RESEARCH

EFFECT OF INTRAVENOUS CLONIDINE PREMEDICATION ON HAEMODYNAMIC FLUCTUATIONS DURING LAPAROSCOPIC CHOLECYSTECTOMY

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Abstract

Background: Clonidine, a selective alpha-2 adrenergic receptor agonist, used as a premedication has been shown to attenuate the stress response triggered by pneumoperitoneum during laparoscopic cholecystectomy. To evaluate the effect of intravenous clonidine premedication on haemodynamic changes during laparoscopic cholecystectomy, and its effect on postoperative nausea, vomiting and shivering. **Materials and Methods:** Sixty patients of either sex of ASA grade I and II undergoing laparoscopic cholecystectomy were randomly assigned to one of the two groups of 30 patients each in a double blind manner. The patients received either IV clonidine 1.5 microgram/kg body weight diluted to ten ml with normal saline (group A) or ten ml of normal saline (group B) over ten minutes (min) 30 min before induction of anaesthesia. Unpaired t test and Chi-square test or Fisher's exact test. Statistical difference was considered to be significant when P-value was < 0.05. **Result:** Rise in heart rate (85.90 ± 9.22 versus (vs) 90.93 ± 7.79 beats/minute), systolic blood pressure (133.00 ± 17.90 vs 149.47±20.24 mm Hg), diastolic blood pressure (80.90 ± 7.18 vs 97.37 ± 9.55 mm Hg) and mean arterial pressure (102.63 ± 9.98 vs 114.27 ± 12.68 mm Hg) was significantly less in group A as compared to group B post pneumoperitoneum. The incidence of nausea and vomiting was 20% in group A and 43.33% in group B. One patient in group A and two patients in group B had shivering. Incidence of sedation was significantly more in group A as compared to group B. **Conclusion:** IV clonidine 1.5 microgram/kg body weight may be accepted as an effective premedication before laparoscopic cholecystectomy to attenuate the stress response triggered by pneumoperitoneum. However more studies with larger sample size and comparing different doses of IV clonidine hydrochloride are desirable to determine its ideal dose before considering these observations as generalised.

INTRODUCTION

Haemodynamic changes like increase in mean arterial pressure, systemic vascular resistance, pulmonary vascular resistance, decrease in venous return and cardiac output produced by carbondioxide pneumoperitoneum during laparoscopic cholecystectomy has been presenting new anaesthetic challenges.[1,2,3,4] Various pharmacologic interventions have been used to attenuate these haemodynamic and stress responses.[1,2,3,5,6,7]

Clonidine hydrochloride is a selective α2 adrenergic receptor agonist. It improves perioperative haemodynamics and sympathoadrenal stability.[8,9,10,11,12] It also has antiemetic,[13] antishivering action,[14] induces sedation, decreases anaesthetic requirements.[8,9,15,16] Effect of clonidine

hydrochloride premedication, using different doses, routes and methods of administration, on perioperative haemodynamic response to carbon dioxide pneumoperitoneum during laparoscopic cholecystectomy has been evaluated. It has been shown that clonidine decreases peripheral sympathetic discharge and increases perioperative circulatory stability with enhancement of parasympathetic control of heart rate.[13,17,18,19,20,21,22] Thus clonidine hydrochloride can be useful in the anaesthetic management of patients undergoing laparoscopic cholecystectomy.

Most of the previous studies have used clonidine hydrochloride in a higher dose, some of which were associated with greater peri-induction haemodynamic alterations like severe hypotension and bradycardia which needed perioperative interventions to correct them. IV clonidine hydrochloride given under multiparameter monitoring prior to induction of anaesthesia seems to be a better method of giving this premedication. Very few Indian studies with IV clonidine hydrochloride used for this purpose are available.

So we proposed this study with the aim of evaluating the effect of intravenous clonidine 1.5 µg/kg body weight, premedication on haemodynamic changes during laparoscopic cholecystectomy. The objectives were to investigate its clinical efficacy in prevention of haemodynamic response associated with carbon dioxide pneumoperitoneum during laparoscopic cholecystectomy and its effect on post operative nausea, vomiting and shivering.

