

# EFFECT OF BUPIVACAINE WITH AND WITHOUT INTRA PERITONEAL INSTILLATION ON POSTOPERATIVE VISCERAL PAIN AFTER LAPAROSCOPIC CHOLECYSTECTOMY

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## ABSTRACT

**Background:** Laparoscopic Cholecystectomy is the treatment of choice for symptomatic gallstones disease. Open cholecystectomy results mainly in parietal pain while laparoscopic cholecystectomy causes visceral pain. **Objective:** To compare post-operative visceral pain at 24 hours in patients undergoing laparoscopic cholecystectomy with and without intra peritoneal instillation of bupivacaine. **Methodology:** Setting: Surgical Unit II, Sheikh Zayed Medical College/Hospital Rahim Yar Khan. Duration of Study: 1<sup>st</sup> July to 31<sup>st</sup> December 2015. Study design: Randomized controlled trial (RCT). A total of 60 patients having symptomatic gallstones disease were included in this study. Patients were randomly divided into two groups. Thirty patients in group A were treated with bupivacaine 0.5 % instillation. For the patients in group B, the dose was not instilled in the gall bladder fossa and right and left sub diaphragmatic spaces. Postoperative pain was assessed up to 24hours after surgery using Visual Analogue Scale (VAS). The data was entered and analyzed by using SPSS version 16. **Results:** The mean age of the patients was 35±8 years in group A, and 37± 8 years in Group B. Post operative pain at 24 hours was significantly low in group A than in group B (33.3% vs. 70%; p=0.004). **Conclusion:** Intraperitoneal bupivacaine instillation after laparoscopic cholecystectomy reduces pain in the initial postoperative period. It is easy to administer with no adverse effects and may become a routine practice for this procedure.

**Key Words:** Intra peritoneal Bupivacaine, Gall bladder fossa, Post-operative pain, Laparoscopic Cholecystectomy.

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## INTRODUCTION

Gall stone is one of the most common biliary pathology and most of the patients remain asymptomatic. Approximately 1 patients will develop symptoms and ultimately will require cholecystectomy.<sup>1</sup> Currently Laparoscopic Cholecystectomy is considered gold standard for symptomatic gallstones.<sup>2,3</sup>

Although, there are certain advantages of laparoscopic cholecystectomy in terms of less post-operative pain, and respiratory complications as compared to open cholecystectomy.<sup>4</sup> Mostly the patients are discharged on the same or next day.<sup>5</sup> In open cholecystectomy, mainly there is parietal pain while laparoscopic cholecystectomy results visceral and shoulder tip pain.<sup>5,6,7</sup>

In laparoscopic cholecystectomy, intraperitoneal local anesthesia instillation for relief of pain has been a matter of debate. Several reports has shown substantial decrease in postoperative pain after laparoscopic cholecystectomy with use of bupivacaine as intraperitoneal local anesthesia.<sup>8</sup> We conducted this study to compare the effect of bupivacaine with and without intra peritoneal

instillation on frequency of postoperative visceral pain after laparoscopic cholecystectomy.

## METHODOLOGY

**Setting:** Surgical ward Sheikh Zayed Medical College/Hospital Rahim Yar Khan. **Duration of Study:** 1<sup>st</sup> July to 31<sup>st</sup> December 2015. **Sampling Technique:** Random simply technique. **Study Design:** Randomized controlled trial (RCT). **Inclusion Criteria:** All adult males and females having symptomatic gallstones, proven on ultrasound showing presence of gallstones, admitted through outpatient department with ASA class 1 and 2. **Exclusion Criteria:** History of allergy to local anesthesia and patients belonging to ASA class 3 or above study was started after approval from the Institutional Review Board of the hospital. Selected patients who gave written informed consent were randomly allocated either of two groups by lottery method. All the laparoscopic cholecystectomies in both groups were done by consultant surgeon. Bupivacaine instillation was instilled by the same surgeon.

Patients included in Group A, received bupivacaine 0.5 % instillation. The calculated dose (2mg/kg) was

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diluted in distilled water to make of 50ml total. Instillation of dose was as under: 10ml instilled in the gall bladder fossa, 10ml instilled in the right subdiaphragmatic space, 10ml instilled in the left subdiaphragmatic space and 20ml injected at the port sites i.e. 5ml each of the four ports.

For the patients included in Group-B, the calculated dose was diluted in distilled water to make of 50ml total.

Out of this, 20ml was injected at the port sites (5ml each of the four ports) and remaining 30 ml was not instilled into gall bladder fossa, right and left subdiaphragmatic spaces.

Postoperative pain was assessed up to 24 hours after surgery using Visual Analogue Scale (VAS). This assessment was done by the trainee doctor, who was blinded from group to which the patient belongs. All the findings were recorded in the proforma.

Data was entered and analyzed on SPSS version 16. Mean and Standard deviation were calculated for quantitative variables like age and VAS score. Frequency and percentage were calculated for qualitative variables like gender, postoperative pain and its intensity.

VAS score was compared between two groups by student's t test. Postoperative pain and its intensity were compared between two groups by Chi-square test. P value  $\leq 0.05$  was taken as significant.

