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Original Research Article

Study of analgesia using bupivacaine as local infiltration in cholecystectomy

Shridhar Kuradagi*, Krishnareddy Navalli

Department of Surgery, Gadag Institute of Medical Sciences, Karnataka, India

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***Correspondence:**
Dr. Shridhar Kuradagi,
E-mail: shridharkuradagi@gmail.com

ABSTRACT

Background: Minimally invasive procedures hold an important position in nowadays' surgical practice. Laparoscopic cholecystectomy has become the main treatment of symptomatic cholelithiasis. Post-operative pain management has been a constant challenge to many of the surgeons. Effective relief of pain has got physiological and psychological benefits. Because of their side effects most of the analgesic dosage is inadequate. There is need for developing newer modalities which can provide good analgesia with fewer side effects. The objective of the study was to compare preemptive and preclosure infiltration of bupivacaine in reducing post operative pain and analgesic requirement.
Methods: Double blind randomized clinical trial was done in GIMS Hospital Gadag. Total of 40 patients, 20 undergoing open Cholecystectomy, 20 undergoing laparoscopic Cholecystectomy were included in study. Post-operative pain measured using numerical VAS and amount of analgesic use.
Results: In open Cholecystectomy there was significant difference in pain score at 3rd hr and 6th hr. Requirement of rescue analgesia occurred early in preclosure group and also the numbers of doses required were more when compared to preemptive grou. Requirement of rescue analgesia occurred early in preclosure group and also there was significant difference in analgesic requirement at 6th hr and at 10th hr.
Conclusions: Preemptive infiltration is helpful in delaying first dose of analgesic and decreasing the number of analgesic doses in first 48 hrs postoperatively in open cholecystectomy. Preemptive infiltration of bupivacaine delays the time duration for the requirement of first analgesic dose and may also be helpful in reducing the number of analgesic doses in postoperative period when compared to preclosure infiltration in common abdominal surgeries.

Keywords: Analgesia, Bupivacaine, Cholecystectomy

INTRODUCTION

Minimally invasive procedures hold an important position in nowadays' surgical practice. Laparoscopic cholecystectomy has become the main treatment of symptomatic cholelithiasis. It represents the most common laparoscopic procedure performed all over the world and has been performed as a day-care procedure for over a decade.[1] The most important benefits of such procedure are less discomfort, shorter hospitalisation and earlier return to normal activity.

Although this is the case, the patients usually suffer from post-operative pain, especially with coughing, respiratory movements and mobilisation during the first hours and shoulder pain secondary to peritoneal insufflation after the eighth post-operative hours and during the night after surgery. This can delay the patient's recovery, lengthen the hospital stay and increase morbidity and costs.[2,3] Postoperative pain is treated inadequately in about one half of people undergoing surgeries under treatment results in unacceptable levels of pain with tachycardia and analgesic administration above patient's requirement

increases side effects such as nausea, vomiting, somnolence and dizziness.

There are few clinical studies that answer the effectiveness preemptive analgesia. We need to know if the effect is clinically apparent at safe drug doses and also the efficacy of preemptive analgesia in reducing post-operative analgesic requirement has to be evaluated.[4] Although there are many studies using bupivacaine as local anaesthetic, few studies have used levobupivacaine and the timing and route of administration of the local anaesthetic agent were different in most of them. 5 In the present study, we aim to evaluate and compare preemptive and preclosure analgesia using 0.25% bupivacaine infiltration in reducing post-operative wound pain.

METHODS

This stratified randomized double blind clinical trial was carried out in Gadag Institute of Medical Sciences Hospital, Gadag, over a period of one year between May 2014 to April 2015. The study population consisted of 40 patients who met inclusion and exclusion criteria and were divided into 3 groups. Group I consisted of 20 patients undergoing open Cholecystectomy, Group II consisted of 20 patients undergoing Laparoscopic cholecystectomy each group was divided into two subgroups preemptive and preclosure to receive infiltration accordingly.

Acute abdomen/ peritonitis cases; preoperative use of analgesics > 3 days per week for > 3 months; pediatric patients; patients having chronic pain (>3 months); history of chronic drug /alcohol abuse; epidural/spinal anesthesia; undergoing re-operation; severe hepatic, renal, CVS dysfunction were excluded from the study. The study population underwent stratified randomization to receive infiltration from pre-loaded syringes such that each patient received bupivacaine infiltration either preemptively i.e. pre incision or pre-closurely i.e. just before closure is done. Standard protocol was followed during infiltration of bupivicaine. Pre-emptive infiltration was given after induction of anaesthesia and painting and draping the parts. Incision was taken about 5 min after the infiltration. The timing of preemptive infiltration, the duration of surgery, its intra-operative findings and the time of pre-closure infiltration were noted.

Evaluation of pain was done post-operatively using visual analogue score at 3rd hour, 6th hour 10th hour, 24th hour, 32nd hour and 48th hour. Patient coming out of anaesthesia was taken as '0' hour. For each patient at each interval of time pain was tested in three modalities a-incisional pain, b- pain on pressure, c-pain on movement. Patient was asked to give individual score for each of them. Analgesic used was tramadol 100mg IV injection statistical analysis was done using Mann-Whitney 'U' test. Test of proportions was used for analysis of analgesic requirement in different groups.

RESULTS

Table 1: Evaluation of pain post-operatively using visual analogue score for open cholecystectomy.