MATERIALS AND METHODS

This study was conducted on 60 patients aged 18 to 60 years of American Society of Anaesthesiologists (ASA) grade I and II undergoing laparoscopic cholecystectomy after obtaining institutional ethical committee's approval. Patients were randomly assigned to one of the two groups of 30 patients each in a double-blind manner. Patients with history of hypertension, ischemic heart disease, aortic stenosis, left ventricular failure and atrioventricular block, cerebrovascular insufficiency, patients taking clonidine hydrochloride, methyldopa, β blockers, antipsychotic drugs, patients with hepatic/renal insufficiency, lactating and nursing mother, morbidly obese patients, patients having known sensitivity to the study drug were excluded from the study.

Informed written consent was taken from all the patients. All patients were kept fasting eight hours prior to surgery and were given anxiolytic in the form of tablet alprazolam 0.5 mg night prior to surgery.

In the operation theatre, a multiparameter monitor was attached and baseline paramerters like heart rate (HR), non-invasive blood pressure (NIBP) and arterial oxygen saturation by pulse oximeter (Sp02) were recorded and electrocardiograph (ECG) monitoring done. After securing IV-line 8 ml/kg of ringer's lactate solution was given over 30 minutes before induction of anaesthesia.

Group A- Clonidine group (n = 30) received IV clonidine hydrochloride 1.5 µg/kg body weight diluted in 10 ml normal saline infused over 10 minutes, 30 minutes before induction of anaesthesia*. Group B - Control group (n = 30) received 10 ml of normal saline infused over 10 minutes, 30 minutes before induction of anaesthesia.

*Calculated dose of clonidine hydrochloride (1.5 µg/kg body weight) was diluted to ten ml with 0.9% saline.

Level of sedation was assessed by sedation scale,[23] five min before induction of anaesthesia: 0 = none (patient alert); 1 = mild (patient may be sleepy but easy to arouse); 2 = moderate (frequently drowsy but still fully arousable); 3 = severe (difficult to arouse).

After preoxygenation for three minutes, patients received IV glycopyrrolate 0.2 mg and IV fentanyl citrate 1.5 µg/kg five minutes before induction of anaesthesia. They were induced with sleep dose of IV thiopentone sodium. Endotracheal intubation was facilitated by IV succinylcholine 1.5 mg/kg body weight. Anaesthesia was maintained with O_2 (40%) + N_2O (60%) + isoflurane (1 MAC) + IV vecuronium bromide 0.1mg/kg. Patients were mechanically ventilated to maintain $EtCO_2$ between 30 to 40 mm Hg.

Pneumoperitoneum was created by CO_2 insufflator at a standard conventional slow flow rate initially and then at a flow rate of six to ten litres/minute. Intraabdominal pressure of 12 to 14 mm Hg was maintained throughout the procedure.

Systolic blood pressure (SBP), diastolic blood pressure (DBP), mean arterial pressure (MAP), heart rate (HR), oxygen saturation by pulse oximeter (SpO_2), End tidal carbondioxide ($EtCO_2$) were recorded at the following points of time - before premedication, prior to induction, after sleep dose of thiopentone sodium, immediately after endotracheal intubation, three minutes after endotracheal intubation, before pneumoperitonium and then at every five minutes till the surgery was completed, ten minutes after release of CO_2, ten minutes after extubation.

A rise in mean arterial pressure of more than 20% from the baseline was considered as hypertension and treated with titrated doses of IV nitroglycerin infusion. A fall in mean arterial pressure of more than 20% from baseline was considered as hypotension and treated with intravenous fluid and if necessary with IV ephedrine hydrochloride 3 mg in titrated doses. A fall in heart rate of more than 20% from baseline was considered as bradycardia and treated with IV atropine sulphate 0.02mg/kg repeated as per requirement.

Fifteen minutes prior to reversal slow IV ondansetron 4 mg was given in drip.

After the surgery neuromuscular block was reversed with appropriate dose of IV neostigmine

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methylsulphate and IV glycopyrrolate and patients were extubated and shifted to the recovery room.

