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Original Research

Assessment of the efficacy of Intraperitoneal Instillation of Levobupivacaine (0.25%) plus Dexmedetomidine for postoperative analgesia in patients undergoing laparoscopic cholecystectomy

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ABSTRACT:

Background: Postoperative pain management remains a major challenge after laparoscopic procedures. Levobupivacaine has strongly emerged as a safer alternative for regional anesthesia than its racemic sibling, bupivacaine. Hence; under the light of above mentioned data, the present study was undertaken for assessing the efficacy of Intraperitoneal Instillation of Levobupivacaine (0.25%) plus Dexmedetomidine for postoperative analgesia in patients undergoing laparoscopic cholecystectomy. **Materials & methods:** A total of 50 patients were broadly divided into two study groups with 25 patients in each group as follows: Control group: Patients who were given 40 ml of normal saline, and Study group: Patients who were given 20 ml of 0.5% levobupivacaine plus Dexmedetomidine. Laparoscopic procedures were carried out in all the patients under general anesthesia. Postoperatively the patients were assessed for pain utilizing visual analogue scale (VAS) at different time intervals. Rescue analgesics (Inj. Diclofenac) was given when VAS is more than 3. **Results:** While comparing the mean VAS at different time intervals in between the two study groups, significant results were obtained. However; at 24 hours postoperatively, results were found to be non-significant. Smong the study group, only 6 patients required rescue analgesia, while in the control group, 5 patients required rescue analgesia at half hour postoperatively, 8 patients required rescue analgesia at one hour postoperatively, 12 patients required rescue analgesia at two hours postoperatively, 7 patients required rescue analgesia at 12 hours postoperatively and 1 patient required rescue analgesia at 24 hours postoperatively. Mean time to first analgesic requirement among the patents of the study group and the control group was found to be 142.2 minutes and 65.9 minutes. While comparing statistically, significant results were obtained. **Conclusion:** Levobupivacaine can be used safely for controlling postoperative analgesia in patients undergoing laparoscopic cholecystectomy.

Key words: Levobupivacaine, Laparoscopic cholecystectomy

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INTRODUCTION

Gallstone disease is often thought to be a major affliction in modern society. Cholecystectomy is the most common intraabdominal surgical procedure performed worldwide. Postoperative pain management remains a major challenge after laparoscopic procedures. Pain after laparoscopic surgery has a visceral component, as a result of surgical handling and diaphragmatic irritation by dissolved carbon dioxide and a somatic component due to the holes made in the abdominal wall for the trocars. Various methods have been tried to relieve postoperative pain following laparoscopic procedures.[1-3]

Opioid drugs, nonsteroidal anti-inflammatory drugs, or local anesthetics were used to reduce pain after laparoscopic surgeries with its adverse effects such as respiratory depression and nausea. Levobupivacaine has strongly emerged as a safer alternative for regional anesthesia than its racemic sibling, bupivacaine. Dexmedetomidine is found to be a vastly discriminating α-2 adrenoreceptor agonist that is confirmed to possess both analgesic and sedative properties.[4-6] Hence; under the light of above

mentioned data, the present study was undertaken for assessing the efficacy of Intraperitoneal Instillation of Levobupivacaine (0.25%) plus Dexmedetomidine for postoperative analgesia in patients undergoing laparoscopic cholecystectomy.

MATERIALS & METHODS

The present study was conducted in department of anesthesia with the aim of assessing the efficacy of Intraperitoneal Instillation of Levobupivacaine (0.25%) plus Dexmedetomidine for postoperative analgesia in patients undergoing laparoscopic cholecystectomy. A total of 50 patients of American Society of Anesthesiologists (ASA) grade I and II of age group 18 - 65 years of either sex, scheduled to undergo laparoscopic cholecystectomy surgery under general anesthesia were enrolled. Ethical approval was obtained from institutional ethical committee and written consent was obtained from all the patients after explaining in detail the entire research protocol. Pre-anaesthetic checkup of all the patients was done. All the patients were broadly divided into two study groups with 25 patients in each group as follows:

- Control group: Patients who were given 40 ml of normal saline, and
- Study group: Patients who were given 20 ml of 0.5% levobupivacaine plus dexmedetomidine

In each case detailed history and physical examination was carried out. Patients were asked to restrict fluids and solids by mouth at least six hours before operation. Laparoscopic procedures were carried out in all the patients under general anesthesia. Postoperatively the patients were assessed for pain utilizing visual analogue scale (VAS) at different time intervals. Rescue analgesics (Inj. Diclofenac) was given when VAS is more than 3. Various hemodynamic parameters were also monitored at different time intervals. All the results were recorded in Microsoft excel sheet and were analyzed by SPSS software.

