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Original Research Article

To Observe the Effects of Oral Clonidine on Haemodynamic Changes Associated with Creation of Pneumoperitoneum in Laparoscopic Surgery

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Abstract:

Background & Methods: The aim of the study is to observe the effects of oral clonidine on haemodynamic changes associated with creation of pneumoperitoneum in laparoscopic surgery. All patients received inj. Ondensetron 4 mg IV and inj. Glycopyrrolate 0.2 mg IV before induction after securing a suitable peripheral vein. All patients were preloaded with ringer lactate solution 10 ml/kg BW.

Results: In study group hypotension and bradycardia is more as compared to control group. In study group 18 patients had dryness of mouth and none in control group. In both groups 04 patients had episodes of shivering post operatively.

Conclusion: The observations were discussed in terms of blood pressure, and side effects. The results of the study indicate that premedication with oral clonidine (2-2.5 mcg) in laparoscopic surgeries effectively counteracts the haemodynemic changes due to creation of pneumoperitoneum. Activation of postsynaptic α-2 receptor in nucleus tractus solitaries and locus cerulious of brain stem resulting in peripheral vasodialatation. The incidence of side effects was minimum in clonidine treated patients.

Keywords: Oral Clonidine, Haemodynamic Pneumoperitoneum & Laparoscopic Surgery.

Study Design: Case Control Study.

Introduction

Absolute contraindications to laparoscopy and pneumoperitoneum are rare. Nonetheless, pneumoperitoneum in patients with increased intracranial pressure or with significant hypovolemia is undesirable [1]. Laparoscopy can be performed safely in patients with ventricular peritoneal shunt and peritoneojugular shunt if the shunts have a unidirectional valve resistant to the IAPs used during pneumoperitoneum. Anesthetic preparation is of utmost importance to face any of the possible complications that may occur during the procedure. Non-invasive blood pressure monitoring, electrocardiogram, pulse oximeter [2], $ETCO_2$ concentration monitoring, airway pressure monitoring and body temperature are used routinely. In patients with poor cardiopulmonary function or hemodynamic instability, invasive blood pressure monitoring should be used as well as blood gas analysis and urine output measurement [3]. In patients with serious cardiac diseases, intraoperative assessment of cardiac function should be considered. General anesthesia techniques for laparoscopy have been achieved using inhalation agents, intravenous agents and muscle relaxant [4]. Among inhalation agents nitrous oxide, isoflurane, desflurane and sevoflurane have been widely used. Although nitrous oxide has repeatedly been linked to post-operative nausea and vomiting (PONV), the actual contribution of N_2O to PONV is probably less than previously considered.

Laparoscopic cholecystectomy was introduced by Phillipe Mouret in 1987. 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. [5]

The hallmark of laparoscopy is creation of carbon dioxide (CO_2) pneumoperitoneum and change in the patients position from Trendelenberg to reverse Trendelenberg. It also results in stress hormone responses (cortisol, epinephrine and nor-epinephrine) especially when CO_2 pneumop - eritoneum is used concomitantly.

Clonidine is an α–2 adrenoreceptor agonist. It exerts central sympatholytic effect and has a half-life of 9-12 h. Premedication with clonidine blunts the stress response to surgical stimuli and the narcotic and anaesthetic doses are also reduced. In addition, clonidine increases cardiac baroreceptor reflex sensitivity to increase in systolic blood pressure, and thus stablises, blood pressure. [6]

These characteristics suggest that clonidine may be useful in the anaesthetic management of patients undergoing laparoscopic surgeries. Accordingly, this study was designed to evaluate the effects of oral clonidine premedication on haemodynamic response and modulation of post-operative pain in patients undergoing laparoscopic surgeries.

Material and Methods

The present study was conducted in a prospective randomised fashion on 120 ASA grade I and II, patients of age group 20-50 years in the department of Anaesthesiology et Tertiary Care Centre, India. The patients were randomly allocated to two groups of 60 each-study and control group.

- The study group received oral clonidine 2-2.5 mcg with a sip of water 90 min. Prior to surgery.
- The control group recieved oral vit. c tablets as placebo with a sip of water 90 min. Prior to surgery.

Apart from that all patients received inj. Ondensetron 4 mg IV and inj. Glycopyrrolate 0.2 mg IV before induction after securing a suitable peripheral vein. All patients were preloaded with ringer lactate solution 10 ml/kg BW.

Patients with history:

- Diabetes mellitus
- Asthma
- Valvular heart disease
- Congestive cardiac failure.
- Patients concomitantly taking clonidine, beta blocker, MAO inhibitors alpha methyl dopa, benzodiazepine were also excluded.

Result

Table 1: Duration of surgery (in min.)

Duration	Control group	Study Group
mean±SD	75.13±18.52	73.44±27.1
Range	50-110	45-115

The difference in duration of surgery of both group were statistically insignificant (P>0.05)

Table 2: Variation in diastolic blood pressure

Period of observation	Control group	Study group
Prior to induction	80.0±14.0	76.8 ± 11.9
After laryngoscopy and intubation	97.5±14.5	84.2±10.2
Before pneumoperitoneum	83.6±17.08	78.6±9.9
15 min. after pneumoperitoneum	95.7±12.2	83.8±9.3
30 min. after pneumoperitoneum	97.2±20.4	83.1±8.8
45 min. after pneumoperitoneum	95.9±18.5	81.8±11.9
10 min. after release of CO2	85.4±14.9	82.0±12.0
10 min. after extubation	83.5±11.2	79.8±9.6

The difference in diastolic blood pressures of two group was very significant after laryngoscopy and intubation, 15 min. 30 min. and 45 min. after pneumoperitoneum.