In the post operative period following parameters was recorded every 15 minutes for two hours: systolic blood pressure (SBP), diastolic blood pressure (DBP), mean arterial pressure (MAP), heart rate (HR), oxygen saturation by pulse oximeter (SpO_2).

Any episode of nausea and vomiting in the postoperative period was treated by slow IV ondansetron 4 mg in drip as a rescue antiemetic. Analgesia was provided by non-narcotic analgesics. In case of any evidence of adverse effect in the form of heavy sedation (Grade 2 or 3) or sustained hypotension, the patient was monitored and treated in post anaesthesia care unit (PACU).

All the observations and results were analyzed statistically & compared using Unpaired t test and Chi-square test or Fisher's exact test as applicable. P value < 0.05 was considered significant. Data are presented as mean value ± SD or numbers (%).

RESULTS

The demographic characteristics and baseline haemodynamic parameters in the two groups were comparable with no statistically significant difference (P > 0.05); [Table 1 & 2].

Rise in heart rate post pneumoperitoneum in group A was significantly less when compared with the rise in heart rate in group B (P = 0.026); [Table 3]. Rise in systolic blood pressure, diastolic blood pressure and mean arterial pressure post pneumoperitoneum was significantly less in group A, when compared with the rise in group B (P < 0.05); [Table 4, 5, 6].

The heart rate values in group A were significantly less than in group B at 45 minutes, 60 minutes, 90 minutes and 120 minutes in the postoperative period (P = 0.018, 0.025, 0.046, 0.025) respectively. There was no significant difference in systolic blood pressure, diastolic blood pressure and mean arterial pressure values of both the groups in the postoperative period (P > 0.05).

Regarding perioperative complications, the incidence of hypertension was less in group A (16.66%) than in group B (43.33%) which is statistically significant (P < 0.05). Two patients in group A developed hypotension, while it was not seen in any of the patients in group B, a statistically insignificant finding (P=0.492). Two patients in group A and one patient in group B developed bradycardia, a statistically insignificant finding (P= 1.00); [Figure 1].

Although the incidence of nausea and vomiting, 20 % in group A as compared to 43.33% in group B (P= 0.052), is statistically insignificant, the incidence is much more in group B. One patient in group A and two patients in group B had shivering in our study. Although a statistically insignificant finding (P= 1.00), the incidence is 50% more in the control group [Figure 2].

In group A, sedation score was 0 in 10 patients (33.33%), 1 in 19 patients (63.34%) and 2 in 1 patient (3.33%). In group B, sedation score was 0 in 25 patients (83.33%), 1 in 5 patients (16.67%) and no patient had sedation score of 2. No patient had sedation score of 3 in either of the study groups. Thus the incidence of sedation was higher in group A than in group B and is statistically significant (P < 0.001); [Figure 3].

