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Original Research

Ultrasound-guided transversus abdominis plane block with bupivacaine and ropivacaine as adjuncts for postoperative analgesia in laparoscopic cholecystectomies

[1]Dilshad T P, [2]Sindhura S, [3]R C Krishna Kumar

[1,2]Assistant Professor, [3]Medical Director, PK Das Institute of Medical Sciences, Vaniamkulam, Ottapalam, Kerala, India

ABSTRACT:

Aim: To compare ultrasound-guided transversus abdominis plane block with bupivacaine and ropivacaine as adjuncts for postoperative analgesia in laparoscopic cholecystectomies. **Methodology:** Eighty- four American Society of Anaesthesiologists physical status I/II patients aged 18–70 years who underwent laparoscopic cholecystectomy of either genderwere randomly divided into 2 groups of 42 each. Group 1patients underwent ultrasound-guided TAP block with 0.25% bupivacaine (plain) and group 2patients underwent ultrasound-guided TAP block with 0.375% ropivacaine (plain). Parameters such as the consumption of rescue analgesics and post-operative pain at 10 minutes, 30 minutes, 1 hour, 4 hours, 8 hours, 12 hours, and 24 hours was recorded. **Results:** Group 1 had 20 males and 22 females and group 2 had 21 males and 21 females. The mean weight of patients in group 1 was 65.2 kgs and in group 2 was 66.2 Kgs. The mean height was 157.2 cms in group 1 and 158.4 cms in group 2. The mean duration of surgery was 71.4 minutes in group 1 and 74.6 minutes in group 2. Number of patients requiring analgesics was 38 in group 1 and 32 in group 2. The difference was non- significant (P> 0.05). In both groups, at 10 minutes, the mean pain score at was 0. At 30 minutes, it was 1.9 in group 1 and 0.0 in group 2. At 1 hour was 3.0 in group 1 and 0.0 in group 2. At 4 hours was 2.6 in group 1 and 2.8 in group 2. At 8 hours was 2.2 in group I and 2.5 in group 2. At 12 hours was 1.6 in group 1 and 2.3 in group 2. At 24 hours was 1.2 in group 1 and 1.4 in group 2. **Conclusion:** In comparison to bupivacaine 0.25%, ultrasound-guided deposition of ropivacaine 0.375% in the TAP gave patients undergoing laparoscopic cholecystectomy better analgesia in the early post-operative period.

Key words: Bupivacaine, Laparoscopic cholecystectomy, Ropivacaine

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Corresponding author: Sindhura S, Assistant Professor, 3Medical Director, PK Das Institute of Medical Sciences, Vaniamkulam, Ottapalam, Kerala, India

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INTRODUCTION

Gallstones, sometimes referred to as cholelithiasis, are solid deposits or stones that occur in the gallbladder or bile ducts. Gallstones often form when there is an imbalance in the components of bile, such as calcium salts, bilirubin, and cholesterol.[1] Gallstones come in a variety of forms, such as cholesterol stones (the most prevalent type) and pigment stones (made of bilirubin). There are a number of risk factors known, despite the fact that the precise origin of gallstone formation is not entirely understood.[2]Gallstones are more common in women than in men, particularly in individuals who are pregnant, on hormone therapy, or using birth control pills. Gallstones are more likely to develop as people age, especially beyond the age of 40. The likelihood of acquiring gallstones rises with being overweight or obese. Through dieting or surgery, losing weight too quickly might cause gallstone formation. The risk of gallstones is raised by a high-fat, low-fiber diet.[3]

For the majority of individuals who need to have their gallbladders removed, laparoscopic cholecystectomy is recognized as a safe and efficient treatment.[4]Non-steroidal anti-inflammatory medications, opioids (intravenous [IV] patient-controlled analgesia), local anesthetic (LA) infiltration, thoracic epidural block, and multi-modal analgesia have all been used as pain

management techniques for laparoscopic cholecystectomy patients.[5]

By positioning LA in the neurofascial plane between the internal oblique and transversus abdominis muscles, the transversus abdominis plane (TAP) block blocks abdominal neural afferents. Because more and more abdominal surgeries are being performed under ultrasound guidance for more precise TAP localization, the TAP block is now recognized as an essential therapy for minimizing post-operative discomfort after abdominal surgery.[6] The present study comparedultrasound-guided transversus abdominis plane block with bupivacaine and ropivacaine as adjuncts for postoperative analgesia in laparoscopic cholecystectomies.