Table 3: Variation in systolic blood pressure

Period of observation	Control group	Study group
Prior to induction	124.7±17.9	113.0±16.1
After laryngoscopy and intubation	135.6±22.2	122.6±14.6
Before pneumoperitoneum	125.9±14.4	123.4±10.7
15 min. after pneumoperitoneum	134.3±19.3	119.0±7.1
30 min. after pneumoperitoneum	131.9±20.8	116.8±15.5
45 min. after pneumoperitoneum	127.6±21.0	117.8±11.7
10 min. after release of CO2	123.4±17.3	117.0±14.1
10 min. after extubation	121.0±11.9	114.4±12.8

The difference in systolic blood pressures of two groups was significant throughout the procedure with study group being more stable ($p<0.05$)

Table 4: Incidence of side -effects

Side effect	Control group	Study group
Nausea and vomiting	02	02
Hypotension	04	06
Bradycardia	04	06
Dryness of mouth	00	18
Shivering	04	04
Pruritis	00	00
Respiratory depression	00	00

In study group hypotension and bradycardia is more as compared to control group. In study group 18 patients had dryness of mouth and none in control group. In both groups 04 patients had episodes of shivering post operatively.

Discussion

A small oral dose of oral clonidine decreased the incidence of perioperative myocardial ischemic episodes without affecting haemodynamic stability. Aho et al used 3mcg/kg and 4.5mcg/kg clonidine for suppression of haemodynamic response to pneumoperitoneum. Rise in blood pressure and heart rate was less in both the groups but 4.5 mcg/kg clonidine produced greater fall in mean arterial pressure before induction [7].

Joris et al used very high dose of clonidine (8 mcg/kg) for reducing the level of catecholamine and vasopressin following pneumoperitoneum. Malek et al used 150mcg of clonidine as i.v. infusion and intramuscularly while Sung et al and Yu et al used 150 mcg of oral clonidine as premedication for maintenance of haemodynamic stability during pneumoperitoneum.

Clonidine is a lipid soluble drug and it is well absorbed after oral administration and it's peak hypotensive effect occurs at 90 minutes. Considering the above facts 2-2.5 mcg/.kg clonidine was administered orally, 90 minutes before surgery in this study. All patients in two groups were quite comparable in respect to demographic data [8].

Slight fall in systolic blood pressure, diastolic blood pressure and mean arterial pressure was noticed following premedication with clonidine. Following intubation and pneumoperitoneum, increase in blood pressure was noticed (SBP-124.6±14.6, DBP- 86.2±10.2).but at 15min, 30 min. and 45 min. after creation of pneumoperitoneum , after release of CO_2 and after extubation, (SBP-121.0±7.1 to 116.4 ±12.8 ,DBP-83.8±19.3 to 80.8±9.6mm Hg) the blood pressure did not rise [9].

The difference was very significant in two groups, during laryngoscopy and intubation (P=0.02),15 min. after pneumoperitoneum (P=0.004), 30 min.after pneumoperitoneum (P=0.006) and 45 min. after pneumoperitoneum (P=0.012), thus clonidine premedication was able to achieve haemodynamic stability during pneumoperitoneum.

Conclusion

The observations were discussed in terms of blood pressure, and side effects. The results of the study indicate that premedication with oral clonidine (2-2.5 mcg) in laparoscopic surgeries effectively counteracts the haemodynemic changes due to creation of pneumoperitoneum. Activation of postsynaptic α-2 receptor in nucleus tractus solitaries and locus cerulious of brain stem resulting in peripheral vasodialatation. The incidence of side effects was minimum in clonidine treated patients.

References

1. Apfel CC, Korttila K, Abdalla M, et al: A factorial trial of six interventions for the prevention of postoperative nausea and vomiting. N Engl J Med. 2004; 350:2441.
2. Raeder JC, Mjaland O, Aasbo V, Grogaard B, Buanes T. Desflurane versus propofol maintenance for outpatient laparoscopic cholecystectomy. Acta Anaesthesiol Scand. 1998; 42(1): 106–10.
3. Maltby JR, Beriault MT, Watson NC, et al: Gastric distension and ventilation during laparoscopic cholecystectomy: LMA - classic vs. tracheal intubation. Can J Anaesth. 2000;47 :6 22.
4. Hohlrieder M, Brimacombe J, Eschertzhuber S, et al: A study of airway management using the ProSeal LMA laryngeal mask airway compared with the tracheal tube on postoperative analgesia requirements following gynaecological laparoscopic surgery. Anaesthesia. 2007;6 2:913.
5. Gutt CN, Oniu T, Mehrabi A, et al. Circulatory and respiratory complications of carbon dioxide insufflation. Dig Surg 2004;21(2):95-105.
6. Haroun-Bizri S, El Rassi T: Successful resuscitation after catastrophic carbon dioxide embolism during laparoscopic cholecystectomy. Eur J Anaesthesiol. 2001; 18:118-121.

7. Hsieh CH. Laparoscopic cholecystectomy for patients with chronic obstructive pulmonary disease. J Laparoendosc Adv Surg Tech A. 2003; 13(1):5-9.
8. Hawasli A: Spontaneous resolution of massive laparoscopy-associated pneumothorax: The case of the bulging diaphragm and review of the literature. Laparoendosc Adv Surg Tech A. 2002; 12:77-82.
9. Venkatesh R, Kibel AS, Lee D, Rehman J,Landman J: Rapid resolution of carbon dioxide pneumothorax (capno-thorax) resulting from diaphragmatic injury during laparoscopic nephrectomy. J Urol. 2002; 167:1387-1388.