e-ISSN: 0975-1556, p-ISSN:2820-2643

Available online on www.ijpcr.com

International Journal of Pharmaceutical and Clinical Research 2022; 14(6); 413-417

Original Research Article

Comparative Assessment of the Hemodynamic Variation between Low Dose Oral Clonidine (100mcg) and Placebo Group in Laparoscopic Surgeries

Manzar Nadeem Kazmi

Associate Professor, Department of Anesthesia, Madhubani Medical College & Hospital, Madhubani, Bihar, India.

Received: 15-04-2022 / Revised: 23-05-2022 / Accepted: 05-06-2022
Corresponding author: Dr. Manzar Nadeem Kazmi
Conflict of interest: Nil

Abstract

Aim: This study aims at comparing the hemodynamic variation between low dose oral clonidine (100mcg) and placebo group in laparoscopic surgeries.

Material & Methods: 60 consecutive patients undergoing laparoscopic procedures of 90 to 180 minutes were enrolled into the study. Inclusion criteria was ASA (American Society of Anesthesia) I and II in the age group of 18 and 70 years. Exclusion criteria were patients of ASA III and IV, patients on antihypertensive medications and patients with known cardiac disease.

Results: A statistically significant difference and reduction in heart rate was seen in clonidine group compared to placebo group at various interval. At 90 and 120 minutes, systolic and mean arterial blood pressure was similar between the clonidine and placebo group.

Conclusion: Low dose oral clonidine is a very efficient, easy to administer and cost-effective premedication drug during laparoscopic procedures.

Keywords: Low dose clonidine, Pneumoperitoneum, Laparoscopic surgery, Heart rate, Blood pressure

Introduction

Oral clonidine premedication reduces peripheral sympathetic discharge, induces sedation by inhibiting pontine locus cerulleus, attenuates hemodynamic response to noxious stimuli such as tracheal intubation [1-2] and reduces postoperative pain and analgesic requirement in neuraxial block. [3] It also increases cardiac baroreflex sensitivity in hypertensive individuals and stabilize blood pressure. [4] Furthermore clonidine increases perioperative hemodynamic stability in patients undergoing laparoscopic cholecystectomy with enhancement of parasympathetic control of heart rate. [5-6]

The hallmark of laparoscopy is creation of carbon dioxide (CO2) pneumoperitoneum and change in the patient's position from Trendelenberg to reverse Trendelenberg. It also results in stress hormone responses (cortisol, epinephrine and nor-epinephrine) especially when CO2 pneumoperitoneum is used concomitantly. [7]

Clonidine is a α–2 adrenoreceptor agonist. It exerts central sympatholytic effect and has a half-life of 9-12 h. [8] Premedication with clonidine blunts the stress response to surgical stimuli and the narcotic and anesthetics doses are also reduced. In addition, clonidine increases cardiac baroreceptor reflex sensitivity to increase in systolic blood pressure, and thus stabilizes, blood pressure. [9]

Laparoscopic cholecystectomy was introduced by Phillipe Mouret in 1987. [10] Since then, it quickly became apparent that laparoscopy results in multiple benefits. In comparison with open procedures, laparoscopy is characterized by better maintenance of homeostasis. [11]

The effectiveness of clonidine in preventing postoperative adverse effects of pneumoperitoneum (pain, nausea and vomiting) and general anesthesia (shivering and postoperative oxygen requirement) were also taken into consideration. Thus, this study aims at comparing the hemodynamic variation, requirement of intraoperative opioids (fentanyl) and inhalational agents (isoflurane), incidence of postoperative complications and postoperative analgesic and oxygen requirement between low dose oral clonidine (100mcg) and placebo group in laparoscopic surgeries.

Material & Methods:

Total 60 consecutive patients undergoing laparoscopic procedures of 90 to 180 minutes were enrolled into the study. Inclusion criteria was ASA (American Society of Anesthesia) I and II in the age group of 18 and 70 years. Exclusion criteria were patients of ASA III and IV, patients on antihypertensive medications and patients with known cardiac disease.

Methodology

Rapidly after 60 seconds of succinylcholine administration to avoid distention of the stomach. Inj ondansetron 4mg IV was given to all patients to reduce postoperative nausea and vomiting. Anesthesia was maintained with 33% of oxygen & 66% nitrous oxide, 1% isoflurane and vecuronium. Pneumoperitoneum was created with insufflation of carbon-dioxide. Patient was adequately ventilated to maintain the end tidal carbon dioxide between 30 and 35. Intra-abdominal pressure was maintained within 15 mmhg throughout the surgical procedure. Intraoperative heart rate and blood pressure (systolic, diastolic and mean) were recorded prior to intubation, prior to pneumoperitoneum, 15, 30, 60, 90 and 120 minutes of pneumoperitoneum, after carbon-dioxide release and after extubation.

