



RESEARCH ARTICLE

INTRAPERITONEAL HYDROCORTISONE PLUS BUPIVACAINE ADMINISTRATION FOR PAIN  
RELIEF AFTER LAPAROSCOPIC CHOLECYSTECTOMY

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ABSTRACT

**Background:** Laparoscopic Cholecystectomy (LC) has become the gold standard for treatment of benign Gall Bladder disease. Laparoscopy provides many benefits over conventional open procedures including faster recovery time, shorter hospital stay, less pain, and in some cases, fewer complications. Post Operative pain management has an important role in preventing the postoperative morbidity and its consequences. This study is designed to evaluate the effect of intraperitoneal instillation of bupivacaine with hydrocortisone in comparison to bupivacaine alone for pain relief following laparoscopic Cholecystectomy.

**Aim and Objectives:** To compare the effect of intraperitoneal instillation of bupivacaine with Hydrocortisone versus Bupivacaine alone for post-operative analgesia in laparoscopic Cholecystectomy.

**Methods:** This study includes Laparoscopic Cholecystectomy conducted in the department of General Surgery at the Sir Sayajirao General Hospital & Medical College Baroda during a period of 12 months from January 2015 to December 2015. The patients were randomized into two groups by envelop method. Assessment of the pain was done & its intensity was recorded on VAS (visual Analogue scale) after 0hrs, 6hrs, 12hrs & 24hrs of surgery.

**Results:** Total 50 patients were studied. Each group contain 25 patients. Bupivacaine with hydrocortisone instillation shows significant reduction in VAS Score at 6hr, 12 hr and 24hr (2.40, 3.28 and 4.00) as compare to bupivacaine alone (3.24, 4.28 and 5.04) and it is statistically significant as p value is <0.05 (0.0039, 0.0026 and 0.0046) While reduction in VAS Score at 0 hr (1.08 and 1.48) is not statistically significant as p value is > 0.05 (0.3950).

**Conclusion:** Intraperitoneal preoperative pre-emptive instillation of hydrocortisone with bupivacaine in laparoscopic Cholecystectomy significantly reduce post operative pain at 6 hr, 12 hr and 24hr but not at 0 hr, in comparison to bupivacaine alone.

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INTRODUCTION

With the expanding role of ambulatory surgery and the need to facilitate an earlier hospital discharge, improving postoperative pain control has become an increasingly important issue. (Paul, 2005) Laparoscopic Cholecystectomy (LC) has become the gold standard for treatment of benign Gall Bladder disease. Laparoscopy provides many benefits over conventional open procedures including faster recovery time, shorter hospital stay, less pain, and in some cases, fewer complications. Despite minimal invasive nature of laparoscopic surgery, pain may be substantial and limit an otherwise expeditious recovery. Adequacy of postoperative pain control is one of the most important factors in determining when a patient can be safely discharged from surgical facility and has a major

influence on the patient's ability to resume their normal activities of daily living. (Kehlet and Dahl, 2003) Analgesia provided before a noxious stimulus, known as pre-emptive analgesia, may prevent physiologic changes, resulting in central sensitization and amplification of pain signals. Pre-emptive local anaesthesia, therefore, may be more effective than postoperative anaesthesia administration at preventing postoperative pain. Many experimental and clinical studies have demonstrated the inhibitory effect of pre-emptive analgesia on the development posttraumatic hyperalgesia, resulting in reduced post operative pain and total analgesic requirements. (Barczynski *et al.*, 2005; Maestroni *et al.*, 2002; Pasqualucci *et al.*, 1996; Coughlin *et al.*, 2010; Lee *et al.*, 2001; Mixter and Hackett, 1997; Moynicheck *et al.*, 2000; Kahokehr *et al.*, 2010) Bupivacaine (0.5%) is the most consistently used local anaesthetic in pre-emptive analgesia.