RESULTS

In the present study, a total of 50 patients were analyzed and were broadly divided into two study groups; Study group and the control group. Mean age of the patients of the study group and the control group was found to be 42.8 years and 44.7 years respectively. There were 15 males and 10 females in the study group and 16 males and 9 females in the control group respectively. Mean VAS among the patients of the study group at baseline, half hour postoperatively, 1 hour postoperatively, 2 hour postoperatively, 8 hour postoperatively, 12 hour postoperatively and 24 hour postoperatively was found to be 2.5, 2.1, 2.2, 2.4, 1.5, 1.4 and 1.2 respectively. Mean VAS among the patients of the control group at baseline, half hour postoperatively, 1 hour postoperatively, 2 hour postoperatively, 8 hour postoperatively, 12 hour postoperatively and 24 hour postoperatively was found to be 2.9, 2.6, 2.9, 3.1, 2.9, 2.2 and 1.3 respectively. While comparing the mean VAS at different time intervals in between the two study groups, significant results were obtained. However; at 24 hours postoperatively, results were found to be non-significant. In the present study, among the study group, only 6 patients required rescue analgesia, while in the control group, 5 patients required rescue analgesia at half hour postoperatively, 8 patients required rescue analgesia at one hour postoperatively, 12 patients required rescue analgesia at two hours postoperatively, 7 patients required rescue analgesia at 12 hours postoperatively and 1 patient required rescue analgesia at 24 hours postoperatively. In the present study, mean time to first analgesic requirement among the patents of the study group and the control group was found to be 142.2 minutes and 65.9 minutes. While comparing statistically, significant results were obtained.

Graph 1: Age and gender-wise distribution

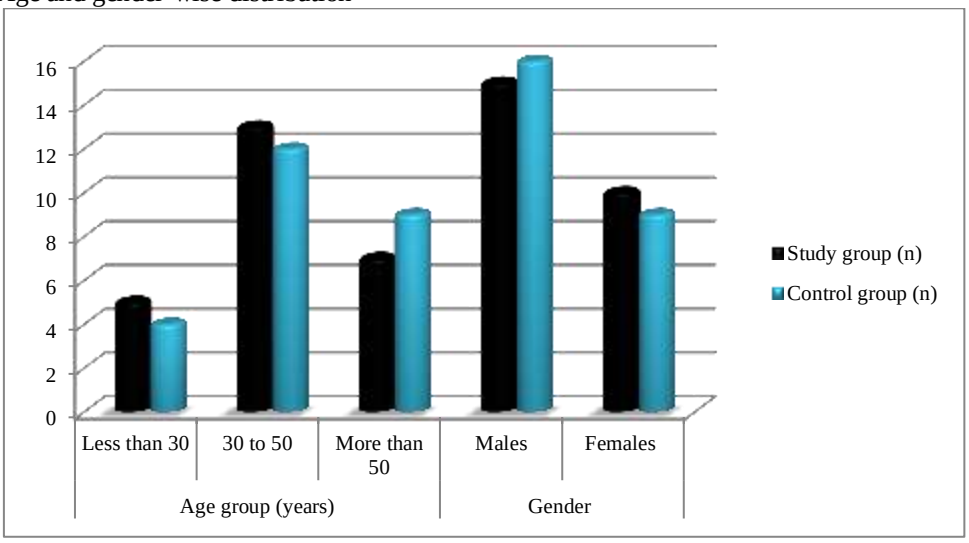

Table 1: Mean VAS

Time (Hours)	Study group	Control group	P value
0	2.5	2.9	0.00(S)
0.5	2.1	2.6	0.01(S)
1.0	2.2	2.9	0.00(S)
2.0	2.4	3.1	0.02(S)
8.0	1.5	2.9	0.01(S)
12.0	1.4	2.2	0.00(S)
24.0	1.2	1.3	0.85

S: Significant

Table 2: Number of patients requiring rescue analgesia

Time (hours)	Study group	Control group
0	0	0
0.5	0	5
1.0	1	8
2.0	5	12
12.0	0	7
24.0	0	1

Table 3: Mean time to first analgesic requirement

Parameter	Study group	Control group	p-value
Mean time (minutes)	142.2	65.9	0.00 (S)