METHODOLOGY

This randomized prospective, observational study comprised of eighty- four American Society of Anaesthesiologists physical status I/II patients aged 18–70 years who underwent laparoscopic cholecystectomy of either gender. Ethical review committee approved the study. A valid written consent was obtained from all patients for participating in the study.

Demographic characteristics such as name, age, gender etc. was recorded. Patients were randomly divided into 2 groups of 42 each. Group 1patients underwent ultrasound-guided TAP block with 0.25% bupivacaine (plain) and group 2patients underwent ultrasound-guided TAP block with 0.375% ropivacaine (plain). Parameters such as the consumption of rescue analgesics and post-operative pain at 10 minutes, 30 minutes, 1 hour, 4 hours, 8 hours, 12 hours, and 24 hours was recorded. Results thus obtained were analysed statistically using chi-square test. Probability (p) value less than 0.05 was considered significant.

RESULTS

Table 1 Distribution of patients

Groups	Group 1	Group 2
Method	0.25% bupivacaine	0.375% ropivacaine
M: F	20:22	21:21

Group 1 comprised of 20 males and 22 females and group 2 had 21 males and 21 females (Table 1).

Table 2 Comparison of parameters

Parameters	Group 1	Group 2	P value
Mean weight (Kgs)	65.2	66.2	0.96
Mean height (cms)	157.2	158.4	0.92
Mean duration of surgery (mins)	71.4	74.6	0.84
Number of patients requiring analgesics	38	32	0.75

The mean weight of patients in group 1 was 65.2 kgs and in group 2 was 66.2 Kgs. The mean height was 157.2 cms in group 1 and 158.4 cms in group 2. The mean duration of surgery was 71.4 minutes in group 1 and 74.6 minutes in group 2. Number of patients requiring analgesics was 38 in group 1 and 32 in group 2. The difference was non- significant (P> 0.05) (Table 2, graph 1).

