

# Comparison of efficacy of intraperitoneal instillation of levobupivacaine alone versus levobupivacaine with different doses of dexmedetomidine for postoperative analgesia in patients undergoing laparoscopic cholecystectomy

Dr. Bhavana Jalubula<sup>1</sup>, Dr. Sunil Kumar Arya<sup>2</sup>, Dr. Mahtab Alam Ansari<sup>3\*</sup>, Dr. Suresh Singh<sup>4</sup>, Dr. Shahbaz Ahmad<sup>5</sup>, Dr. Santosh Kumar Sharma<sup>6</sup>, Dr. Narendra Deo<sup>7</sup>, Dr. Subeesh C<sup>8</sup>, Dr. Neha<sup>9</sup>, Dr. Ajay Kumar Maurya<sup>10</sup>

1. Junior Resident, Department of Anaesthesiology and Critical Care Medicine, Baba Raghav Das Medical College, Gorakhpur, Uttar Pradesh- 273013, India
2. Professor and Head of Department, Department of Anaesthesiology and Critical Care Medicine, Baba Raghav Das Medical College, Gorakhpur, Uttar Pradesh- 273013, India
3. Assistant Professor, Department of Anaesthesiology and Critical Care Medicine, Baba Raghav Das Medical College, Gorakhpur, Uttar Pradesh-273013, India
4. Professor, Department of Anaesthesiology and Critical Care Medicine, Baba Raghav Das Medical College, Gorakhpur, Uttar Pradesh- 273013, India
5. Professor, Department of Anaesthesiology and Critical Care Medicine, Baba Raghav Das Medical College, Gorakhpur, Uttar Pradesh-273013, India
6. Associate Professor, Department of Anaesthesiology and Critical Care Medicine, Baba Raghav Das Medical College, Gorakhpur, Uttar Pradesh-273013, India
7. Associate Professor, Department of Anaesthesiology and Critical Care Medicine, Baba Raghav Das Medical College, Gorakhpur, Uttar Pradesh-273013, India
8. Senior Resident, Department of Anaesthesiology and Critical Care Medicine, Baba Raghav Das Medical College, Gorakhpur, Uttar Pradesh-273013, India
9. Junior Resident, Department of Anaesthesiology and Critical Care Medicine, Baba Raghav Das Medical College, Gorakhpur, Uttar Pradesh-273013, India
10. Junior Resident, Department of Anaesthesiology and Critical Care Medicine, Baba Raghav Das Medical College, Gorakhpur, Uttar Pradesh-273013, India

**\*Corresponding author: Dr. Mahtab Alam Ansari**

Assistant Professor, Department of Anaesthesiology and Critical Care Medicine, Baba Raghav Das Medical College, Gorakhpur, Uttar Pradesh-273013, India  
Email Id: bhavs2807@gmail.com

## ABSTRACT

**BACKGROUND AND AIMS:** Laparoscopic surgeries, despite being minimally invasive, is not popular as a day care surgery because of the post operative pain and requirement of intravenous analgesic drugs. The aim of this study is to compare the efficacy of intraperitoneal instillation of levobupivacaine alone versus levobupivacaine with different doses of dexmedetomidine for post operative analgesia in patients undergoing laparoscopic cholecystectomy.

**Materials and Methods:** Prospective observational study. In the study, 100 patients, scheduled for elective laparoscopic cholecystectomy after getting informed and written consent were taken up and were randomised into 4 groups to receive either 50 ml of 0.25% levobupivacaine + 5ml normal saline [GROUP A], 50ml of 0.25% levobupivacaine + dexmedetomidine 0.5mcg/kg diluted in 5ml normal saline [GROUP B], 50ml of 0.25% levobupivacaine + dexmedetomidine 1mcg/kg diluted in 5ml normal saline [GROUP C], 50ml of 0.25% levobupivacaine + dexmedetomidine 1.5mcg/kg diluted in 5ml normal saline [GROUP D]. Study drug was instilled before the removal of the trocar at the end of the surgery. All the patients also received infiltration of 0.25% bupivacaine at the port sites. Post operative pain using NRS, time to first rescue analgesia and total analgesic requirement of the patients amongst all the four groups was observed and compared.