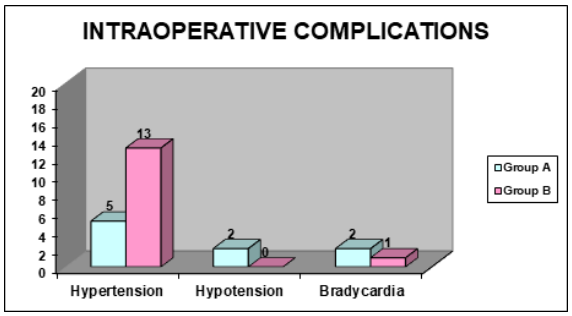

Figure 1: Intraoperative complications

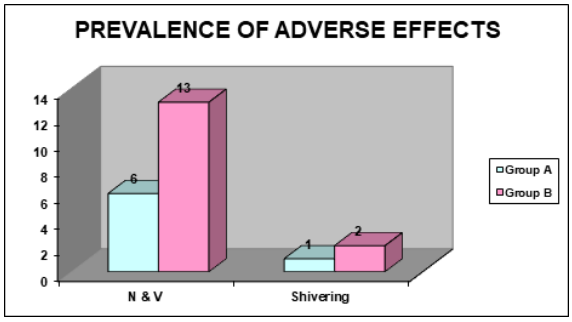

Figure 2: Prevalence of adverse effects
N & V – Nausea & vomiting

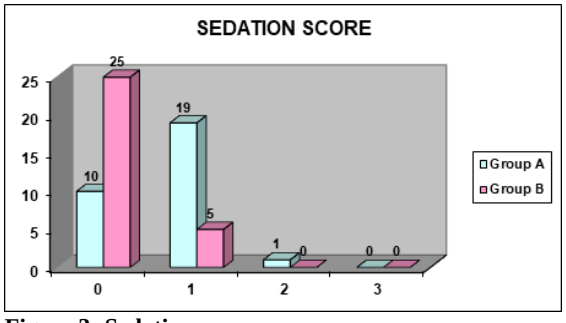

Figure 3: Sedation score

Table 1: Demographic data.

DATA	Group A (mean ±SD)	Group B (mean±SD)	P-value
Age (years)	40.33±10.69	38.93±11.42	0.626
Weight (kgs)	68.17±13.36	65.67±11.76	0.624
Height (cms)	164.37±8.91	162.73±7.62	0.647
Sex (M / F)	10 / 20	7 / 23	0.390
ASA (I / II)	24 / 6	25 / 5	0.739

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Table 2: Baseline haemodynamic data

	Group A (mean± SD)	Group B (mean ±SD	P – value
Heart rate (per minute)	80.70±9.29	82.40±8.79	0.469
SBP (mm Hg)	126.83±12.27	125.03±10.38	0.542
DBP (mm Hg)	82.20±8.81	80.90±7.18	0.533
MAP (mm Hg)	98.00±8.84	95.23±6.89	0.182
SPO2 (%)	99.13±0.346	99.03±0.414	0.314

Table 3: Perioperative heart rate (mean ± SD)

Heart rate (HR)	Group A mean±SD (beats/min)	Group B mean±SD (beats/min)	P – value
HR0	78.63±9.54	87.87±8.02	<0.001
HR1	78.93±9.07	88.67±5.05	<0.001
HR2	87.50±7.98	102.27±4.71	<0.001
HR3	83.70±7.81	89.63±3.53	<0.001
HRp	82.00±7.33	86.23±3.87	0.008
HR5pp	83.83±6.85	87.63±3.43	0.009
HR10pp	84.83±6.35	89.03±5.29	0.007
HR15pp	85.90±9.22	90.93±7.79	0.026
HR20pp	84.93±9.89	90.37±9.32	0.033
HR25pp	82.47±9.61	87.10±7.69	0.044
HR30pp	82.70±9.50	87.07±7.06	0.048
HR35pp	80.83±7.73	84.93±7.46	0.041
HR40pp	79.93±8.02	82.20±6.46	0.233
HR45pp	80.83±7.36	82.07±6.41	0.335
HR50pp	79.77±7.84	82.30±6.98	0.191
HR55pp	77.80±7.02	80.27±7.63	0.198
HR60pp	78.30±7.67	81.67±7.83	0.098
HR65pp	78.76±7.54	82.95±8.22	0.101
HR70pp	79.00±7.31	82.91±7.98	0.188
HR75pp	77.08±8.44	78.60±7.44	0.737
HR80pp	75.56±7.59	79.50±11.03	0.464
HR85pp	76.33±10.42	80.33±14.54	0.611
HR90pp	77.00±8.16	81.33±13.61	0.509
HRc	76.5±7.54	82.83±7.38	0.002
HRe	83.63±7.14	86.53±7.98	0.143

HR O – before induction, HR1- after sleep dose of thiopentone sodium, HR2- immediately after intubation, HR 3- 3 minutes after intubation, HRp- before pneumoperitoneum, HR5pp- 5 minutes post pneumoperitoneum, then after every 5 minutes, HRc- 10 minutes after release of pneumoperitoneum, HRe- 10 minutes after extubation.

