

# Comparison of Intravenous and Intraperitoneal Lidocaine in Laparoscopic Cholecystectomy

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## ABSTRACT

**Objectives:** Comparison of intravenous with intraperitoneal lidocaine in terms of pain relief after laparoscopic cholecystectomy

**Methodology:** This Randomized Controlled Trial was conducted at Department of Anesthesia, CMH, Lahore, we enrolled a total of 100 cases (50 in each group) undergoing elective laparoscopic cholecystectomy, having ASA-I and II criteria of either gender between 20-60 years of age. Two groups were formed, Group-A was allotted to the cases with intravenous group and Group-B was allotted to those infiltrated intraperitoneal lidocaine. To control the severity of the postoperative pain, nalbuphine was used rescue analgesia. A 10 point visual analogue score was used to assess pain and duration of pain relief was recorded.

**Results:** Comparison of the duration of pain relief of intravenous vs intraperitoneal lidocaine in pain relief after laparoscopic cholecystectomy reveals that 139.10±90.6 minutes in Intravenous and 58.10±8.29 in Intraperitoneal group, p value was 0.0001.

**Conclusion:** We concluded that the duration of pain relief of intravenous is significantly longer when compared with intraperitoneal lidocaine in pain relief after laparoscopic cholecystectomy.

**Keywords:** Gallstones, Laparoscopic cholecystectomy, intravenous lidocaine, intraperitoneal lidocaine, duration of pain relief

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## INTRODUCTION

After the introduction of Laparoscopic Cholecystectomy in 1985 by Med Erich Muhe of Boblingen, Germany,<sup>1</sup> the laparoscopic approach to perform cholecystectomy is a recommended procedure while dealing with symptomatic gallstones<sup>2</sup> which is helpful to reduce discharge and time of recovery.<sup>3</sup> This technique has a distinctive feature of less pain than the conventional approach.<sup>4</sup> Patient's quality of recovery is affected due to increased postoperative pain.<sup>5</sup>

Multimodal analgesia is required to control deep visceral pain and superficial incisional pain after the surgery is done.<sup>6</sup> It is helpful for acceleration of postoperative recovery and relief in pain.<sup>7</sup> Preventive effect of postoperative pain is recorded when perioperative intravenous lidocaine is administered, it is considered as a good choice of analgesia due to its anti-inflammatory effect<sup>8</sup> in lumbar and abdominal surgeries.<sup>9-10</sup> It is also found a preferred choice in laparoscopic surgeries.<sup>8</sup> Similarly, infiltration of intraperitoneal lidocaine is also safe and effect analgesia.<sup>11</sup> Previously, the rate of pain after abdominal surgery is found decreased in cases infiltrated intraperitoneal lidocaine.<sup>12-13</sup>

This study was planned to compare intravenous and intraperitoneal lidocaine in terms of mean pain score after the laparoscopic cholecystectomy is done, so that a more effective method may be adopted while controlling post operative pain after laparoscopic cholecystectomy.

## METHODOLOGY

This Randomized Controlled Trial was conducted at Department of Anesthesia, CMH, Lahore, we enrolled a total of 100 cases (50 in each group) undergoing elective laparoscopic cholecystectomy, having ASA-I and II criteria of either gender between 20-60 years of age whereas all

those who received sedatives analgesics 24 hrs before the surgery is scheduled, Spillage or cholelithiasis with known common bile duct pathology, History of previous abdominal surgery, A chronic pain disorder other than gallbladder disease, Allergy to lidocaine, and those with comorbidities like chronic obstructive pulmonary disease or cardiac diseases. We used an informed consent method from the participants of the study to use their data in this research work. Two groups were formed, Group-A was allotted to the cases with intravenous group and Group-B was allotted to those infiltrated intraperitoneal lidocaine. The demographic information including, age, gender, BMI, ASA criteria, address, contact number of the participants in a special designed proforma. All patients were transferred to the operating room without premedication. Anesthesia was induced by IV propofol (2mg/kg) and orotracheal intubation was facilitated by atracurium (0.5mg/kg). Intravenous nalbuphine (0.1mg/kg) was given at the time of induction to all patients. Anesthesia was maintained with oxygen (FiO<sub>2</sub>=1) and isoflurane (1-1.5% volume). Blood pressure, pulse oximeter and electrocardiography was monitored throughout the procedure. Lactated Ringer's solution (3-6ml/kg/hr) was infused. No additional analgesia in the form of NSAID or paracetamol was given intraoperatively. All patients received ondansetron 0.1mg/kg IV thirty minutes before the end of the procedure. At the end of the operation, residual neuromuscular blockade was antagonized with neostigmine (0.05mg/kg) and glycolpyrrolate (0.005mg/kg). To control the severity of the postoperative pain, nalbuphine was used rescue analgesia. A 10 point visual analogue score was used to assess pain and duration of pain relief was recorded. The data analysis was done with the help 22<sup>nd</sup> version of SPSS where, t test was performed to know the significant difference in two groups for mean post operative pain.