**RESULTS:** The mean NRS was found to be significantly lesser in Groups C & D as compared to Groups A & B. Inj. Fentanyl [1-2mcg/kg] was used as rescue analgesia for patients with NRS>4. Patients belonging to Group A received rescue analgesia earlier and higher as compared with Group B. Patients belonging to Group C & D did not require any rescue analgesia.

**CONCLUSION:** The addition of dexmedetomidine to levobupivacaine for intraperitoneal instillation was found to be more efficacious for post operative analgesia and 1mcg/kg of dexmedetomidine can be used as optimal adjuvant dose with levobupivacaine in patients undergoing laparoscopic cholecystectomy.

**KEYWORDS:** Dexmedetomidine, Intraperitoneal instillation, Laparoscopic cholecystectomy, levobupivacaine, Numeric Rating Scale

## 1. INTRODUCTION

The gold standard procedure for any acute or chronic conditions of gall bladder is laparoscopic cholecystectomy. The first laparoscopic cholecystectomy was done in 1987 by Philippe Mouret [1]. It is a minimally invasive procedure to remove the gall bladder. The major advantages of laparoscopic surgery include smaller incision which is better for cosmetic purposes, it is less invasive and there is lesser postoperative pain, decreased incidence of nausea and vomiting, decreased risk of chest infections and deep venous thrombosis post operatively, due to which the patient can return back to normal day-to-day activities sooner compared to open surgeries [2]. However due to the postoperative pain and the requirement of intravenous analgesic drugs, the use of laparoscopic surgeries as day care surgery remains as an issue.

Increased CO<sub>2</sub> level in the blood can lead to the stimulation of sympathetic nervous system, thereby causing an increase in heart rate, BP, systemic and pulmonary vascular resistance and reduced cardiac output. Since the sympathetic stimulation might lead to peri-operative morbidity, the main goal of anaesthesia is to prevent sympathetic stimulation during intra-operative period and provide post-operative analgesia [3].

Various methods of decreasing post operative pain include slow creation of pneumoperitoneum, aspiration of residual gas, leaving a gas drain insitu, using nitrous oxide pneumoperitoneum, rectus sheath block, instillation of intra peritoneal local anaesthetics under diaphragm, surgery under subarachnoid block, perioperative NSAID's and opioids [4].

Perioperative NSAID's and opioids are the most commonly used methods for reducing post-operative pain but these methods are associated with higher incidence of post operative nausea and vomiting, thereby delaying the ambulation of the patient. However, instillation of intraperitoneal local anaesthetics under the diaphragm, in the gall bladder fossa and above the hepatoduodenal flexure has emerged as one of the simple, cheapest and safest methods for providing post-operative analgesia.

Local anaesthetics are instilled along with other adjuvant drugs which include opioid group of drugs and alpha-adrenergic group of drugs. These drugs help in the prolongation of analgesia provided by the local anaesthetics. These drugs act on the visceral nociceptors and thereby decrease the visceral pain. They also prevent peritonitis and bowel adhesions due to the anti-inflammatory action [5].

Levobupivacaine is an S [-] enantiomer of bupivacaine and is gaining more popularity nowadays because of the faster onset of action and lesser cardiovascular and CNS side effects compared to bupivacaine [6]. Alpha receptor agonist drugs help in prolonging the action of the action of local anaesthetics. Dexmedetomidine and clonidine are most commonly used alpha receptor agonists [7]. Dexmedetomidine is 8 times more specific to  $\alpha_2$  receptors than clonidine and is used more frequently [8]. It provides non-opioid mechanism of analgesia and hence does not cause any respiratory depression.

The present study is to compare the efficacy of intraperitoneal instillation of levobupivacaine alone or with different doses of dexmedetomidine for post operative analgesia in patients undergoing laparoscopic cholecystectomy and to find out the optimal dose of dexmedetomidine.

