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Comparison of Hemodynamic Characteristics with Intraperitoneal Levobupivacaine Alone Versus Dexmedetomidine as an Adjuvant to Levobupivacaine in Patients Undergoing Elective Laparoscopic Cholecystectomy Under General Anaesthesia.

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ABSTRACT

Background: Dexmedetomidine has emerged as an attractive premedication desirable in laparoscopic surgery wherein significant hemodynamic stress response is seen. Aim: To study the effect of dexmedetomidine as an adjuvant to levobupivacaine in patients undergoing laparoscopic cholecystectomy. **Methods:** This prospective, randomized, double-blind controlled study was conducted on 70 adults of ASA physical status I and II, scheduled for laparoscopic cholecystectomy under general anaesthesia. Patients were randomized to one of the two groups (n= 35 each), Group B and Group BD. Group B received intraperitoneal instillation of 28 ml of Levobupivacaine 0.25% with 2 ml of normal saline (total 30 ml solution), 10 minutes before extubation. While Group BD received intraperitoneal instillation of 25 ml of Levobupivacaine 0.25% with 0.5 mcq/Kg Dexmedetomidine (total 30 ml Solution), 10 minutes before extubation. Hemodynamic variables (heart rate, systolic, diastolic, mean arterial pressure), and SpO2. **Results:** General characteristics such as age, sex, BMI, ASA status, and duration of surgery were comparable between both groups (P>0.05). Hemodynamic variables (heart rate, systolic, diastolic, mean arterial pressure), and SpO2were comparable between both groups. **Conclusion:** Dexmedetomidine is safe and but has no added advantage in maintaining hemodynamic stability during laparoscopic cholecystectomy.

Keywords: Levobupivacaine, dexmedetomidine, hemodynamics.

INTRODUCTION

Laparoscopic surgery presents several new challenges for the anesthesiologist where an appraisal of the potential problems is essential for optimal anesthetic care, allowing early detection and reduction of complications. Although the overall mortality of laparoscopic surgery is low, preoperative consultation to estimate the risk of perioperative cardiovascular events is common.[1] Indeed, conflicting hemodynamic changes have been reported in association with laparoscopic surgery in humans.[2]

Various pharmacological agents like nitroglycerine, opioids etc. are used to provide hemodynamic stability during pneumoperitoneum,[3] but they have their own disadvantages. Dexmedetomidine is used as an adjuvant and is associated with prolonged motor and sensory block, hemodynamic stability, and less requirement of rescue analgesia in 24 h as a result it facilitates reduction in dose of local anesthetic.[4]

In this study, we compared the hemodynamic characteristics with intraperitoneal Levobupivacaine alone versus Dexmedetomidine as an adjuvant to Levobupivacaine in patients undergoing elective laparoscopic cholecystectomy under general anaesthesia.

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MATERIALS AND METHODS

This study was carried out on patients between 20 to 60 years of age of either sex belonging to American Society of Anesthesiologists (ASA) physical status 1 and 2 and scheduled for elective laparoscopic cholecystectomy scheduled under general anaesthesia were included in this study at Department of Anesthesiology, and Surgery, Dr. RPGMC, Kangra at Tanda, Himachal Pradesh. The patients were excluded if with cardiovascular or respiratory disorders (diabetes, hypertension, asthma), obesity (BMI>30 kg/m2), and/or difficult airway, history of sleep apnea and those for emergency procedures and need for leaving intra-abdominal drains.

After Institutional board approval and patients' written informed consent, patients were taken up for this randomized, double blind, controlled trial. Using computer generated random allocation; the patients were divided into two groups (35 patients in each group): Group (B): Patients received intraperitoneal instillation of 28 ml Levobupivacaine 0.25% with 2 ml of normal saline (total 30 ml solution), before 10 minutes of extubation; Group (BD): Patients received intraperitoneal instillation of 25 ml of Levobupivacaine 0.25% with 0.5mcq/kg of Dexmedetomidine (total 30 ml solution), 10 minutes before extubation.

Data analysis

Data were expressed as frequency, mean, and standard deviation. Quantitative and categorical variables were compared using Student t-test and Chi square test respectively. P value <0.05 was considered significant. Statistical analysis was performed using SPSS v21.

RESULTS

[Table 1] shows general characteristics of the study participants. General characteristics such as age, sex, BMI, ASA status, and duration of surgery were comparable between both groups (P>0.05).

Table 1: General characteristics.