Graph 1 Comparison of parameters

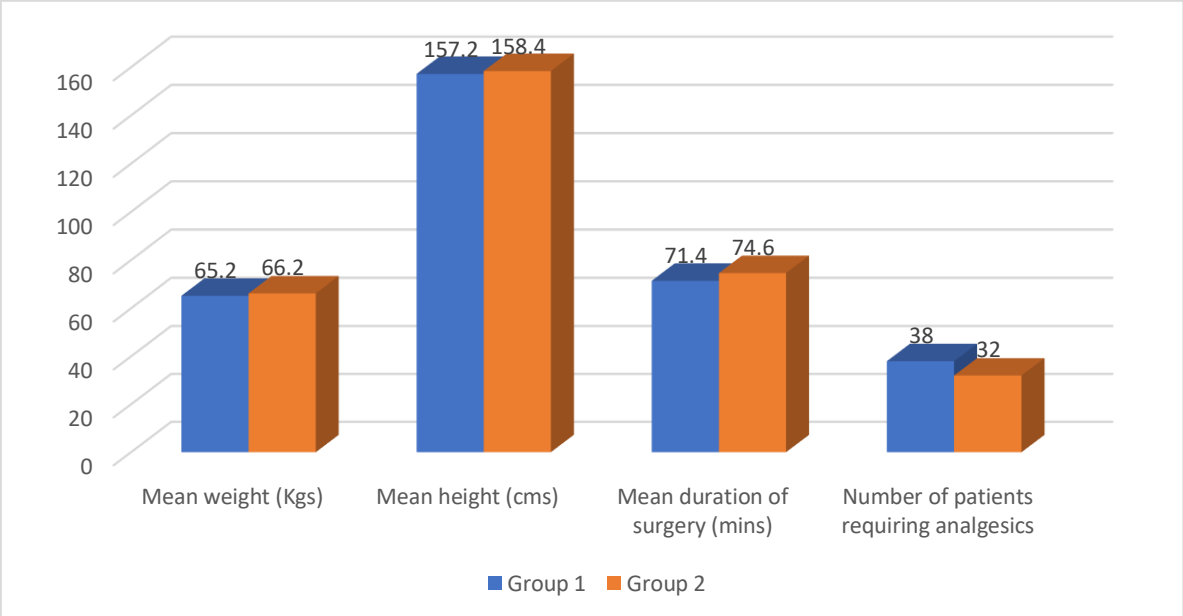
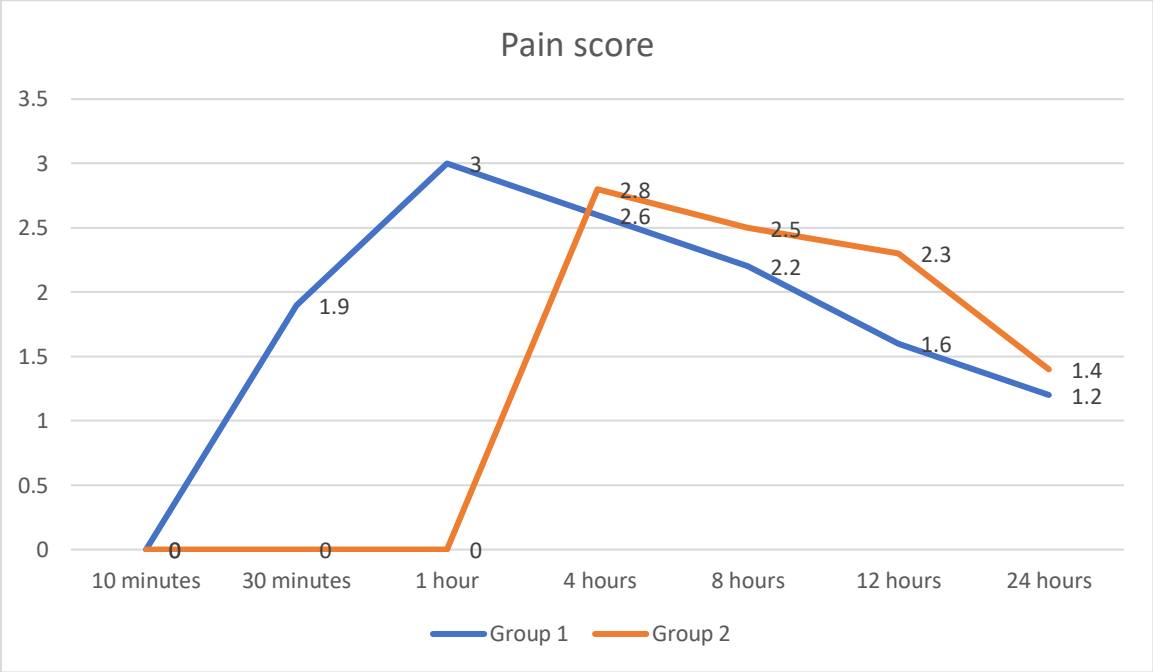


Table 3 Comparison of post-operative pain scores

Time period	Group 1	Group 2	P value
10 minutes	0	0	0.05
30 minutes	1.9	0	
1 hour	3.0	0	
4 hours	2.6	2.8	
8 hours	2.2	2.5	
12 hours	1.6	2.3	
24 hours	1.2	1.4	

In both groups, at 10 minutes, the mean pain score at was 0. At 30 minutes, it was 1.9 in group 1 and 0.0 in group 2. At 1 hour was 3.0 in group 1 and 0.0 in group 2. At 4 hours was 2.6 in group 1 and 2.8 in group 2. At 8 hours was 2.2 in group I and 2.5 in group 2. At 12 hours was 1.6 in group 1 and 2.3 in group 2. At 24 hours was 1.2 in group 1 and 1.4 in group 2. The difference was significant (P< 0.05) (Table 3, Graph 2).

