-3), Moderate (4-6) or Severe (7-10).

STATISTICAL ANALYSIS

All the data collected were entered in a Microsoft Excel worksheet and analysed using statistical software SPSS 20.0.

The Qualitative characteristics like Gender, Diagnosis, Procedure, VAS score status, rescue analgesia and side effects were expressed in frequency with proportions, and compared between the groups by Chi-square test.

The Continuous study variable age is expressed by Median with IQR (Interquartile range) and since data does not follow normality Mann-Whitney U-Test is applied for comparison between the groups.

RESULTS

Age distribution among both groups (A and B) was studied. It was noted that in either group, the majority of the subjects were in the age group of 26-35 years. There were 44% of subjects in 26-35 years in group A, while 34% of subjects in the same age group in Group B. so,

overall, 39% of the study subjects were of the age group of 26-35 years. (Table-1)

Table 1: Age distribution of study subjects among the groups

Age Group (Years)	Group A		Group B		Total
	n	%	n	%	% (n=100)
16-25	6	12	5	10	11
26-35	22	44	17	34	39
36-45	12	24	11	22	23
46-55	8	16	9	18	17
56-65	2	4	8	16	10
Total	50	100	50	100	100
Comparison					
Median (Q1-Q3)	35 (27.75-45.0)		39 (30-50.5)		Mann-Whitney U test = 1005.0 p-value=0.091

The majority of the study subjects were female (65%) followed by male (35%). There was no statistically significant difference in the gender associations with the group A and B (0.396. p>0.05) (Table-2)

Table 2: Gender distribution of study subjects among groups

Gender	Group A		Group B		Total	Chi-square test	p-value
	n	%	n	%	% (n=100)		
Female	34	68	31	62	65	0.396	0.529
Male	16	32	19	38	35		
Total	50	100	50	100	100		

The majority of the female study subjects, were in the age group of 26-35 years (47.7%) followed by 36-45 years (24.6%).

Among male study, subjects were in the age group of 26-35 years and 46-55 years (22.9%) followed by 36-45 years and 56-65 years (20%). (Fig. 1)

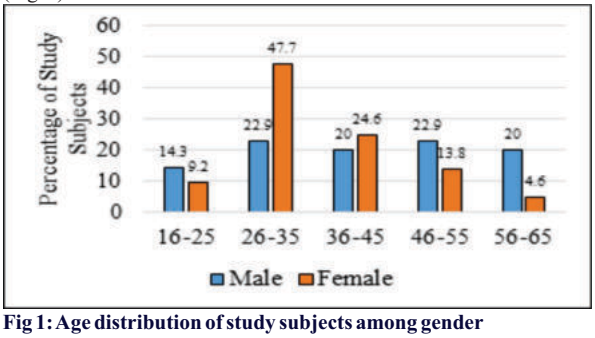

Fig 1: Age distribution of study subjects among gender

In group A and group B majority of the study subjects, 44% and 50% respectively were operated for cholelithiasis, followed by acute appendicitis, 40% and 26% respectively(Table-3).

The procedure undertaken among the majority of the study subjects 48% was laparoscopic cholecystectomy. When looked into group-wise, the most common procedure was laparoscopic cholecystectomy (44% group A and 52% group B).

Table 3: Diagnosis of study subjects among the groups

Diagnosis	Group A		Group B		Total
	n	%	n	%	% (n=100)
Acute Appendicitis	20	40	13	26	33
Cholelithiasis	22	44	25	50	47
Inguinal Hernia	2	4	5	10	7
Umbilical Hernia	6	12	7	14	13
Total	50	100	50	100	100

Visual Analogue score for pain was assessed 1-hour post-surgery (Table-4), showing that no patients in Group A suffered a severe degree of pain. The majority in group A had mild pain (52%) while the rest had moderate (48%) pain. While in group B, the majority had moderate pain (45%) followed by 44% with mild and 11 % had severe post-operative pain.

The difference in the pain scores between group A and Group B, when compared was found to be statistically significant (p=0.005) (Table-4).

Table 4: VAS after 1 hr of surgery of study subjects among the groups

VAS 1 Hour	Group A		Group B		Total	Yates Chi-square test	p-value
	n	%	n	%	% (n=100)		
Mild	26	52	18	36	44	10.293	0.0058
Moderate	24	48	21	42	45		
Severe	0	0	11	22	11		
Total	50	100	50	100	100		

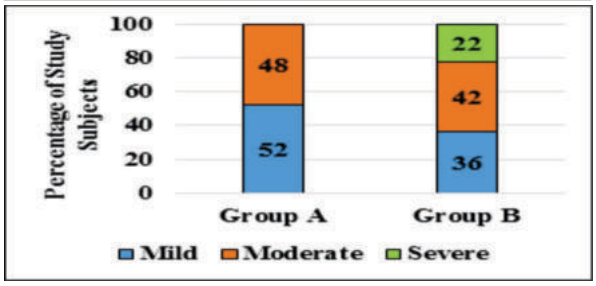

Fig 2: VAS after 1 hr of surgery of study subjects among the groups

Table 5: VAS after 6 hr of surgery of study subjects among the groups

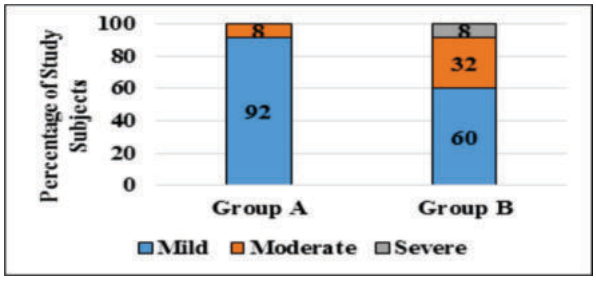

Fig 3: VAS after 6 hr of surgery of study subjects among the groups

Visual Analogue scores after 6 hours were done for group A and B. It was seen that, among Group A majority had only mild pain (92%) 6 hours post-surgery and only 8% had moderate pain and none had severe pain. While in group B, 60% had mild, 20% had moderate and still 4% had severe pain 6 hours post-surgery.

