ORIGINAL ARTICLE

EFFECTIVENESS OF LOCAL ANAESTHETIC IN REDUCING POSTOPERATIVE PAIN AT PORT SITE AFTER LAPAROSCOPIC CHOLECYSTECTOMY

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Background: Laparoscopy has become the highest quality level way to deal with cholecystectomy since its inception 30 years preceding, and is perhaps the most normally performed general surgeries. Pain being a significant issue after laparoscopic cholecystectomy bringing about extended admissions or readmissions. With significant varieties in pain relieving conventions an integrated approach is important to diminish pain. The aim of this study is to assess the effectiveness of Bupivacaine as local anesthetic agent at port sites after laparoscopic cholecystectomy. **Methods:** Study population of 84 patients was divided into control group (receiving no local anesthetic) and study group (receiving Bupivacaine as local anesthetic). Visual analogue scale was used to quantify and compare pain perceived by each group; at fixed intervals of 6, 12 and 24 hours after shifting of the patients back to the ward. **Results:** Each group comprised 42 patients. At 6 hours post operative pain score in study group, 4.5±0.32 was significantly lower than in control group, 7.6±0.41 (p<0.05). Though pain assessments at 12 and 24 hours didn't reveal any significant differences among the two groups; postoperative requirement of Tramadol was significantly (p<0.05) lower in study group (92±0.064mg) in comparison to control group (158±0.21mg). **Conclusion:** Use of long-acting local anesthetic injections at port sites after laparoscopic cholecystectomy significantly lowers pain during first 6 hours post operatively and also lowers narcotic analgesics requirements during post operative period.

Keywords: Laparoscopic Cholecystectomy; Local anesthetic; Bupivacaine

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INTRODUCTION

The first successful laparoscopic cholecystectomy was performed by Erich Muhe in Germany in 1985.[1] In modern world Laparoscopic cholecystectomy is now a conventional and recognized form of management for patients with symptomatic cholelithiasis.[2] It has replaced open cholecystectomy in countless countries on the globe with the benefits of reduced post operative pain, less hospital stay, declined morbidity rate and cost effectiveness.[3] At this moment, laparoscopic cholecystectomy is designated for the treatment of cholecystitis both acute and chronic, symptomatic cholelithiasis, Acalculus cholecystitis, biliary dyskinesia and gall bladder masses.[4] However, minimizing pain at port site subsequent to laparoscopic cholecystectomy still remains a clinical challenge. Pain reaches at ceiling level within 6 hours of the procedure, followed by gradual decline over a couple of days if no complication or obstacle occurs.[5]

There are various hypotheses regarding etiology of pain including damage to abdominal wall, trauma to viscera with inflammation and peritoneal irritation due to CO_2 retention. It has been hypothesized that after laparoscopic cholecystectomy extreme acute pain might perhaps forecast the progress into chronic pain.[6] Pain is linked with various factors in laparoscopic cholecystectomy like somatic, visceral, and phrenic nerve irritation.[7] Local tissue infiltration with local anesthetics is one of the simple, yet effective, techniques to prevent and control pain in first 24 hours. This response to intra-peritoneal local anesthetics is mediated by local peritoneal effects rather than by systemic absorption and has a lot of other advantages like simplicity, safety and low cost[8]. Bupivacaine has the longest half life of the generally used local anesthetic drugs in modern-day anesthesia practices. It has half life of 2.5–3 hours and controls pain to average of 6 hours.[9] The aim of this study is to assess the effect of insertion of Bupivacaine at port site to reduce pain after laparoscopic cholecystectomy.

MATERIAL AND METHODS

This was a 3 years study extending from December 2016 through November 2019 conducted at Surgical B unit of Ayub Medical Complex, Abbottabad. After approval from ethical committee this randomized control trial was carried on a group of 84 patients who

were diagnosed to have symptomatic cholelithiasis and underwent laparoscopic cholecystectomy. Fully informed written consents were obtained prior to enrollment. Inclusion criteria were the fulfillment of American society of Anesthesiologists (ASA) class I or II, while exclusion criteria were: Conversion to open procedure, history of intra-abdominal drain placement, choledocholithiasis, previous upper abdominal surgery, patients received opioid or tranquilizers or any other analgesic drugs before surgery, history of alcohol or drug abuse, and patients with immediate postoperative complications. Patients were randomized into two groups by blocked randomization by using permuted blocks of 6. After completion of surgery, evacuation of residual CO_2 was made sure then about 20 ml of 0.5% Bupivacaine solution was instilled into port sites, 6ml was instilled into midline port side each and 4 ml into lateral port sites before suturing skin in the study group. In all cases residual CO_2 was evacuated by introducing reducers and abdominal compressions before closure of ports. After shifting patient to the ward, the arrival time was identified as zero hour. Pain intensity was measured at fixed time interval of 8 hours, 16 hours and 24 hours respectively by using visual analogue scale (VAS). Patient were given narcotic analgesics intravenously (Tramadol 50 mg/ml + Dimenhydrinate 50mg/ml) upon requirement.

Data was entered in SPSS version 26.0 and analyzed. Mean and standard deviation was calculated for quantitative variables and frequency with percentage was calculated for qualitative variables. Bar chart was used to see the pain site prevalence. Independent student t test was applied for significance testing at 5% level.