Table 4: Perioperative systolic blood pressure (mean±SD)

Systolic Blood Pressure	Group A mean±SD (mmHg)	Group B mean±SD (mmHg)	P - value
SBP0	119.40±11.90	127.63±10.61	0.006
SBP1	115.43±11.75	124.03±10.55	0.004
SBP2	125.80±12.22	139.97±10.85	<0.001
SBP3	121.97±11.77	133.03±12.05	0.001
SBPpp	120.37±10.98	128.17±12.55	0.013
SBP5pp	123.33±12.76	131.30±16.57	0.041
SBP10pp	124.30±15.69	136.50±16.02	0.004
SBP15pp	126.17±18.89	141.03±22.89	0.008
SBP20pp	130.63±21.21	145.33±22.48	0.012
SBP25pp	131.23±21.12	147.27±22.58	0.006
SBP30pp	133.00±17.90	149.47±20.24	0.001
SBP35pp	129.50±15.15	148.27±16.00	<0.001
SBP40pp	131.07±13.52	142.67±12.86	0.001
SBP45pp	130.27±12.25	134.63±12.18	0.172
SBP50pp	129.33±14.73	134.17±11.28	0.159
SBP55pp	130.70±15.11	134.73±9.68	0.224
SBP60pp	129.53±13.27	133.17±10.23	0.240
SBP65pp	129.24±11.53	132.16±10.13	0.404
SBP70pp	130.44±11.26	134.00±10.13	0.400
SBP75pp	126.92±13.78	131.60±7.98	0.491
SBP80pp	124.67±11.54	130.50±5.80	0.366
SBP85pp	122.78±12.22	134.67±7.51	0.150
SBP90pp	126.44±6.56	131.33±14.47	0.622
SBPc	126.07±12.21	128.40±9.58	0.414
SBPe	132.37±11.83	134.10±8.30	0.514

SBPO – before induction, SBP1- after sleep dose of thiopentone sodium, SBP2- immediately after intubation, SBP 3- 3 minutes after intubation, SBPp- before pneumoperitoneum, SBP5pp- 5 minutes post pneumoperitoneum,

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then after every 5 minutes, SBPc- 10 minutes after release of pneumoperitoneum, SBPe- 10 minutes after extubation.

Table 5: Perioperative diastolic blood pressure (mean±SD)

Diastolic Blood Pressure	Group A mean±SD (mmHg)	Group B mean±SD (mmHg)	P – value
DBP0	76.53±8.81	83.10±7.16	0.002
DBP1	73.43±8.62	80.07±6.99	0.002
DBP2	82.43±7.95	94.33±8.71	<0.001
DBP3	78.90±7.43	86.77±9.83	0.001
DBPp	77.87±8.32	83.60±11.32	0.029
DBP5pp	82.97±10.22	89.57±10.40	0.016
DBP10pp	83.97±13.42	93.33±14.01	0.009
DBP15pp	85.97±13.88	96.10±11.69	0.003
DBP20pp	86.70±17.19	96.57±13.14	0.015
DBP25pp	87.03±12.78	97.13±13.38	0.004
DBP30pp	87.50±14.20	97.10±9.68	0.004
DBP35pp	87.53±10.39	97.37±9.55	<0.001
DBP40pp	88.07±9.73	97.07±7.99	<0.001
DBP45pp	87.27±9.57	92.83±6.95	0.013
DBP50pp	87.00±9.95	92.17±6.62	0.022
DBP55pp	87.23±9.51	89.80±5.95	0.215
DBP60pp	87.17±7.77	88.73±5.09	0.368
DBP65pp	87.0±7.94	90.21±8.04	0.126
DBP70pp	86.67±7.81	90.45±3.67	0.145
DBP75pp	85.17±10.31	85.80±7.50	0.903
DBP80pp	79.90±12.96	85.25±7.04	0.457
DBP85pp	81.67±11.84	87.0±3.64	0.472
DBP90pp	84.11±9.96	81.0±2.0	0.614
DBPc	83.33±8.59	82.70±6.20	0.745
DBPe	87.50±7.03	88.90±5.13	0.382

DBPO – before induction, DBP1- after sleep dose of thiopentone sodium, DBP2- immediately after intubation, DBP 3- 3 minutes after intubation, DBPp- before pneumoperitoneum, DBP5pp- 5 minutes post pneumoperitoneum, then after every 5 minutes, DBPc- 10 minutes after release of pneumoperitoneum, DBPe- 10 minutes after extubation.