An increase in heart rate by 15 beats or mean arterial pressure by 15% from baseline was managed with additional bolus of 20 mcg of inj fentanyl iv and increase of isoflurane by 1% to 1.5% alternatively. Fall in heart rate below 50 bpm with the drop in BP was given inj atropine 0.6mg IV. Intraoperative requirement of opioids (fentanyl) and inhalational agents (isoflurane) were recorded. Patient was reversed with inj neostigmine 2.5mg and inj glycopyrrolate 0.2 mg intravenously and extubated. Postoperative sedation was score by 5 point sedation score, pain by 10 point visual analog scale and presence of nausea, vomiting and shivering were recorded. Postoperative requirement of oxygen was also recorded.

The data was entered and analyzed using “SPSS for windows (Version 17)” statistical software. All the continuous variables were described using descriptive statistics and dichotomous variables using proportions. Student’s t test and Pearson’s Chi square test was the statistical test of significance. P value lesser than 0.05 was considered as significant.

Results:

Total number of ASA I patients were 30 of which 15 were in clonidine group and 15

were in the placebo group. Total number of ASA II patients were 30, of which 15 were in the clonidine group and 15 in the placebo group.

These parameters were comparable between both the two groups and were not statistically significant.

Table 1 shows there is statistically significant difference and reduction in heart rate in clonidine group compared to placebo group at various interval.

Table 2 shows a significantly lower arterial blood pressure (systolic, diastolic and mean) immediately after pneumoperitoneum, various intervals during surgery and after extubation between the clonidine and placebo group. At 90 and 120 minutes, systolic and mean arterial blood pressure was similar between the clonidine and placebo group. However, at 90 minutes the diastolic blood pressure was lower in the test group, but at 120 mts there was no statistically significance between the two groups (p=0.603).

Table 1: Heart rate (in Bpm)

Heart rate	Test		Control	
	Mean	std	Mean	std
Prior to intubation	81.5	12.3	83.5	12.8
Prior to Pneumoperitoneum	74.7	15.8	85.8	18.4
15 mts of pneumoperitoneum	76.8	13.4	87.4	15.2
30 mts of pneumoperitoneum	78.9	12.1	84.8	11.7
60 mts of pneumoperitoneum	70.3	19.4	86.1	14.0
After co_2 release	75.7	10.2	81.3	11.3
After extubation	82.4	11.6	90.7	9.5

Table 2: Blood pressure (in mm of Hg)

	Mean Systolic blood pressure		Mean Diastolic Blood pressure		Mean arterial pressure	
	Test	**Control**	**Test**	**Control**	**Test**	**Control**
Prior to intubation	121.4	128.9	73.2	77.9	88.9	93.7
Prior to Pneumoperitoneum	104.2	116.8	65.8	71.8	74.8	82.5
5mts of Pneumoperitoneum	121.7	138.1	83.2	83.8	92.4	106.8
30 mts of pneumoperitoneum	126.8	136.3	75.4	80.4	97.0	104.7
60 mts of Pneumoperitoneum	122.6	125.5	77.9	81.3	96.2	97.2
After Co_2 release	120.32	131.6	76.0	81.5	93.8	96.0
After extubation	137.8	140.7	79.2	82.7	95.1	102.8

Discussion:

Looking at oral clonidine dose wise, the rate of propofol reduction was more in study done by Imai et al [12]. The difference in the findings could be due to the fact that they conducted their study in minor surgery and the mean duration of anesthesia in their study was longer than our study. Further, they also used nitrous

oxide during maintenance of anesthesia along with propofol infusion. Richards and coworkers [13] reported oral clonidine 600 mg to reduce the minimum anesthetics concentration of propofol with prolonged recovery from anesthesia.

In laparoscopic surgeries a greater sympathetic tone and catecholamine release may trigger nausea and vomiting. [14] Clonidine increases gastrointestinal motility by decreasing sympathetic outflow and increasing parasympathetic outflow from the central nervous system and reduces the postoperative nausea and vomiting. In our study, clonidine group did not have nausea and vomiting but the placebo group had significant patients with nausea and vomiting. Similar observation was seen in studies done by B Ghrab et al [15] and Javaher Froosch et al. [16]

Pneumoperitoneum created during laparoscopic surgery induces certain drastic changes in the patients‟ hemodynamics. These include an increase in MAP, decrease in CO and increase in SVR which manifest as hypertension, tachycardia and may also compromise tissue perfusion and affect the acid-base homeostasis. This necessitates the use of anesthetics interventions for maintaining hemodynamic parameters in acceptable range in order to maintain blood supply to vital organs. Techniques like use of low intra-abdominal pressure and gasless laparoscopies using abdominal elevators have been used with limited success. [17-18]

The first stimulus for sympathoadrenal response i.e. laryngoscopy and intubation was associated with a steep rise in HR, SBP, DBP and MAP in the placebo group. This rise in HR and BP did not occur in clonidine group patients. Our findings matched the findings of Rawal, et al who used a dose of 4 μg/kg clonidine for attenuation of hemodynamic response to laryngoscopy and intubation. [19,20]

Conclusion:

Low dose oral clonidine is a very efficient, easy to administer and cost-effective premedication drug during laparoscopic procedures.