The difference in the VAS scores for group A and Group B was found to be statistically significant (p<0.05) (Table-5)

Table 6: VAS after 24 hr of surgery of study subjects among the groups

VAS 6 Hour	Group A		Group B		Total % (n=100)	Yates Chi-square test	P -value
	n	%	n	%			
Mild	46	92	30	60	76	11.261	0.0035
Moderate	4	8	16	32	20		
Severe	0	0	4	8	4		
Total	50	100	50	100	100		

Visual Analogue scores after 24 hours were done for group A and B. It was seen that, among Group A all patients (100%) had only mild pain 24 hours post-surgery. Among group B, 86% had mild, 13% had moderate and still 1% had severe pain 24 hours post-surgery. The difference in the VAS scores for group A and Group B after 24 hours of surgery, was found to be statistically significant (p<0.05) (Table-6)

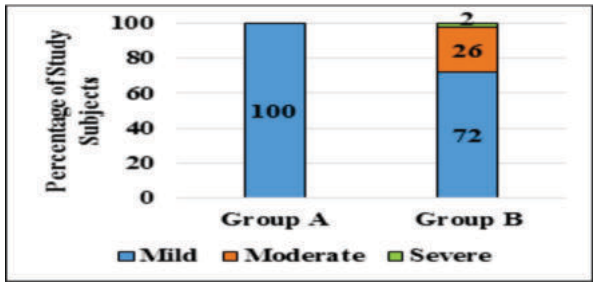

Fig 4: VAS after 24 hr of surgery of study subjects among the groups

DISCUSSION

Even though laparoscopic surgeries are associated with less surgical trauma and pain than open surgeries [3, 4], early postoperative pain is still a common complaint. Since laparoscopic procedures are now performed as day-care procedures, it is essential to provide adequate pain relief following surgery so that patients can be discharged the same day.

VAS 24 Hour	Group A		Group B		Total	Yates Chi-square test	p-value
	n	%	n	%	% (n=100)		
Mild	50	100	36	72	86	13.042	0.0014
Moderate	0	0	13	26	13		
Severe	0	0	1	2	1		
Total	50	100	50	100	100		

Following laparoscopy, a number of potential causes of pain have been proposed: ruptured blood vessels as a result of rapid peritoneal distension; traumatizing pressure on the nerves; release of inflammatory molecules; when the specimen is taken out of the abdomen; trauma to the abdominal wall pneumoperitoneum that is made with CO2; maintaining a high pressure in the abdomen; phrenic nerve irritation; and the use of cold CO2 [5].

Because pain is multifactorial [6], there is no consensus regarding effective postoperative pain relief for patients undergoing laparoscopic surgeries. In an effort to lessen postoperative pain following surgery, a number of studies have been conducted, but the outcomes have varied. The goal of pain management after surgery is early mobilization, recovery, and discharge. However, pain also contributes to the impairment of postoperative pulmonary function and plays a significant role in the metabolic and endocrine responses. Local anesthesia [33], intraperitoneal infiltration of local anesthesia [7], preoperative administration of anti-inflammatory drugs [8], using CO2 at body temperature, intrapleural morphine [9], and combined use of NSAIDs and opioids [10] have all been investigated for reducing postoperative pain.

According to our findings, infiltrating Ropivacaine through the Port site after surgery reduced pain intensity In this study, none of the patients who received ropivacaine reported any adverse effects like circumoral numbness, nystagmus, muscle fasciculations, or changes in the cardiovascular system This study confirms previous findings that a post-operative local anesthetic infiltration is more effective for patients undergoing laparoscopic surgery.

Similarly, Cantore and colleagues [11] in Italy demonstrated that preincision local infiltration with levobupivacaine reduces postoperative pain and the need for rescue analgesics following laparoscopic cholecystectomy.

Johnson et al. [12] have conducted two studies with intra-peritoneal and peri-portal injections of bupivacaine following surgery in consecutive studies. Their findings demonstrated that intraperitoneal bupivacaine administration is comparable to port site infiltration in terms of efficacy

CONCLUSIONS

Infiltration of local anaesthetic agents through laparoscopic port sites at the end of laparoscopic surgeries can effectively control the intensity of pain effectively in the early postoperative period.

They are recommended in for all laparoscopic surgeries without any limitations.

This study concludes infiltration of Ropivacaine through laparoscopic port sites at the end of the surgery during port withdrawal, can achieve effective analgesia.

Disclosures:

This research paper constitutes a portion of the dissertation submitted to the Rajiv Gandhi University of Health Sciences, Bangalore in partial fulfilment of requirements for post graduate degree of Master of Surgery in General Surgery(2023 February)

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