Table 6: Perioperative mean arterial pressure (mean±SD)

Mean arterial pressure	Group A mean±SD (mmHg)	Group B mean±SD (mmHg)	P - value
MAP0	90.47±8.99	97.67±6.75	0.001
MAP1	87.13±8.70	94.23±6.88	0.001
MAP2	95.90±8.02	109.80±8.44	<0.001
MAP3	92.83±7.53	101.87±8.86	<0.001
MAPp	91.27±8.22	98.57±10.45	0.004
MAP5pp	95.13±9.44	103.17±10.93	0.003
MAP10pp	97.07±14.39	107.83±13.26	0.004
MAP15pp	99.50±14.67	110.40±14.71	0.006
MAP20pp	101.17±17.71	112.67±15.58	0.010
MAP25pp	102.10±14.70	113.00±15.74	0.007
MAP30pp	102.57±14.36	114.27±12.68	0.001
MAP35pp	101.47±11.46	113.87±10.95	<0.001
MAP40pp	102.63±9.98	111.50±9.63	0.001
MAP45pp	98.97±18.78	106.50±7.52	0.046
MAP50pp	101.37±11.04	106.00±6.52	0.054
MAP55pp	102.47±10.08	103.67±6.24	0.582
MAP60pp	101.33±8.90	103.40±5.51	0.285
MAP65pp	102.29±9.02	104.11±4.19	0.413
MAP70pp	102.55±7.53	104.91±5.07	0.415
MAP75pp	99.75±10.13	101.20±5.22	0.768
MAP80pp	95.78±10.96	101.0±4.24	0.385
MAP85pp	96.11±12.68	102.67±2.08	0.170
MAP90pp	98.89±9.35	96.33±4.16	0.564
MAPc	97.07±8.76	97.47±5.37	0.832
MAPe	102.37±8.21	103.33±4.60	0.576

MAPO – before induction, MAP1- after sleep dose of thiopentone sodium, MAP2- immediately after intubation, MAP 3- 3 minutes after intubation, MAPp- before pneumoperitoneum, MAP5pp- 5 minutes post pneumoperitoneum, then after every 5 minutes, MAPc- 10 minutes after release of pneumoperitoneum, MAPe- 10 minutes after extubation.

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DISCUSSION

Pneumoperitoneum which is the prerequisite for laparoscopic surgery causes intraoperative adverse cardiovascular effects.[1,2,3,4] These haemodynamic changes have been presenting new anaesthetic challenges. Various pharmacologic interventions have been used to attenuate these haemodynamic and stress response and to reestablish the baseline haemodynamic parameters during laparoscopy.[1,2,3,5,6,7]

We used a lower dose of 1.5 µg/kg clonidine hydrochloride given by IV route slowly over ten minutes, 30 minutes before induction of anaesthesia under multiparameter monitoring to investigate the adequacy of this dose in achieving a better peri-induction haemodynamics and suppressing haemodynamic changes in response to carbon dioxide pneumoperitoneum during laparoscopic cholecystectomy and at the same time avoiding severe hypotension and bradycardia.