S: Significant

DISCUSSION

Regional anesthesia techniques have seen numerous modifications over the last two decades with the advent of many new and safer local anesthetics. Bupivacaine, the widely used local anesthetic in regional anesthesia is available in a commercial preparation as a racemic mixture (50:50) of its two enantiomers, levobupivacaine, S (−) isomer and dextrobupivacaine, R (+) isomer. Levobupivacaine exerts its pharmacological action through reversible blockade of neuronal sodium channels. The dose as well as the route of administration of levobupivacaine determines the plasma concentration following therapeutic administration as the absorption is dependent upon the vascularity of the tissue. After epidural administration of levobupivacaine, the absorption is biphasic, with rapid absorption of a small quantity of drug into the circulation and slower absorption of the remainder of the drug. It has been observed that peak levels of levobupivacaine in the blood reaches approximately 30 min after epidural administration and doses up to 150 mg had resulted in mean Cmax levels up to 1.2 g/mL.[6- 8] Hence; under the light of above mentioned data, the present study was undertaken for assessing the efficacy of Intraperitoneal Instillation of Levobupivacaine (0.25%) plus Dexmedetomidine for postoperative analgesia in patients undergoing laparoscopic cholecystectomy.

In the present study, a total of 50 patients were analyzed and were broadly divided into two study groups; Study group and the control group. Mean VAS among the patients of the study group at baseline, half hour postoperatively, 1 hour postoperatively, 2 hour postoperatively, 8 hour postoperatively, 12 hour postoperatively and 24 hour postoperatively was found to be 2.5, 2.1, 2.2, 2.4, 1.5, 1.4 and 1.2 respectively. While comparing the mean VAS at different time intervals in between the two study groups, significant results were obtained. However; at 24 hours postoperatively, results were found to be non-significant. Louizos AA et al tested the use of preincisional and intraperitoneal levobupivacaine (L-B) 0.25% in laparoscopic cholecystectomies for postoperative analgesia. A total of 108 patients under general anesthesia were randomly assigned to receive preincisional local infiltration of 20 ml solution and intraperitoneal instillation of another 20 ml solution. Group A received for local infiltration and intraperitoneal instillation normal saline (NS). Group B received for local infiltration L-B 0.25% and for intraperitoneal instillation NS. Group C received for local infiltration NS and for intraperitoneal instillation L-B 0.25%. Group D received both for local infiltration and intraperitoneal instillation L-B 0.25%. They concluded that the combination of preincisional local infiltration and intraperitoneal instillation of L-B 0.25% shows an advantage for postoperative analgesia after laparoscopic cholecystectomy.[10]

In the present study, among the study group, only 6 patients required rescue analgesia, while in the control group, 5 patients required rescue analgesia at half hour postoperatively, 8 patients required rescue analgesia at one hour postoperatively, 12 patients required rescue analgesia at two hours postoperatively, 7 patients required rescue analgesia at 12 hours postoperatively and 1 patient required rescue

analgesia at 24 hours postoperatively. Papadima A et al reported that postoperative pain can prolong hospital stay and lead to increased morbidity. A total of 71 patients was randomized to receive either intraperitoneal analgesic (IPA group) or not (controls). At the completion of cholecystectomy, 10 mL of levobupivacaine 0.5% were infused intraperitoneally in the IPA group and 8 h postoperatively, whereas in the controls, 10 mL of 0.9% NaCl were administered in the corresponding points of time. Their study showed that 2 separate doses of intraperitoneally administered levobupivacaine significantly decreased postoperative pain and the need for opioids compared with placebo.[11]

In the present study, mean time to first analgesic requirement among the patents of the study group and the control group was found to be 142.2 minutes and 65.9 minutes. While comparing statistically, significant results were obtained. Hilvering B et al determined the effect of combined subcutaneous infiltration and intraperitoneal instillation of levobupivacaine before the start of LC on postoperative abdominal pain up to 24 h after surgery. Patients eligible for elective LC were randomized to receive preincisional infiltration and preoperative intraperitoneal instillation of 80 ml of either 0·125 per cent levobupivacaine (experimental group) or normal saline (placebo group). The duration of operation, use of anaesthesia, use of rescue analgesia, shoulder pain, duration of hospital stay and time to resumption of normal daily activities did not differ between the two groups. They concluded that combined subcutaneous and intraperitoneal administration of levobupivacaine did not influence postoperative abdominal pain after LC.[12]

CONCLUSION

From the above results, the authors conclude that Levobupivacaine can be used safely for controlling postoperative analgesia in patients undergoing laparoscopic cholecystectomy.

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