## 2. MATERIAL AND METHODS

A prospective observational study was conducted after obtaining informed and written consent in 100 patients of either sex aged 18-65 years in patients undergoing elective laparoscopic cholecystectomy in a period of one year.

### **INCLUSION CRITERIA:**

1. Patients of any gender scheduled for elective laparoscopic cholecystectomy under General Anaesthesia.
2. Age 18-65 years.
3. Patients with ASA physical status I and II.
4. People giving informed consent.

### **EXCLUSION CRITERIA:**

1. Patients who deny the consent
2. Patients with ASA physical status III and IV
3. Patients with history of drug allergy
4. Patients with severe cardiac, pulmonary, hepatic, renal and neurologic disease
5. Patients in whom an abdominal drain was instilled and the chance of getting converted into open surgery was present
6. Patients physically dependent on narcotics

Randomisation was be done using the chit and box method and all the patients were divided into four groups:

GROUP A received intraperitoneal instillation of 50 ml of 0.25% levobupivacaine + 5ml normal saline.

GROUP B received intraperitoneal instillation of 50ml of 0.25% levobupivacaine + dexmedetomidine 0.5mcg/kg diluted in 5ml normal saline.

GROUP C received intraperitoneal instillation of 50ml of 0.25% levobupivacaine + dexmedetomidine 1mcg/kg diluted in 5ml normal saline.

GROUP D received intraperitoneal instillation of 50ml of 0.25% levobupivacaine + dexmedetomidine 1.5mcg/kg diluted in 5ml normal saline.

After satisfactory pre anaesthetic assessment, patients were taken into the operating room. an 18- gauge intravenous catheter was inserted and intravenous fluid Ringer Lactate was started. All the monitors including, oxygen saturation [SpO<sub>2</sub>], non-invasive blood pressure, electrocardiography will be connected and the baseline values were recorded. Pre- oxygenation with 100 percent oxygen was done for 3 minutes. General anaesthesia was induced with IV Fentanyl 1.5mcg/kg, propofol 2-2.5mg/kg followed by vecuronium bromide 0.1mg/kg to facilitate orotracheal intubation. The trachea was intubated with cuffed endotracheal tube of appropriate size. Anaesthesia was maintained with 60% N<sub>2</sub>O in oxygen with 0.5-1% isoflurane. Intermittent top-up doses of vecuronium bromide was given for achieving muscle relaxation. Minute ventilation was adjusted to maintain normocapnia [EtCO<sub>2</sub> between 34 and 38mmHg]. Nasogastric tube of appropriate size was inserted.

The hemodynamic changes occurring during the surgery were recorded and managed accordingly. The patient was placed in Trendelenberg's position with left side tilt. During laparoscopy, intraabdominal pressure was maintained between 12 and 14 mmHg.

Anaesthesiologist who was not involved in the study prepared the study drugs. Anaesthesiologist and the surgeon were unaware of the study group of the patient till the end of the study. At the end of the surgery, the study solution was given intraperitoneally in Trendelenberg's position, into the hepato-diaphragmatic space, on the gall bladder bed and near and above hepatoduodenal ligament. The CO<sub>2</sub> was then removed carefully by manual compression of the abdomen at the end of the procedure and the trocar was slowly removed. Local infiltration of 5ml of 0.25% of bupivacaine was done in the incision site at the end of the surgery in patients of all groups.

The neuromuscular blockade was antagonised with neostigmine 0.05mg/kg and glycopyrrolate 0.01mg/kg and patient were extubated. The nasogastric tube was removed and the patient was shifted to postoperative unit [2].

The patients stayed in postoperative unit for 2 hours at the end of surgery. The primary outcome variable was to compare the pain score [numeric rating scale]. The other outcomes included hemodynamic changes, first request of analgesia, total dose of analgesic required in first 24 hours post-operatively and any adverse effects were observed.

The intensity of the pain was recorded in the post-operative period for all the patients using NRS score at 0.5, 1, 2, 4, 6, 12, 24hours after surgery and overall NRS score[mean of all NRS scores]. All the patients were explained about the NRS score before induction of anaesthesia. The patients who required analgesia were given Inj. Fentanyl [1-2mcg/kg] and total amount of drug required in 24 hours was calculated.