## RESULTS

Age distribution shows that 64 % (n=32) in A Group and 70% (n=35) in B Group falls in range of 20-40yrs whereas 36% (n=18) in Group-A and 30% (n=15) in B Group falls in range of 40-60yrs of age, 33.8±7.75 was the mean age in cases belongs to A Group and 34.10±8.11yrs belongs to B Group. (Table No. 1)

Gender distribution shows that 60% (n=30) in A Group and 64% (n=32) in B Group were females and 40% (n=20) in A Group and 36% (n=18) in B Group were males. (Table No. 2)

Mean BMI in A Group was 29.41±5.87 and 31.30±4.98 in B Group. (Table No. 3)

ASA status shows that 26% (n=13) in A Group and 42% (n=21) in B Group had ASA-I whereas 74% (n=37) in A Group and 58% (n=29) in B Group had ASA-II. (Table No. 4)

Pain relief after laparoscopic cholecystectomy shows that 135.73±8.77 minutes in A and 74.52±9.61 minutes in B group, p value was 0.0001. (Table No. 5)

Table 1: Age of Patients (n=100)

Age (in years)	Group-A(n=50)		Group-B(n=50)	
	No. of cases	%	No. of cases	%
20-40	32	64	35	70
41-60	18	36	15	30
Total	50	100	50	100
Mean ± sd	33.8±7.75		34.10±8.11	

Table 2: Gender Distribution (n=100)

Gender	Group-A(n=50)		Group-B(n=50)	
	No. of cases	%	No. of cases	%
Female	30	60	32	64
Male	20	40	18	36
Total	30	100	30	100

Table 3: Mean Body Mass Index (n=100)

BMI	Group-A(n=50)		Group-B(n=50)	
	Mean	SD	Mean	SD
	29.41	5.87	31.30	4.98

Table 4: ASA Status (n=100)

ASA	Group-A(n=50)		Group-B(n=50)	
	No. of cases	%	No. of cases	%
I	13	26	21	42
II	37	74	29	58
Total	50	100	50	100

Table 5: Comparison of Two Groups (n=60)

Pain duration	Group-A (n=50)		Group-B (n=50)	
	Mean	SD	Mean	SD
	135.73	8.77	74.52	9.61

P value=0.0001

## DISCUSSION

In our study, comparison of intravenous vs intraperitoneal lidocaine in pain relief after laparoscopic cholecystectomy shows that 135.73±8.77 minutes in A and 74.52±9.61 minutes in B group, p value was 0.0001, we compared our results with a previous study<sup>14</sup> reveals that the patients receiving intravenous lidocaine demonstrated a statistically longer time to first analgesic requirement (143.2±25.93 min) during the postoperative period compared with those

receiving intraperitoneal lidocaine (56.04±24.04 min). Our findings are in agreement with this study.

Another study by Yoo Shin Choi<sup>15</sup> concluded that both techniques significantly reduced opioid consumption and postoperative pain in cases undergoing laparoscopic cholecystectomy. However, intravenous administration of lidocaine may be an alternative choice.

Yang SY and others<sup>16</sup> are also of the same opinion and found both techniques as effect for reducing postoperative pain, however, they considered IV administration as convenient method and IP administration may please an additional burden for the surgeons. Khaled Mohamad Morsy and others<sup>17</sup> further supported both of the techniques for pain reduction.

However, the above discussion reveals that intravenous lidocaine is significantly better when compared with intraperitoneal lidocaine infiltration for pain relief after laparoscopic cholecystectomy. The additional benefit of IV lidocaine is early return of bowel activity, it may facilitate to reduce the hospital stay and LC may be a day-care procedure.

## CONCLUSION

Intravenous lidocaine has significantly longer time of pain relief when compared with intraperitoneal lidocaine after laparoscopic cholecystectomy

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