The rise in heart rate in response to pneumoperitoneum in group A was significantly less when compared to group B ($P = 0.026$). On statistical comparison the rise in systolic blood pressure, diastolic blood pressure and mean arterial pressure post pneumoperitoneum was significantly less in group A as compared to group B ($P < 0.05$). Titrated nitroglycerin infusion had to be started in 16.66 % of cases in group A and in 43.33% of cases in group B to control hypertension in response to pneumoperitoneum. This difference in number of cases in which nitroglycerin infusion had to be started is statistically significant ($P= 0.024$). Our observations corroborates with the findings of other studies using different doses and routes of clonidine hydrochloride premedication. Jean L. Joris et al,[18] in 1998 used 8 µg/kg IV clonidine hydrochloride infused over one hour before pneumoperitoneum to investigate its effect in attenuating haemodynamic changes during laparoscopic cholecystectomy and observed that clonidine hydrochloride reduces catecholamine release and improves perioperative haemodynamic stability during laparoscopy. They also observed that after exsufflation all haemodynamic parameters returned to preoperative values. Malek et al,[22] in 1999 used 150 µg clonidine hydrochloride as infusion fifteen minutes before operation and 150 µg clonidine hydrochloride IM sixty to ninety minutes before laparoscopic cholecystectomy. A highly significant drop in the incidence of hypertension was recorded during operation for systolic blood pressure ($P < 0.001$) after both ways of administration, as well as of diastolic pressure ($P < 0.01$ for intravenous and $P < 0.05$ for intramuscular premedication). M. Laisalmi et al,[19] in 2001 used IM clonidine hydrochloride 4.5 µg/kg and found that it blunted haemodynamic stress response to carbon dioxide pneumoperitoneum during laparoscopic cholecystectomy and were of view that it effectively attenuates the rise in heart rate during and after pneumoperitoneum. H.P Yu. et al,[17] in 2003 investigated the clinical efficiency of oral clonidine hydrochloride 150 µg used as premedication in patients undergoing laparoscopic cholecystectomy and concluded that it preserves heart rate control during pneumoperitoneum and recovery periods. Manjushree Ray et al,[13] in 2007 used oral clonidine hydrochloride 150 µg as premedication and found it to be an effective method of providing perioperative haemodynamic stability and protection against stress response due to pneumoperitoneum during laparoscopic cholecystectomy.

Heart rate values in the post operative period in group A were also significantly less than in group B ($P < 0.05$). Although there was no significant difference in systolic blood pressure, diastolic blood pressure and mean arterial pressure values of both the groups in the postoperative period, the values were less in group A ($P > 0.05$).

Although the incidence of nausea and vomiting, 20 % in group A as compared to 43.33% in group B ($P= 0.052$), is statistically insignificant the incidence is much more in group B. Manjushree Ray et al,[13] in 2007 observed that the incidence of nausea and vomiting was 6.89 % in clonidine hydrochloride group and 43.33% in control group.

One patient in group A and two patients in group B had shivering in our study. Although a statistically insignificant finding ($P= 1.00$), the incidence was 50% more in the control group. G. Nicolaou et al,[14] in 1997, did a study to determine the effects of clonidine hydrochloride on warm and cold thermoregulatory thresholds and concluded that clonidine hydrochloride inhibits cold thermoregulatory response due to an effect on central integration, control and output from thermoregulatory centers. They found that clonidine hydrochloride produced dose dependent decrease in both vasoconstriction and shivering thresholds (i.e., cooling to a lower core temperature would be required to stimulate the later two responses). Thus they concluded that clonidine hydrochloride can be used as an effective agent for inhibition of perioperative shivering. Incidence of shivering was 10.7 % in control group compared to none in the clonidine group in a similar study by Manjushree Ray et al.[13]

The incidence of sedation before induction of anaesthesia as assessed by sedation score was higher in group A. In group A, 63.34% patients had grade 1 sedation compared to 16.67% in group B. While grade 2 sedation was observed in 3.33% patients in group A and no patients in group B. No patient had sedation score of 3 in either of the study groups. The incidence of sedation was higher in group A than in group B and is statistically significant ($P < 0.001$). In a similar study by Manjushree Ray et al,[13] incidence of sedation was 33.33 % in clonidine group, which was statistically significant and corroborates with the finding of our study.

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CONCLUSION

Premedication with IV clonidine hydrochloride 1.5 μg/kg body weight provides significant haemodynamic stability during laparoscopic cholecystectomy. Clonidine hydrochloride at this dose is not associated with significant adverse effects like hypotension or bradycardia. It produces mild sedation as a desirable effect prior to induction of anaesthesia. It provides added advantage of reduction in postoperative complications such as nausea, vomiting and shivering.

Therefore IV clonidine hydrochloride 1.5 μg/kg body weight with minimal adverse effects may be accepted as an effective premedication before laparoscopic cholecystectomy to attenuate the stress response triggered by pneumoperitoneum. However more studies with larger sample size and comparing different doses of IV clonidine hydrochloride are desirable to determine its ideal dose before considering these observations as generalised.

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