## RESULTS

The mean age of the patients was  $35 \pm 8$  years in group A, and  $37 \pm 8$  years in Group B. Mean preoperative pain score was significantly high in group B as compared to group A ( $p=0.005$ ) (Table I). Out of 60 patients, 17 (28.3%) were male and 43(71.7%) were female.

Severity of Postoperative pain (mild to severe) at 24 hours was significantly high in group B than group A (70% vs. 33.3%;  $p=0.035$ ). (Table II)

With respect to gender, postoperative pain was insignificant ( $P=0.09$ ) between groups in male patients while pain was observed significantly high in group B as compared to group A in female cases (72.2% vs. 38.1%;  $p=0.022$ ). (Table III)

Similarly with respect to age groups, pain was observed high in group B than group A but significant difference ( $P=0.02$ ) was observed in below 40 years of age. (Table IV)

**Table I: Comparison of characteristics between groups**

Variables	Group A (n=30)	Group B (n=30)	P-Value
Age (Years)	35 $\pm$ 8	37 $\pm$ 8	0.33
Preoperative VAS PAIN Score	1.30 $\pm$ 2.26	2.77 $\pm$ 2.51	0.021

**Table II: Comparison of severity of post operative pain between groups at 24 hours**

Severity of Pain	Group A (n=30)	Group B (n=30)	Total	P-Value
No Pain	20 (66.7%)	9 (30%)	29 (48.3%)	0.032
Mild	5 (16.7%)	10 (33.3%)	15 (25%)	
Moderate	3 (10%)	9 (30%)	12 (20%)	
Severe	2 (6.7%)	2 (6.7%)	4 (6.7%)	

**Table III: Comparison of post operative pain between groups at 24 hours with respect to gender**

Gender	Post Operative Pain	Group A (n=30)	Group B (n=30)	P-Value
Male	Yes	2 (22.2%)	5 (62.5%)	0.092
	No	7 (77.8%)	3 (37.5%)	
	Total	9	8	
Female	Yes	8 (38.1%)	16 (72.2%)	0.022
	No	13 (61.9%)	6 (27.3%)	
	Total	21	22	

**Table IV: Comparison of post operative pain between groups at 24 hours with respect to age groups**

Age Groups	Post Operative Pain	Group A n=30	Group B n=30	P-Value
$\leq 40$ Years	Yes	5(22.7%)	11(57.9%)	0.021
	No	17(77.3%)	8(42.1%)	
	Total	22	19	
$>40$ Years	Yes	5(62.5%)	10(90.9%)	0.13
	No	3(37.5%)	1(9.1%)	
	Total	8	11	

## DISCUSSION

Laparoscopic cholecystectomy being minimal invasive surgery, but it is associated with incisional, intra-abdominal and shoulder tip pain after the

procedure.<sup>9,10</sup> Open cholecystectomy usually results in parietal pain, (abdominal wall), while after laparoscopic cholecystectomy patients feels more of visceral pain.<sup>11</sup> Pneumoperitoneum done by CO<sub>2</sub> lead to shoulder tip pain due to diaphragmatic irritation.<sup>12</sup> In a systemic review of intra peritoneal administration of bupivacaine showed. Significant pain reduction occurred in 7 trials but not in the other 6.<sup>13</sup>

Results of our study showed marked decrease in postoperative pain at 24hr in the Group A patients. The results of our study may be related to the use of higher concentration of bupivacaine compared to other studies because it is the concentration which may be important in laparoscopic cholecystectomy rather than volume. Also the drug was instilled in 20° Trendelenberg position so as to encourage its accumulation in gall bladder fossa, right and left subdiaphragmatic spaces. These findings are consistent with the findings of Neerja B et al.<sup>14</sup> They noted pain relief up to 8hrs, and less shoulder tip pain and analgesic requirement post-operatively.

Narchi et al also found that post-operative pain relief by intra peritoneal Local Anaesthetic instillation lasted for 48hrs.<sup>15</sup> D. J. Alexander et al demonstrated that direct peritoneal injection of bupivacaine at the level of visceral peritoneum reduces pain.<sup>16</sup> While another study showed pain relief only up to two hours with intra peritoneal instillation of 0.25% bupivacaine.<sup>17</sup> Rehan AG et al found that infiltration of 0.25% bupivacaine at port sites, under the right hemi diaphragm and gall bladder bed decreased the post operative pain in first 24 hours and significantly reduced the analgesic requirements.<sup>18</sup> Evidence suggested that females have a lower pain threshold and a lower tolerance to painful stimuli. With respect to gender, postoperative pain was insignificant between groups in male patients while pain was observed significantly high in group B as compared to group A in female cases (72.2% vs. 38.1%; p=0.022). Similarly with respect to age groups, pain was observed high in group B than group A but significant difference was observed in below 40 years of age it means younger patients feel more pain than older patients.

The factors which may influence the effect of intra-peritoneal analgesia affect of local anesthesia are timing of instillation, dose and concentration of LA, site of instillation spillage of

blood and bile (may interfere with absorption), pneumo-peritoneum volume of residual CO<sub>2</sub>, degree of non-visceral pain (e.g. from port sites) and post-operative analgesia regimen.<sup>19,20,21</sup>

## CONCLUSION

Intraperitoneal instillation of bupivacaine after laparoscopic cholecystectomy reduces pain in the initial postoperative period, it is easy to administer with no adverse effects and may become a routine practice for this procedure.

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