RESULTS

Eighty-four patients were enrolled in this study according to inclusion criteria. Among these 52 patients (61.9%) were female and 32 patients (38.0%) were male. Of all the female to male ratio was 1.6: 1. Patients with average age group were from 40 years to 65 years with mean of 52.5. There were 42 patients in each group with female to male ratio of 1.5:1. Post operative pain was assessed at fixed interval 6 hrs., 12 hrs. and 24 hrs.

It shows that there was significant difference in mean pain score at six-hour post operatively (p<0.05) while there was no difference at 12- & 24-hour post operatively (p>0.05) as shown in Table-1.

In initial 6 hours the dominant pain site was trocar (incision) site in 49 (58.3%) patients followed by generalized abdominal pain (visceral pain) in 28 (33.3%) patients and shoulder tip pain in 7 (8.3%) patients.

In first 24 hours post operatively mean dose requirement of Tramadol in Bupivacaine group was (92±0.064 mg) while in control group was (158±0.21) & the difference was found to be statistically significant.

The mean post operative assessment time in control group at all fix intervals was observed to be more as compared to Bupivacaine group with all significant p-values.

The highest mean dose was found in control group as compared to Bupivacaine group and significant p-value showing that the same dose of Tramadol not given to patients of both groups.

Table-1: Post operative pain assessment at fixed interval

Post operative pain assessment time	Bupivacaine group (n=42)	Control group (n=42)	p-value
6 hr	4.5±0.32	7.6±0.41	<0.05
12 hr	2.1±0.25	2.3±0.6	>0.05
24 hr	1.8±0.81	2.1±0.54	>0.05

Table-2: Distribution of patients in accordance to pain 6 hours post operatively

Pain site	Number of patients	Percentage
Trocar site	49	58.3
Abdominal	28	33.3
Shoulder tip	7	8.3
Total	84	100

.

Table-3: Post operative pain was assessed at fixed interval

	Group Name	N	Mean	Std. Deviation	*p*-value
Post op assessment time (6 Hours)	Control group	42	7.60	1.07	0.000
	Bupivacaine group	42	4.50	0.98	
Post op assessment time (12 Hours)	Control group	42	2.30	0.39	0.024
	Bupivacaine group	42	2.10	0.41	
Post op assessment time (24 Hours)	Control group	42	2.10	0.44	0.000
	Bupivacaine group	42	1.80	024	

Table 4: Tramadol Dose

	Group Name	N	Mean	Std. Deviation	*p*-value
Tramadol Dose	Control group	42	158.0476	20.40200	0.000
	Bupivacaine group	42	92.8095	11.33791	

DISCUSSION

In modern surgical practice laparoscopic procedures are gold standard due to early recovery, and short hospital stay but postoperative port site pain after laparoscopic cholecystectomy is a major complaint and efforts are made to overcome this complaint.[10] The pain usually occurs in right upper quadrant (visceral), port sites (somatic) and shoulder tip (due to pneumo peritoneum).[11] Though there is some controversy regarding source of this pain as some clinicians believe placement of ports through abdominal wall is the source while few other argue that most pain arises due to abdominal wall distension secondary to insufflations of CO_2.[2] Early pain after laparoscopic cholecystectomy is multifactorial & different treatments options are being practiced. Use of local anesthetic at port site is an attractive treatment option. Instillation of local anesthetic agent at trocar site & in sub diaphragmatic region as a method of pain control has been evaluated in many trials.[13] There is variation in pain scores, especially at 6^{th} hour postoperatively. We observed differences in pain scores between two groups. Infiltration of a local anesthetic agent, Bupivacaine at port site diminishes pain peak in 6^{th} hour and further reduces need for narcotic analgesics. Similar findings were noticed in other studies.[14,15] It was also observed that those who received Bupivacaine required less dosage of narcotic analgesics.

On comparing the incidences of pain localizing sites in early 6-hour period post operatively it is evident (Table-3) that trocar site pain dominates other pain sites, same results noticed by from Nazir & Merdan.[16] Hanna RS *et al.*[17] assumed that somatic or parietal pain is important as or more than visceral pain in first 24–48 hours. In our study post operative shoulder tip pain was 8.3% while in some studies higher values were reported it can be explained, as in our learn assessment of pain localization was done during first 24 hours postoperatively while shoulder tip pain predominantly occurs on third or fourth day.[18] Our pain assessment spotlight was merely on laparoscopic cholecystectomy patient while in few studies mentioned above assessment were made on patients undergoing diverse laparoscopic procedures. We did not notice any side effects related to use of Bupivacaine as local anesthetic for postoperative pain control, as consistent with result of Bisgaard *et al*.[19]

The strengths of the study are that data was diligently collected and analyzed. Small sample siz is a weakness.

CONCLUSION

After laparoscopic cholecystectomy infiltration of port site with long-acting anesthetic provides a marked pain relief in first 6 hours of postoperative period. It also minimizes use of narcotic analgesics.

AUTHOR'S CONTRIBUTION

IA: Principal author, data collection. SB: drafting the research paper, corresponding author MSK: Refining the basic idea and objectives of research.

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