The following parameters were evaluated in all the study groups:

1. Time to first request of analgesia after extubation
2. The incidence and severity of postoperative pain for 24 hours using NRS pain score
3. Total dose of analgesia
4. Postoperative hemodynamic parameters including pulse and BP

Feedback from the patients in the form of 7- point Likert type verbal rating scale was recorded.

All data was recorded, tabulated and statistically evaluated with appropriate software tools.

### 3. OBSERVATION AND RESULTS:

The study comprised of 100 patients with 19 males and 81 females, belonging to ASA I and II. They were divided into 4 groups based on the drug combinations instilled intraperitoneally [Table 1]. All the patients passed smooth intra operative course without any complications related to surgical procedures or anaesthetic modalities.

Group	Drug combination	n	Mean
Group A	Normal saline [5ml]	25	25.0
Group B	Dexmedetomidine [0.5mcg/kg] [5ml]	25	25.0
Group C	Dexmedetomidine [1mcg/kg] [5ml]	25	25.0
Group D	Dexmedetomidine [1.5mcg/kg] [5ml]	25	25.0

Table 1 Distribution of patients in groups

These patients were observed for post operative pain using Numeric Rating Scale [NRS], time for first rescue analgesia, total analgesic consumption and patient satisfaction score at 1 hour, 2 hours, 3 hours, 4 hours, 5 hours, 6 hours, 12 hours, 18 hours and 24 hours post operatively.

	Group A	Group B	Group C	Group D	F	p-Value
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NRS on rest post-Op	Mean	±SD	Mean	±SD	Mean	±SD	Mean	±SD		
1 hr	1.04	0.35	0.04	0.20	0.00	0.00	0.00	0.00	161.55	0.001*
2 hrs	1.24	0.66	0.04	0.20	0.00	0.00	0.00	0.00	78.44	0.001*
3 hrs	1.80	0.91	0.08	0.40	0.00	0.00	0.00	0.00	79.29	0.001*
4 hrs	2.40	1.19	0.04	0.20	0.04	0.20	0.00	0.00	94.11	0.001*
5 hrs	2.48	1.05	0.12	0.33	0.12	0.33	0.04	0.20	105.33	0.001*
6 hrs	2.80	1.15	0.32	0.56	0.16	0.37	0.16	0.37	87.27	0.001*
12 hrs	3.00	1.47	0.64	0.64	0.28	0.46	0.28	0.46	57.42	0.001*
18 hrs	3.24	1.39	0.72	0.61	0.48	0.65	0.28	0.46	64.96	0.001*
24 hrs	3.08	1.29	0.80	0.65	0.48	0.65	0.36	0.64	56.32	0.001*

Table 2 Comparisons of mean NRS on rest in between group A, group B, group C and group D at post-operative period

NRS on rest Post operatively	Group A vs Group B		Group A vs Group C		Group A vs Group D	
	Mean Difference	p- Value	Mean Difference	p-value	Mean Difference	p- value
1 hr	1.000	<0.001*	1.040	<0.001*	1.040	<0.001*
2 hrs	1.200	<0.001*	1.240	<0.001*	1.240	<0.001*
3 hrs	1.720	<0.001*	1.800	<0.001*	1.800	<0.001*
4 hrs	2.360	<0.001*	2.360	<0.001*	2.400	<0.001*
5 hrs	2.360	<0.001*	2.360	<0.001*	2.440	<0.001*
6 hrs	2.480	<0.001*	2.640	<0.001*	2.640	<0.001*
12 hrs	2.360	<0.001*	2.720	<0.001*	2.720	<0.001*
18 hrs	2.520	<0.001*	2.760	<0.001*	2.960	<0.001*
24 hrs	2.280	<0.001*	2.600	<0.001*	2.720	<0.001*

Table 3 Comparison of NRS in between Group A and Group B, C and D at various time intervals post operatively