Characteristic	Group B (n=35)	Group BD (n=35)	P value
Age (Years)	42.86±11.28	39.74±12.62	P=0.280
Gender, n (%) Male Female	 9 26	 9 26	P=1.000
BMI (Kg/m2) mean ±SD	21.63±1.80	21.63±1.78	P=1.000
ASA Grade n (%) I II	 30 5	 32 3	P=0.710
Duration of surgery (min)	40.00±11.43	40.65±10.70	P=0.807

Data were expressed as mean±SD otherwise mentioned

Table 2: Comparison of heart rate

	Group B	Group BD	P value
At start of drug	81.14±11.25	77.29±9.95	0.133
At extubation	80.86±11.62	76.2±10.87	0.880
30 min post-extubation	80.71±11.91	80.34±9.85	0.887

Data were expressed as mean±SD

Heart rate

Our study observed that mean heart rate was comparable between both groups at the start of drug (P=0.133), at extubation (P=0.880), and 30 min post-extubation (P=0.887) [Table 2].

Blood pressure

In the present study, mean systolic BP were not statistically different between both groups at the start of drug (P=0.061), at extubation (P=0.444), and 30 min post-extubation (P=0.868). Diastolic BP was significantly higher in group BD at the start of drug (P=0.017); however, diastolic BP was comparable at extubation (P=0.465), and 30 min post-extubation (P=0.159). Mean arterial pressure were not statistically different between both groups at the start of drug (P=0.260), at extubation (P=0.319), and 30 min post-extubation (P=0.183) [Table 3].

Oxygen saturation (SPO2)

Our study observed that mean SPO2 was comparable between both groups at the start of drug (P=0.632), at extubation (P=0.812), and 30 min post-extubation (P=0.344) [Table 4].

Table 3: Comparison of blood pressure

	Group B	Group BD	P value
Systolic BP			
At start of drug	121.63±6.33	118.74±6.34	0.061
At extubation	119.8±5.95	118.69±6.14	0.444
30 min post-extubation	120±6.37	120.23±5.06	0.868
Diastolic BP			
At start of drug	88.06±6.17	91.49±5.58	0.017
At extubation	91.69±7.03	90.49±6.63	0.465
30 min post-extubation	91.4±2.17	92.89±5.77	0.159
Mean arterial pressure			
At start of drug	99.25±5.29	100.58±4.48	0.260
At extubation	101.06±4.76	99.89±4.98	0.319
30 min post-extubation	100.93±2.29	102±4.11	0.183

Data were expressed as mean±SD

Table 4: Comparison of SPO2

	Group B	Group BD	P value
At start of drug	99.57±0.5	99.63±0.49	0.632
At extubation	99.43±0.5	99.4±0.5	0.812
30 min post-extubation	99.6±0.5	99.49±0.51	0.344

Data were expressed as mean±SD

DISCUSSION

An appraisal of the potential problems in laparoscopic surgery is essential for optimal anaesthetic care of patients. The anaesthetic technique for upper abdominal laparoscopic surgery is generally limited to general anaesthesia with neuromuscular blockade, tracheal intubation, and mechanical ventilation. Pneumoperitoneum during laparoscopic surgery leads to significant hemodynamic changes such as an increase in MAP and systemic vascular resistance (SVR) and a decrease in cardiac output. The decline in cardiac output and venous return can be attenuated by volume infusion before pneumoperitoneum. However, an increase in MAP and SVR requires therapeutic intervention. Techniques like reduction in intra-abdominal pressure during pneumoperitoneum and gasless laparoscopy using abdominal elevators have been tried to counteract these detrimental effects of pneumoperitoneum.[5-7] Pharmacological agents like β-blocker, opioids, increasing concentration of inhalational anaesthetic

agents, nitroglycerine, and α-2 adrenergic agonist have been used to minimize these hemodynamic derangements during laparoscopy with varied results.

In our study, there was no statistically difference in heart rate with dexmedetomidine when added as adjuvant to levobupivacaine. Masoori et. al.[8] observed that was a gradual reduction in heart rate after dexmedetomidine administration in patients of lap cholecystectomy with no significant difference. After intubation, there was increase in mean heart rate in patients of both groups which can be attributed to the increase in the central sympathetic outflow. Dexmedetomidine was effective for suppressing the rise in heart rate. The decrease in heart rate can be attributed to reflex response for transient hypertension during initial part of infusion and subsequently it was due to diminish nor-epinephrine release and inhibition of central sympathetic outflow.

Our study observed that systolic, diastolic BP, and mean arterial pressure were comparable in all the groups. Masoori et. al.[8] observed that systolic and diastolic BP were significantly lower with the higher dose of dexmedetomidine. As we have used dexmedetomidine in the dose of 0.5µg/kg as adjuvant to Levobupivacaine intraperitoneal; therefore, we didn't encounter the significant fluctuations in hemodynamic variables in our study.

CONCLUSION

Dexmedetomidine when added intraperitoneal to Levobupivacaine has no added advantage in maintaining hemodynamic stability.

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