



COMPARISON OF HEMODYNAMIC CHARACTERISTICS WITH INTRAPERITONEAL INSTILLATION OF LEVOBUPIVACAINE ALONE VERSUS WITH INTRAVENOUS DEXMEDETOMIDINE 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 intravenous dexmedetomidine along with intraperitoneal instillation of levobupivacaine in patients undergoing laparoscopic cholecystectomy

Patients and 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 A received intravenous 10 ml normal saline (NS) over 10 minutes before extubation along with intraperitoneal instillation of 28 mL Levobupivacaine 0.25% with 2ml of normal saline, while group B received dexmedetomidine 0.5 µg/kg intravenous (IV) in 10 ml normal saline (NS) over 10 minutes before extubation along with intraperitoneal instillation of levobupivacaine to total volume of 30 ml. Hemodynamic variables (heart rate, systolic, diastolic, mean arterial pressure), and SpO₂. Results: General characteristics such as age, sex, and ASA status were comparable between both groups (P>0.05). Hemodynamic variables (heart rate, systolic, diastolic, mean arterial pressure), and SpO₂ were comparable between both groups.

Conclusion: Dexmedetomidine is safe and but has no added advantage in maintaining haemodynamic stability during laparoscopic cholecystectomy.

KEYWORDS : Levobupivacaine, dexmedetomidine, heart rate

INTRODUCTION

Laparoscopic cholecystectomy is the best treatment choice for gall stones.¹ It is advantageous over open procedures due to less bleeding, better cosmesis, less postoperative pain, and shorter postoperative stay.² It produces significant haemodynamic changes specially in elderly and haemodynamically compromised patients.

Pneumoperitoneum affects several homeostatic systems leading to alteration in acid-base balance, cardiovascular, pulmonary physiology and stress response. The extent of cardiovascular changes associated with pneumoperitoneum include an increase in mean arterial pressure, decrease in cardiac output and increase in systemic vascular resistance which in turn compromise tissue perfusion.³

Various pharmacological agents were chosen to prevent haemodynamic changes associated with pneumoperitoneum. The present study aimed to compare effect of intraperitoneal instillation of levobupivacaine alone or in combination with intravenous dexmedetomidine.

PATIENTS 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 Anaesthesiology, 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 three groups (35 patients in each group): **Group (B):** Patients received intravenous 10 ml normal saline (NS) over 10 minutes before extubation along with intraperitoneal instillation of 28 mL Levobupivacaine 0.25% with 2ml of normal saline; **Group**

(BD): Patients received dexmedetomidine 0.5 µg/kg intravenous (IV) in 10 ml normal saline (NS) over 10 minutes before extubation along with intraperitoneal instillation of levobupivacaine to total volume of 30 ml.

Intraperitoneal instillations were guided by the camera on the surgical site and under both the cupulae of the diaphragm. The drug was injected intraperitoneally into the infraumbilical incision before the removal of trocar at the end of the surgery, in trendelenberg position to facilitate dispersion of drug solution in sub hepatic region. At the same time, the intravenous drug solution was given over a period of 5 minutes.

Statistical 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, and ASA status were comparable between both groups (P>0.05); however, the patients in group B had significantly higher BMI in comparison to the patients in group D (P=0.034).

Heart rate

Our study observed that mean heart rate was comparable between both groups at extubation (P=0.146), and 30 min post-extubation (P=0.517); however, at the start of drug, heart rate was significantly higher in patients in group B in comparison to group D (P=0.013).

Blood pressure

In the present study, mean systolic BP were not statistically different between both groups at the start of drug (P=0.481), at extubation (P=0.546), and 30 min post-extubation (P=0.696). Mean diastolic BP were not statistically different between both groups at the start of drug (P=0.230), at extubation (P=0.748), and 30 min post-extubation (P=0.822). Mean arterial pressure were not statistically different between both groups at the start of drug (P=0.507), at extubation (P=0.543), and 30 min post-

extubation (P=0.681) (Table 3).

Oxygen saturation (SPO₂)

Our study observed that mean SPO₂ was comparable between both groups at the start of drug (P=0.346), at extubation (P=0.637), and 30 min post-extubation (P=0.097) (table 4).

DISCUSSION

Pneumoperitoneum during laparoscopy produces significant haemodynamic changes, which can be detrimental especially in elderly and haemodynamically compromised patients.⁴ Various techniques and pharmacological agents have been used to counteract these detrimental effects of pneumoperitoneum.

This double-blind prospective study was carried out in 70 adult patients, to evaluate the effect of intravenous dexmedetomidine in attenuating haemodynamic stress.

Dexmedetomidine, which is the pharmacologically active dextro-isomer of medetomidine, is a newer highly selective α₂-adrenergic agonist, approved by Food and Drug Administration (FDA) in 1999.⁵ It has a ten-fold greater α₂:α₁ receptor selectivity and has a shorter duration of action than clonidine.⁵ It possesses hypnotic, sedative, anxiolytic, sympatholytic, and analgesic properties without producing significant respiratory depression.⁷

In present study, there was no change in hemodynamic variables in both groups at any point of time. Our study finds that stressful events do not lead to significant increase in heart rate, blood pressure, and MAP in patients undergoing laparoscopic cholecystectomy. However, a few other studies have reported a significant increase in hemodynamic variables in dexmedetomidine group in comparison to normal saline.^{8,9}

CONCLUSION

In conclusion, administration of intravenous dexmedetomidine provides no advantage along with intraperitoneal instillation of levobupivacaine.

Table 1: General characteristics

Characteristic	Group B (n=35)	Group D (n=35)	P value
Age (Years)	42.86±11.28	42.46±10.02	P=0.876
Gender, n (%)			
Male	9	12	P=0.434
Female	26	23	
BMI (Kg/m ²) mean ± SD	21.63±1.80	20.74±1.61	P=0.034
ASA Grade n (%)			
I	30	3	P=0.721
II	5	4	

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	75.09±8.45	0.013
At extubation	80.86±11.62	77.0±10.29	0.146
30 min post-extubation	80.71±11.91	78.94±10.84	0.517

Data were expressed as mean ± SD

Table 3: Comparison of blood pressure

	Group B	Group BD	P value
<i>Systolic BP</i>			
At start of drug	121.63±6.33	120.60±5.80	0.481
At extubation	119.8±5.95	118.94±5.87	0.546
30 min post-extubation	120±6.37	119.37±7.00	0.696

<i>Diastolic BP</i>			
At start of drug	88.06±6.17	89.77±5.65	0.230
At extubation	91.69±7.03	91.17±6.30	0.748
30 min post-extubation	91.4±2.17	91.17±5.58	0.822
<i>Mean arterial pressure</i>			
At start of drug	99.25±5.29	100.05±4.73	0.507
At extubation	101.06±4.76	100.43±3.78	0.543
30 min post-extubation	100.93±2.29	100.57±4.65	0.681

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	99.46±0.50	0.346
At extubation	99.43±0.5	99.49±0.51	0.637
30 min post-extubation	99.6±0.5	99.40±0.50	0.097

Data were expressed as mean ± SD

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