NRS on rest Post operatively	Group B vs Group C		Group B vs Group D	
	Mean Difference	p- Value	Mean Difference	p-value
1 hr	0.040	0.897	0.040	0.897
2 hrs	0.040	0.977	0.040	0.977
3 hrs	0.080	0.941	0.080	0.941
4 hrs	0.000	1.000	0.040	0.996
5 hrs	0.000	1.000	0.080	0.962
6 hrs	0.160	0.847	0.160	0.847
12 hrs	0.360	0.459	0.360	0.459
18 hrs	0.240	0.757	0.440	0.275
24 hrs	0.320	0.549	0.440	0.269

Table 4 Comparison of NRS in between Group B and Group C and Group D at various time intervals post operatively

NRS on rest Post operatively	Group C vs Group D	
	Mean Difference	p- Value
1 hr	0.000	1.000
2 hrs	0.000	1.000
3 hrs	0.000	1.000
4 hrs	0.040	0.996
5 hrs	0.080	0.962
6 hrs	0.000	1.000
12 hrs	0.000	1.000
18 hrs	0.200	0.843
24 hrs	0.120	0.959

Table 5 Comparison of NRS between Group C and Group D at various time intervals post operatively

Intraperitoneal local anaesthetic instillation with 0.25% levobupivacaine with dexmedetomidine was found to provide better post operative analgesia as compared to levobupivacaine alone. There was no much difference in the NRS scores of the patients who received different doses of dexmedetomidine as adjuvant. [Table 2,3,4,5]

Throughout the post operative period, it was observed that there was no significant difference in the hemodynamic parameters of the patients belonging to all the four groups. [Table 6]

Rescue analgesia of Inj. Fentanyl 1mcg/kg was given to patients when NRS>4. The mean total analgesic consumption in 24 hrs was significantly decreased from group A to group D. Significant difference was also observed in between Group A and Group B, while patients remaining in Groups C and D, did not receive any rescue analgesia [Table 7]. The mean time taken for first rescue analgesia [in Hrs] was significantly different in between Group A and Group B while patients belonging to Groups C and D did not require any rescue analgesia [Table 8].

Among 100 patients taken up for the study, 28% of the patients reported to be extremely satisfied [grade=7], 28% of the patients were satisfied [grade=6], 36% of the patients were somewhat satisfied [grade=5], 5% of the patients reported undecided [grade=4] and 3% of the patients were somewhat dissatisfied [grade=3]. In Group A, 68% of the patients reported somewhat satisfied [grade=5], 20% of the patients reported undecided [grade=4] and 12% of the patients reported somewhat dissatisfied [grade=3]. In Group B, 36% of the patients reported satisfied [grade=6] and 64% of the patients reported somewhat satisfied [grade=5]. In Group C, 40% of the patients reported extremely satisfied [grade=7], 52% of the patients reported satisfied [grade=6] and 8% of the patients reported somewhat satisfied [grade=5]. In Group D, 84% reported extremely satisfied [grade=7] and 16% reported satisfied [grade=6]. No patients belonging to all the four groups reported extreme dissatisfaction [Table 9]. The patient satisfaction score increased significantly from Group A to Group D [Table 10].

MAP Post-Op	Group A		Group B		Group C		Group D		Chi sq.	p-Value
	Mean	±SD	Mean	±SD	Mean	±SD	Mean	±SD		
1 hr	92.05	5.85	91.55	5.33	92.07	5.80	92.80	5.08	0.97	0.409
2 hrs	93.15	5.82	88.56	8.09	90.91	4.36	93.76	4.39	4.06	0.009*
3 hrs	93.41	4.74	90.69	4.61	90.91	4.29	92.88	4.69	2.25	0.088
4 hrs	92.91	5.06	92.40	5.29	91.17	4.00	93.76	5.26	1.20	0.313
5 hrs	93.23	3.56	91.60	5.55	91.76	4.38	92.33	4.53	0.65	0.584
6 hrs	91.95	4.15	91.71	4.97	91.73	4.29	92.08	3.70	0.04	0.988
12 hrs	93.63	3.44	92.27	5.01	90.88	4.27	92.53	3.34	1.92	0.131
18 hrs	93.49	4.16	91.52	4.33	91.52	3.89	91.97	3.80	1.34	0.267
24 hrs	93.76	5.00	92.13	4.80	91.84	4.39	91.79	3.74	1.07	0.365