Graph I Comparison of post-operative pain scores



DISCUSSION

The local anesthetic drugs bupivacaine and ropivacaine can both be added for postoperative analgesia during laparoscopic cholecystectomies.[7] Local anesthetics can be administered in a number of methods, such as epidural, intrathecal, and wound infiltration. Bupivacaine and ropivacaine are effective painkillers used during laparoscopic cholecystectomy because they prevent the brain from receiving pain signals from the surgical site when administered as wound infiltration.[8] According to studies, adding bupivacaine and ropivacaine to postoperative opioid regimens after laparoscopic cholecystectomies can decrease the demand for opioids and other medications, as well as postoperative pain scores and patient satisfaction with pain management.[9,10]There are several risks associated with using local anesthetics for postoperative analgesia, such as toxicity, allergic reactions, and nerve injury. Therefore, a trained healthcare professional should carefully review and oversee the use of bupivacaine and ropivacaine as adjuncts for postoperative analgesia during laparoscopic cholecystectomies.[11]The present study compared ultrasound-guided transversus abdominis plane block with bupivacaine and ropivacaine as adjuncts for postoperative analgesia in laparoscopic cholecystectomies.

There were 20 males and 22 females and group 2 had 21 males and 21 females. Sinha et al[12] compared the effectiveness of bupivacaine and ropivacaine for post-operative analgesia. All patients had their post-operative pain and use of rescue analgesics assessed at 10, 30, 1, 1, 4, 8, 12, and 24 hours. Patients receiving the ultrasound-guided TAP block with ropivacaine (Group II) experienced significantly less pain than those who received the block with bupivacaine (Group I) at 10 min, 30 min, and 1 h. However, the effects of both drugs were the same.

The mean weight of patients in group 1 was 65.2 kgs and in group 2 was 66.2 Kgs. The mean height was 157.2 cms in group 1 and 158.4 cms in group 2. The mean duration of surgery was 71.4 minutes in group 1 and 74.6 minutes in group 2. Number of patients

requiring analgesics was 38 in group 1 and 32 in group 2. In their study, Baaj et al[13] examined the efficacy of TAP block for postoperative analgesia in 40 patients who were undergoing postoperative caesarean births under spinal anesthesia with bupivacaine and fentanyl. Following the surgery, 20 patients each had a bilateral ultrasound-guided TAP block using either saline (S group, or placebo group) or bupivacaine 0.25% (B group). Then, the sole method of patient-controlled analgesia—i.v. morphine—was given. Each patient completed a pain, morphine intake, nausea, vomiting, sedation, patient satisfaction, and pain relief during mobilization (24 hours post-caesarean section) evaluation 24 hours after birth. The 40 participants all completed the study. Additionally, the bupivacaine group reported less morphine use and higher satisfaction with their pain management 24 hours after surgery.

In both groups, at 10 minutes, the mean pain score at was 0. At 30 minutes, it was 1.9 in group 1 and 0.0 in group 2. At 1 hour was 3.0 in group 1 and 0.0 in group 2. At 4 hours was 2.6 in group 1 and 2.8 in group 2. At 8 hours was 2.2 in group I and 2.5 in group 2. At 12 hours was 1.6 in group 1 and 2.3 in group 2. At 24 hours was 1.2 in group 1 and 1.4 in group 2.In patients undergoing laparoscopic cholecystectomy procedures who got TAP blocks with different concentrations of levobupivacaine (0.25-0.5%), Ra et al[13] found decreased post-operative pain scores and rescue analgesic need.

CONCLUSION

In comparison to bupivacaine 0.25%, ultrasound-guided deposition of ropivacaine 0.375% in the TAP gave patients undergoing laparoscopic cholecystectomy better analgesia in the early post-operative period.

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