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**PATIENTS AND METHODS**

A prospective, randomized study of 50 patients of laparoscopic Cholecystectomy (LC) was conducted in the department of General Surgery at the Sir Sayajirao General Hospital & Medical College Baroda during a period of 12 months from January 2015 to December 2015. All adult patients of ASA-I and 2 in the age group of 18 to 60 years irrespective of sex scheduled for Elective laparoscopic Cholecystectomy were included in the study. Patients in whom conversion to open Cholecystectomy, ASA grade III and IV, History of taking opioids, tranquilizer, steroids or NSAIDS were excluded from the study. After taking informed and written consent, patients were randomized in two groups using enveloped method. On the day of surgery an independent hospital staff randomly opened an envelope with a card in side. Patients were randomized to their respective card group, either ‘A’, or ‘B’

**Group ‘A’:** In which 100 mg bupivacaine in 250 ml of normal saline was instilled in peritoneal cavity.

**Group ‘B’:** In which 100 mg hydrocortisone and 100 mg bupivacaine in 250 ml of normal saline was instilled in peritoneal cavity. After installation of drugs patient was rotated into Trendelenburg, anti-Trendelenburg, left and right lateral decubitus and finally supine positions (each for 2 minutes). Patients will be followed by a blind investigator for postoperative abdominal pain using VAS based on a 0-10 scale(with 0 meaning no pain and 10 meaning the most intense pain ever experienced) in the recovery room and at 6,12 and 24 hours after operation.

**Statistical methods**

Statistical analysis was done by SPSS 17.0 software. Chi-square (X<sup>2</sup>) test, unpaired t test and Mann-Whitney test was used for analysis of data. The p-value for significance level was set at 0.05.

**RESULTS**

A prospective, randomized study of 50 patients of Intraperitoneal hydrocortisone plus bupivacaine administration for pain relief after laparoscopic cholecystectomy, a comparison with bupivacaine “was conducted.

**Patients were randomized in two groups:**

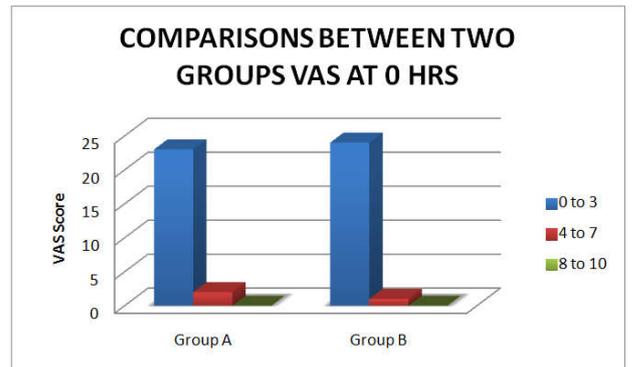
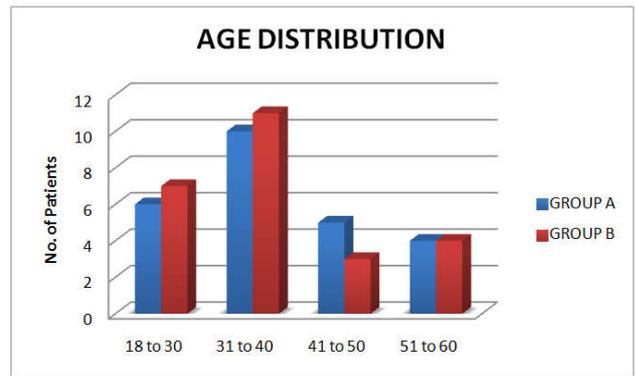
In Bupivacaine group (group A) total patients: 25.  
In Bupivacaine plus Hydrocortisone group (group B) total patients: 25.

**Table 1. Distribution of patients according to age**

AGE GROUP	GROUP A	GROUP B	TOTAL
18 to 30	6	7	13
31 to 40	10	11	21
41 to 50	5	3	08
51 to 60	4	4	08