References:

1. Laurito CE, Baughman VL, Becker GL, DeSilva TW, Carranza CJ. The effectiveness of oral clonidine as a sedative/anxiolytic and as a drug to blunt the hemodynamic responses to laryngoscopy. J Clin Anesth 1991; 3:186 –93.
2. Ghignone M, Quintin L, Duke PC, Kehler CH, Calvillo O. Effects of clonidine on narcotic requirements and hemodynamic response during induction of fentanyl anesthesia and endotracheal intubation. Anesthesiology 1986; 64:36–42.
3. Goyagi T, Nishikawa T. Oral clonidine premedication enhances the quality of Postoperative analgesia by intrathecal morphine. Anesth Analg 1996; 82:11 92– 6.
4. Parlow JL, Begou G, Sagnard P, Cottetr Emard JM, Levron JC, Annat G, Cardiac baroreflex during the postoperative period in patients with hypertension: Effect of clonidine. Anesthesiology 1999; 90:681-92.
5. Ndiaye AL, Guyon F, Knorr M, Huch V, Veith M, Anorg Z. Adverse hemodynamic changes during LC and their possible suppression with clonidine premedication. comparison with intrvenuos intravascular premedication Rozalchir 1999:78(6): 286- 91.
6. DeBoer RW, Karemaker JM, Strackee J. Hemodynamic fluctuations and baroreflex sensitivity in humans: a beat-to-beatmodel. Am J Physiol 1987: 253: 608—609.
7. Naude GP, Ryan MK, Pianim NA, Klein SR, Lippmann M, Bongard FS. Comparative stress hormone changes during helium versus carbon dioxide laparoscopic cholecystectomy. J Laparoendosc Surg 1996; 6:93-8.

8. Hayashi Y, Maze M. Alpha 2 adrenoceptor agonists and anesthesia. Br J Anaesth 1993; 71:108-18.
9. Harron DW, Riddell JG, Shanks RG. Effects of azepexole and clonidine on baroreceptor mediated reflex bradycardia and physiological tremor in man. Br J Clin Pharmacol 1985;20: 431-6.
10. Vecchio R, MacFayden BV, Palazzo F. History of laparoscopic surgery. Panminerva Med 2000; 42:87-90.
11. Joris JL. Anesthesia for laparoscopic surgery. In: Miller RD, editor. Miller's Anesthesia. 7th ed. Elseviere: Churchill livingstone; 2010. p. 2185-6.
12. Imai Y, Muammoto T, Murakami K, Sakai T, Kirita T, Sugimura M et al. The effects of preanesthetic oral clonidine on total requirement of propofol for general anesthesia. J. clin anesthesia 1998; 10:660- 665.
13. Richards MJ, Skues MA, Jarvis AP, Prys- Roberts C. Total i.v. anesthesia with propofol and alfentanil: dose requirements for propofol and the effect of premedication with clonidine. Br JAnaesth 1990; 65:157– 63.
14. Arman Taheri, Mohammad Ali Javadimanesh and Haleh Ashraf, "The effect of oral clonidine premedication on nausea and vomiting after ear surgery" Middle east journal of anesthesia (2010), 5 (20), 691-694.
15. Ghrab. B, Khemakhem. K, Chaari. M, Kolsi. K, Karoui. A, "Clonidine improves postoperative analgesia and reduces nausea and vomiting after laparoscopic cholecystectomy: 14AP58" European Journal of Anaesthesiology (2007 June), 24,181.
16. JavaherFroosch F, M RazaPipelzadeh, Namazi M, "Clonidine reduces postoperative nausea and vomiting in laparoscopic Gynaecological surgery" Pakistan journal of medical science (2009) 25(5), 782- 785.
17. Sussan Soltani Mohammadi, Mirsadegh Seyedi, Effect of oral clonidine in preventing postoperative shivering after general anesthesia. International journal of pharmacology. 2007:3 (5), 441–443.
18. Dexter SPL, Vucevic M, Gibson J, McMahon MJ. Hemodynamic consequences of high- and low-pressure capnoperitoneum during laparoscopic cholecystectomy Surg Endosc. 1999;13(4):376-81.
19. Gurusamy KS, Samraj K, Davidson BR. Abdominal lift for laparoscopic cholecystectomy. Cochrane database Syst Rev. 2008;16(2):CD006574.
20. Raval DL, Mehta MK. Oral clonidine premedication for attenuation of hemodynamic response to laryngoscopy and intubation. IJA. 2002;46(2):124-9.
21. Darmal, D. I., Khan, A., Ahmad, D. S., & Gowani, A. Frequency of Type II Diabetes Mellitus in ST Segment Elevated MI patients presented to French Medical Institute for Mothers and Children: A Cross Section Study. Journal of Medical Research and Health Sciences, 2022:5(6), 2023–2038.