Table 6 Comparisons of mean arterial blood pressure [mmHg] in between group A, group B, group C and group D at post-operative period

	Group A		Group B		Group C		Group D		f	p-Value
	Mean	±SD	Mean	±SD	Mean	±SD	Mean	±SD		
<b>Total Analgesic Consumption IN 24 HRS [Inj. Fentanyl mcg/kg]</b>	2.76	0.44	1.71	0.49	0.00	0.00	0.00	0.00	29.96	<0.001*

Table 7 Comparisons of mean Total Analgesic Consumption IN 24 HRS [Inj. Fentanyl mcg/kg] in between group A, group B, group C and group D at post-operative

	Group A		Group B		Group C		Group D		F	p-Value
	Mean	±SD	Mean	±SD	Mean	±SD	Mean	±SD		
<b>Time taken for first rescue</b>	8.88	1.83	12.00	0.00	0.00	0.00	0.00	0.00	22.68	<0.001*

analgesia [in Hrs]										
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Table 8 Comparisons of mean time taken for first rescue analgesia [in Hrs] in between group A, group B, group C and group D at post-operative period

	Extremely Satisfied	Satisfied	Somewhat Satisfied	Undecided	Somewhat Dissatisfied
Group A			68%	20%	12%
Group B		36%	64%		
Group C	40%	52%	8%		
Group D	84%	16%			

Table 9 Distribution of patient satisfaction scores after 24 hours according to study groups

	Group A		Group B		Group C		Group D		F	p-Value
	Mean	±SD	Mean	±SD	Mean	±SD	Mean	±SD		
Patient Satisfaction Score	4.48	0.87	5.36	0.49	6.24	0.60	6.76	0.52	61.73	<0.001*

Table 10 Comparisons of mean patient satisfaction score in between group A, group B, group C and group D at post-operative period

#### 4. DISCUSSION

Laparoscopic cholecystectomy has gained popularity in recent years due to the fact that it involves small incision, less hospital stays, lesser post operative pain and early ambulation. The post operative pain that occurs due to peritoneal stretching while insufflating the gases remains one of the complications of this surgery. This remains one of the reasons for the increase in the duration of hospital stay for the patients undergoing laparoscopic cholecystectomy. The intensity of pain is highest on the day of surgery and the next day and gradually decreases there on[9]. Intraperitoneal instillation of local anaesthetics with or without adjuvant drugs was found to be one of the most effective ways to reduce post operative pain in laparoscopic cholecystectomy. Reduced incidence of post operative nausea and vomiting and early ambulation of the patients are the added advantages of this technique[10].

Bupivacaine, ropivacaine and levobupivacaine are commonly used local anaesthetics intraoperatively[11]. Levobupivacaine is the S[-] enantiomer of bupivacaine and it exerts action by reversibly blocking the neuronal sodium channels. Commonly used adjuvants along with local anaesthetic drugs are fentanyl, tramadol, dexmedetomidine, clonidine, etc.

The use of parenteral opioids and NSAIDs provided adequate post operative analgesia. However, the number of drugs required were higher and had other side effects like respiratory depression, nausea, vomiting, pruritis, etc thereby increasing the hospital stay of the patients.

In our study, the mean NRS was found to be significantly higher in Group A compared to other three groups. Sudhir Kumar Rai et al., found that the mean VAS scores in patients who received intraperitoneal instillation of levobupivacaine was significantly higher compared to patients who received levobupivacaine along with dexmedetomidine[12]. In a double randomized control study conducted by NT Das et al., it has been observed that intraperitoneal instillation of local anaesthetics following laparoscopic cholecystectomy helps in early ambulation of the patients[13]. Our findings were also in congruence with the study conducted by Chetan Shukla et al., and Thomas SM et al[14,15].