	3 hr	6 hr	10 hr	24 hr	32 hr	48 hr	Average
Average pain score in PE subgroup	2.88	3.4	4.68	5.18	4.04	3.24	3.90
Average pain score in PC subgroup	3.84	4.44	4.78	4.58	4.18	3.44	4.21
P value	0.015	0.015	0.84	0.22	0.69	0.69	0.22
Statistical significance	Significant	Significant	Not significant	Not significant	Not significant	Not significant	Not significant
Total analgesic doses at each intervals in PE group	-	-	1	4	-	-	Total doses in PE group -5
Percentage of analgesic dosage in PE group	-	0%	20%	80%	0%	-	-
Total analgesic doses at each intervals in PC group	-	3	3	2	2	-	Total doses in PC group -10
Percentage of analgesic dosage in PC group	-	60%	60%	40%	40%	-	-
P value	-	0.019	0.098	0.098	0.056	-	-
Statistical significance	-	Significant	Not significant	Not significant	Not significant	-	-

Table 2: Evaluation of pain post-operatively using visual analogue score for laparoscopic cholecystectomy.

	3 hr	6 hr	10 hr	24 hr	32 hr	48 hr	Average
Average pain score in PE subgroup	2.22	2.56	3.5	4.58	4.38	3.5	3.46
Average pain score in PC subgroup	2.1	2.54	3.72	4.86	4.02	3.52	3.46
P value	0.69	0.84	0.30	0.22	0.42	0.84	0.84
Statistical significance	Not significant	Not significant	Not significant	Not significant	Not significant	Not significant	Not significant
Total analgesic doses at each intervals in PE group	-	-	-	2	3	-	5
Percentage of analgesic dosage in PE group	-	-	-	40%	60%	-	-
Total analgesic doses at each intervals in PC group	-	-	-	4	1	-	5
Percentage of analgesic dosage in PC group	-	-	-	80%	20%	-	-
P value	-	-	-	0.098	0.098	-	-
Statistical significance	-	-	-	Not significant	Not significant	-	

There was statistically significant difference in pain scores at 6 hrs. There was no statistically significant difference in pain scores at 10 hrs, 24 hrs, 32 hrs and 48hrs and in the average pain scores (Table 1). There was no statistically significant difference in pain scores at 3hrs, 6 hrs 10 hrs, 24 hrs, 32 hrs, and 48 hrs and in the average pain score (Table 2).

DISCUSSION

Laparoscopic cholecystectomy is one of the commonest day-care surgeries. The post-operative pain associated with this minimally invasive procedure is generally less intense and lasts a shorter time than that follow open cholecystectomy but it remains a prevalent problem of the early post-operative period and may delay discharging the patient, especially in day-case departments. It reaches a peak within the first few hours following the operation but diminishes with time.[6-9] The origin of pain after laparoscopic cholecystectomy is multifactorial with pain arising from the incision sites (somatic pain), from the gallbladder bed (visceral pain) and as a consequence of a pneumoperitoneum. Though the pain scores were less in pre-emptive group. There was no statistically significant difference in pain scores at any interval (Table 2). Though all the patients received only one dosage of rescue analgesic (IV Tramadol 100mg) in both the groups, overall the requirement occurred early in pre-closure group. But there was no statistically significant difference in analgesic requirement at any intervals.

Preemptive infiltration of bupivacaine is marginally better than preclosure infiltration in reducing postoperative pain in open cholecystectomy. It is helpful in delaying first dose of analgesic and decreasing the number of analgesic doses in first 48hrs postoperatively in open cholecystectomy. There is no significant difference in preemptive and preclosure infiltration of bupivacaine in reducing postoperative pain in laparoscopic cholecystectomy. Preemptive infiltration is helpful in delaying first dose of analgesic as compared to preclosure infiltration in laparoscopic cholecystectomy.

Preemptive infiltration of bupivacaine is marginally better than preclosure infiltration in reducing postoperative pain in elective laparotomy. It is also helpful in delaying first dose of analgesic and decreasing the number of analgesic doses at certain intervals. Many researchers have suggested that the combination of somatovisceral local anaesthetic treatment reduces incisional, intra-abdominal and shoulder pain in laparoscopic cholecystectomy.[10-12] These local agents induce antinociception by acting on the nerve membranes. They reversibly decrease the rate of depolarisation and repolarisation of excitable membranes (like nociceptors). There are different routes to administrate the local anaesthetic drug; some researchers have shown that local parietal anaesthesia is effective in controlling post-operative pain, while others have shown that it is not effective.

Some studies failed to demonstrate any pain reduction with intraperitoneal bupivacaine after laparoscopic

cholecystectomy, while others have noted only reduced shoulder pain with overall pain not affected.[13,14] On the contrary, some studies have shown that intraperitoneal lidocaine reduces effectively both shoulder pain and abdominal post-operative pain after laparoscopic cholecystectomy.[15-16] In the present study, post-operative right shoulder pain is less with patients assigned to intraperitoneal infiltration of local anaesthetic than those who are assigned to intraincisional infiltration, yet it is not statistically significant. This insignificant result may be due to reduced contact with the gallbladder bed as a result of continuous flux of intraperitoneal liquids. This fact also explains the large difference in results shown by different authors.

CONCLUSION

The present study showed that intraincisional infiltration of levobupivacaine is more effective than intraperitoneal route in controlling post-operative abdominal pain. It decreases the post-operative analgesia requirements. Although it is insignificant, shoulder pain is less with intraperitoneal infiltration. Overall, though preemptive infiltration of bupivacaine reduces pain better than preclosure infiltration in common abdominal surgeries but it may be not significant. Preemptive infiltration of bupivacaine delays the time duration for the requirement of first analgesic dose and may also be helpful in reducing the number of analgesic doses in postoperative period when compared to preclosure infiltration in common abdominal surgeries.

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