**Table 2. Comparisons between two groups vas at 0 hrs**

VAS Score	Group A	Group B
0 to 3	23	24
4 to 7	2	1
8 to 10	0	0

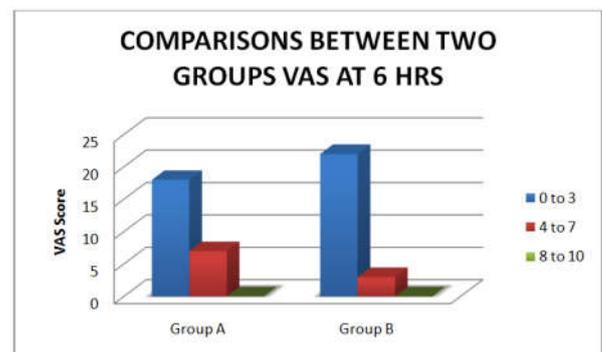


**Comparisons between two groups vas at 0 hrs**

Group A & B AT 0HRS	
Mann – Whitney U value	270.50
‘p’ value	0.3950
Significance (‘p’value<0.05)	Not Significant

**Table 3. Comparisons between two groups vas at 6 hrs**

Vas Score	Group A	Group B
0 to 3	18	22
4 to 7	7	3
8 to 10	0	0

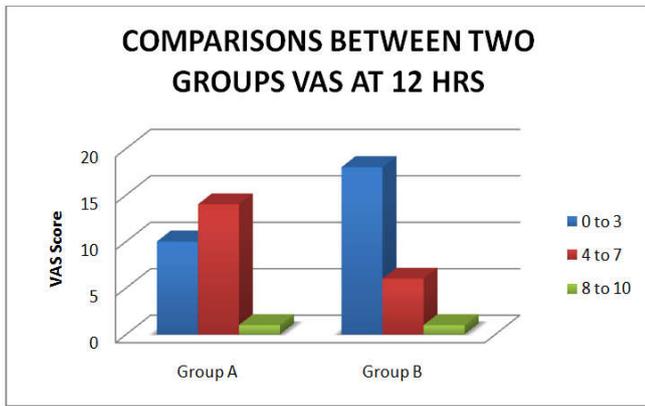


**Comparisons between two groups for vas 6 hrs**

Group A & B AT 6 HRS	
Mann – Whitney U value	210.0
‘p’ value	0.039
Significance (‘p’value<0.05)	Significant

**Table 4. Comparisons between two groups vas at 12 hrs**

Vas Score	Group A	Group B
0 to 3	10	18
4 to 7	14	6
8 to 10	1	1



Comparisons between two groups for vas 12 hrs

Group A & B AT 12 HRS	
Mann – Whitney U value	199.50
'p' value	0.026
Significance ('p' value < 0.05)	Significant

Table 5. Comparisons between two groups vas at 24 hrs

Vas Score	Group A	Group B
0 to 3	6	15
4 to 7	17	8
8 to 10	2	2

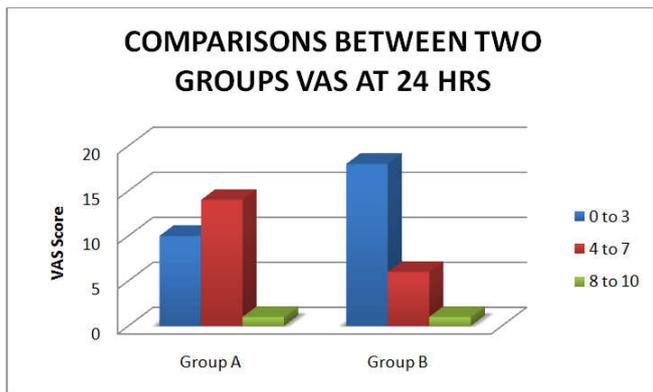


Table 7. Comparison of different study and present study for demographic data

Study	Sample Size	Sex ratio M/F	Mean age	Comparison
Maestroni <i>et al</i> 2002	60	23/37	54.9±15	Intraperitoneal bupivacaine Vs Placebo
Sabzi Sarvestani 2014	60	24/36	44.16±8.31	Intraperitoneal bupivacaine Vs Intraperitoneal bupivacaine plus hydrocortisone
Mehdi Mohemmadi	62	23/37	44.3±3.16	Intraperitoneal hydrocortisone Vs placebo
Present Study	50	15/35	38.7±16.5	Intraperitoneal bupivacaine Vs Intraperitoneal bupivacaine plus hydrocortisone

Table 8. Comparison of mean vas score in different study

Vas Score	Sabzi Sarvestani 2014 (P value)	Mehdi Mohemmddi (P value)	Present study (P value)
0 hr	0.001	0.025	0.3950
6 hr	0.001	0.007	0.039
12 hr	0.001	0.006	0.026
24 hr	0.004	0.012	0.046