The heart rate [HR], systolic BP [SBP], diastolic BP [DBP] and MAP were recorded for each patient in all the four study groups at different time-points in the postoperative period. No significant difference in the hemodynamic parameters was found among all the four groups. Hence it was observed that intraperitoneal instillation of levobupivacaine with or without dexmedetomidine was not associated with any unfavorable effects on the hemodynamic parameters of the patients. Our findings were supported by the study conducted by Arjun Singh et al., and Neena Jain et al [16,17]. Our findings were, however incongruent to a study conducted by Srinivas Rapolu et al, in which a comparative study was conducted on intraperitoneal instillation of bupivacaine alone or with dexmedetomidine for post operative analgesia following laparoscopic cholecystectomy, it has been noted that there was statistically significant difference in between two groups of patients in terms of heart rate, systolic and diastolic blood pressure from 1hour to 12 hours post operatively [18].

In our study, patients were provided with Inj. Fentanyl 1mcg/kg if NRS >4 as rescue analgesia. It has been observed that patients belonging to Group A and B required post operative rescue analgesia while those belonging to Group C and D did not require any rescue analgesia. The total analgesic requirement for patients in Group A was significantly higher than the patients belonging to Group B [p<0.001]. This shows that patients who received intraperitoneal instillation of levobupivacaine with 1mcg/kg and 1.5mcg/kg of dexmedetomidine did not require

any rescue analgesia for the first 24 hours post operatively. Usha Shukla et al., conducted a similar study and observed that the requirement of rescue analgesia was significantly lower in patients who received 1mcg/kg dexmedetomidine with bupivacaine as compared to patients who received tramadol as adjuvant[2]. Similar findings were observed by Joginder Pal et al., also[19].

The mean time taken for the first rescue analgesia is significantly higher [ $p < 0.001$ ] for patients in Group B as compared to patients in Group A, while the patients in Group C and Group D did not require any rescue analgesia in the first 24 hours post operatively. Hence the duration of analgesic action was prolonged for patients belonging to Group C and Group D as compared to patients belonging to Group A and Group B. This in turn implies that patients who received 1mcg/kg and 1.5mcg/kg of dexmedetomidine as an adjuvant to levobupivacaine for intraperitoneal instillation for postoperative analgesia. These results were in congruence with the study conducted by Thottikat Kaarthika et al., in which they did a comparison of intraperitoneal instillation of bupivacaine with 1mcg/kg of dexmedetomidine versus 1mcg/kg of clonidine as an adjuvant. The time taken for first rescue analgesia was higher for the patients belonging to dexmedetomidine group as compared to those patients belonging to clonidine group[20].

The satisfaction of the patients with intraperitoneal instillation levobupivacaine alone and different doses of dexmedetomidine and the overall experience was recorded using 7-point Likert satisfaction scale. The patient satisfaction score was significantly higher for patients belonging to Group B as compared to patients belonging to Group A [ $p < 0.001$ ], while it was also significantly higher for the patients belonging to Group C and Group D as compared to patients belonging to Group B [ $p < 0.001$ ]. However, the patient satisfaction score was similar in the patients belonging to Groups C and D. No patients in any groups reported dissatisfaction or extreme dissatisfaction. This implies that patients who received 1mcg/kg and 1.5mcg/kg of dexmedetomidine as an adjuvant had no difference in their satisfaction score.

The main limitations of our study were smaller sample size and using NRS, which is a subjective tool for pain assessment and hence making it difficult to quantify objectively for comparing various treatment options for the patients.

## 5. CONCLUSION

With careful appraisal of the present study, it can be concluded that in patients undergoing laparoscopic cholecystectomy, intraperitoneal instillation of levobupivacaine alone and with different doses of dexmedetomidine was considered an effective modality for post operative analgesia. In patients who received 1mcg/kg and 1.5mcg/kg dexmedetomidine as adjuvant to levobupivacaine required no rescue analgesia, had longer duration of post operative analgesia and better patient satisfaction score. Hence 1mcg/kg of dexmedetomidine can be considered optimal dose as an adjuvant to 0.25% levobupivacaine for Intraperitoneal instillation in patients undergoing laparoscopic cholecystectomy under general anaesthesia.

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