Research Article

Intravenous clonidine for intraoperative hemodynamic stability during laparoscopic surgeries

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Abstract

Clonidine is an alpha 2 adrenoreceptor agonist, which has emerged as an attractive premedication desirable in laparoscopy surgery, wherein significant haemodynamic response is seen. Its effectiveness in providing better intraoperative haemodynamics has been well proven. The minimum safe and effective dose of I.V. Clonidine is not yet determined to attenuate the haemodynamic stress response during laparoscopic surgeries. We did a study in which I.V. Clonidine 2µg/kg was given 30 minutes prior surgery. Haemodynamics variables (heart rate, systolic, diastolic and mean arterial pressure) were recorded at specific timings. Mean arterial pressure above 20% from baseline was considered significant and treated with Inj. Nitroglycerine

Keywords: Clonidine, Laparoscopy, Haemodynamic stability.

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INTRODUCTION

Laparoscopic surgery has various advantages, shorter hospital stay, smaller scar, early ambulation, less postoperative pain. Laparoscopy is not risk free as it is associated with significant haemodynamic changes due to creation of pneumoperitoneum, potential for systemic absorption of carbon dioxide and reverse Trendenlenberg position. There is increase in plasma renin activity, catecholamines and vasopressin due to direct effects of CO2 and due to increased intraabdominal pressure, leading to increase in mean arterial pressure and systemic vascular resistance. Various drugs like nitroglycerine, beta blocker and opioids are used to provide haemodynamic stability during laparoscopy but they have their own disadvantages. Clonidinedecreases sympathetic outflow, blood pressure, heart rate, induces sleep, anxiolysis, reduction in secretions, analgesia, reduction in requirements of opioids and other anaesthetics. These properties of clonidine make it ideal as an adjuvant in laparoscopic surgeries. The use of I.V. Clonidine instead of oral gives us better control overdosing of Clonidine. The present study was undertaken with the objective of evaluating the extent of haemodynamic changes during laparoscopic surgeries.

MATERIALS AND METHODS

This is a study of 50 cases undergoing laparoscopic procedures which are done after informed, written consent of patients. The types of surgeries done are shown in Table 1

Table 1:

Sr. No.	Name of Surgery	No. of cases
1	Appendicectomy	22
2	Cholecystectomy	5
3	Diagnostic Laparoscopy for sterility	15
4	Ectopic Pregnancy	3
5	Lap. Assisted Vaginal Hysterctomy	5

Patients of ASA Grade I, II, in the age group of 20 to60 years of either sex, body weight of 40 Kgs. To70Kgs.were included in the study. Patients suffering from cardiovascular, respiratory or renal diseases, Diabetes Mellitus, obese patients and patients receiving drugs that affect B.P. and pulse rate were excluded from study. In the preoperative room monitoring of heart rate

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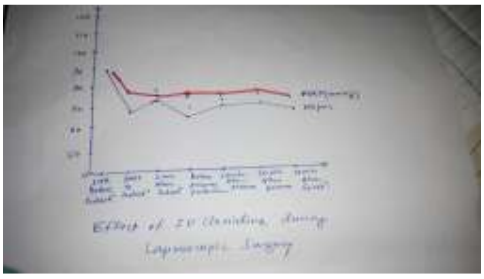
(HR), non-invasive systolic blood pressure (SBP), diastolic blood pressure (DBP), mean arterial pressure (MAP), was done. Patients were given Inj. Clonidine 2µg/Kg. in 100 ml saline, 30 minutes prior to induction. They were premedicated with Inj.Glycopyrrollate0.2 mg and Inj. Fortwin 30 mg. Preoxygenation was done with 100% Oxygen for 5 minutes. Inj. Propofol 2mg/kg was given for induction followed by Inj. Succinyl choline 2mg/kg. to facilitate tracheal intubation. Trachea was intubated with an appropriate size cuffed, disposable tube. Anaesthesia was maintained with Nitrous oxide, oxygen, Isoflurane. Patients were mechanically ventilated. Inj. Vacuronium 0.8 mg/kg was used for neuromuscular blockade. Tidal volume and ventilatory frequency were adjusted to maintain normocapnia. Pneumoperitoneum was created by insufflation of CO2and operation table was tilted according to the need. Intra. abdominal pressure was not allowed to exceed 15 mm Hg. Heart rate. MAP ,SBP and DBP were recorded prior to Induction, 2 minutes after Intubation, before pneumoperitoneum,10 and 20 minutes after pneumoperitoneum and 10 minutes after Extubation . The total amount of intraoperative fluids, drugs were recorded. Any change in haemodynamic variables more than 20% on either side of baseline was considered significant and were treated accordingly. At the end of surgery, neuromuscular blockade was reversed with Inj. Neostigmine (2.5mg) and Inj.GlycoP (0.4 mg) diluted in 20 ml given slowly through I.V. route. After satisfying the extubation criteria, trachea was extubated. Patients were transferred to recovery room. Oxygen insufflations 2L/mts. was given with mask and were closely monitored.

RESULTS

Patients preoperative heart rate was in the range of 76 to90 per minute. The MAP was 88 to 96 mm of Hg. The HR after Inj. Clonidine was on the lower side (60 to 72 per minute) and MAP was also on lower side (80 to 90 mm of Hg). There was no significant change in HR and MAP during Induction, Intubation and after pneumoperitoneum. Five patients had increased SBP and DBP 20 minutes of Pneumoperitoneum



Which was controlled by increasing concentration of Isoflurane. One patient had more than 20% increase in MAP, SBP and DBP which was treated with Inj. Nitroglycerine successfully. No cases had significant bradycardia or Hypotension.

DISCUSSION

Pneumoperitoneum During laparoscopic surgery leads to significant haemodynamic changes such as increase in MAP, Systemic vascular resistance and 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. In our study, we observed the effects of preoperative I.V. Clonidine 2µ/Kg. in laparoscopic surgeries. We observed that there is no significant incidence of bradycardia, change in blood pressure. Inj. Clonidine is a potent hypotensive agent. It inhibits catecholamines and vasopressin mediatedincrease in SVR caused by Pneumoperitoneum. Studies using oral clonidine before induction of anesthesiahave shown good results. The bioavailability of clonidine after oral administration requires 2 to 4 hrs. to develop its peak effect as compared to I.V. route which has got action within 15 minutes (with a peak at 30 mts). Numerous studies using I.V. Clonidine 3µ/kg to 8µ/kg showing haemodynamic stability have been done and demonstrated significant less analgesic requirements.

CONCLUSION

Significant haemodynamic derangements during Pneumoperitoneum of laparoscopic surgeries can be effectively attenuated by premedication with I.V. Clonidine 2µ/kg. We recommend the use of Inj. Clonidine 30 minutes before induction of anaesthesia to attenuate the haemodynamic stress response of Pneumoperitoneum, tracheal intubation and extubation. Clonidine has added advantage of producing lessincidence of postoperative nausea and vomiting and reduction in doses of anaesthetic agents. However, patients do have higher sedation

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