Comparisons between two groups for vas 24 hrs

Group A & B AT 24 HRS	
Mann – Whitney U value	211.0
'p' value	0.046
Significance ('p' value < 0.05)	Significant

Table 6. Table statistical analysis of vas by mann whitney u test regarding vas value

VAS Score	GROUP	VAS
0 hrs	A	1.48
	B	1.08
6 hrs	A	3.24
	B	2.40
12 hrs	A	4.28
	B	3.28
24 hrs	A	5.04
	B	4.00

On comparing study Group A with study Group B for post-operative VAS value which was less in GROUP B. 'p' value was highly significant (p<0.05) at 6 hrs, 12 hrs and 24 hrs VAS Score. There was no significant difference in VAS Score in group A and group B at 0 hrs. On comparison by Mann Whitney U Test between Group A and B, data shown for pain that the VAS value was less at all assessment as compared to Group A.

DISCUSSION

Laparoscopic Cholecystectomy results in less post operative pain and / or reduced analgesic consumption as compared with open Cholecystectomy. Still some patients of LC experience considerable discomfort during first 24 postoperative hours. There are many methods of analgesia with varying rates of success to diminish the intensity of post-operative pain after laparoscopic Cholecystectomy.

These include

- Low-pressure pneumoperitoneum,
- Local Anaesthetic (LA) infiltration at trocar site, (Barczynski *et al.*, 2005; Coughlin *et al.*, 2010; Lee *et al.*, 2001; Mixter and Hackett, 1997)
- Instillation of the sub-diaphragmatic region with a local anaesthetic, usually using Bupivacaine, (Barczynski *et al.*, 2005; Maestroni *et al.*, 2002; Pascqualucci *et al.*, 1996; Coughlin *et al.*, 2010; Lee *et al.*, 2001)

- Use of conventional opioids and non opioids analgesics in the postoperative period.

Bupivacaine a local anaesthetic agent used in present study for intraperitoneal instillation for post operative pain relief after removal of gall bladder because it is most commonly used in

most of previous studies for pre-emptive analgesia. (Barczynski *et al.*, 2005) The peak serum level of intraperitoneal Bupivacaine is reached 20 to 30 min after application and lasts for 2 to 24 hours after surgery because the half life of Bupivacaine is 1.5 – 5.5 hours. Hydrocortisone is added to bupivacaine for this study to improve the pain control. It has been shown that glucocorticoids can play a crucial role in the regulation of inflammatory response through both genomic and nongenomic mechanisms and therefore may reduce pain. (Stahn and Buttgerit, 2008) Prolonging the onset and duration of nerve blockade that can reduce their effective dosage and side effects by addition glucocorticoid to local anaesthetics showed in different studies. (Mirzai *et al.*, 2002; Stan *et al.*, 2004) Comparison of present study with Sabzi Sarvestani and Mehdi Moheemdi shows that the p value of VAS Score at 0 hr is not significant as in both study. While p value at 6hr, 12hr and 24hrs are statistically significant as in both study. Significant difference in VAS score can be explained by action of glucocorticoids which prolong the onset and duration of nerve blockade by local anaesthetics. Limitations with this study are that, We did not adopted saline (placebo) controlled design, which would have raised more questions. Although all surgeries followed a strict protocol, the patients were operated by a number of surgeons with varying experiences; hence minor variations in surgical technique and tissue handling may have been there. Though the patients were properly educated about VAS, some illiterate patients could not be adequately understood the instruction and accordingly in certain instances they may not have revealed their pain appropriately.

### Conclusion

This study suggest that intraperitoneal preoperative pre-emptive instillation of hydrocortisone with bupivacaine in laparoscopic Cholecystectomy significantly reduce post operative pain at 6 hr, 12 hrs and 24 hrs in comparison to bupivacaine alone. While the reduction in pain at 0 hr is not significant.

### List of abbreviations

LC : Laparoscopic Cholecystectomy  
 ASA : American society of anaesthesiologists  
 SPSS : Statistical presenting system software  
 VAS : Visual analogue scale

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