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## **PHARMACOLOGICAL AND NON PHARMACOLOGICAL MEANS ARE EFFECTIVE IN PREVENTING PONV AFTER LAPROSCOPIC CHOLECYSTECTOMIES**

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### **ABSTRACT**

Present study was done in SRMSIMS Bareilly with the help of general surgery department. For years cholecystectomy is considered as emetogenic surgery. Evolution was done with the introduction of laparoscopy, it has brought a boon to the surgeons, because of the lesser scar size. Anaesthetists are still in search for the technique which has less PONV and which gives a better feel of anaesthesia. We tried to reduce PONV to a minimal level by adopting specified technique. A randomized double blind study was conducted in 160 healthy ASA 1 and 2 female patients, who were in ovulatory phase of their menstrual cycle, scheduled for elective laproscopoc cholecystectomies. We did this study in SRMS, IMS in 2 years. We did anxiolysis day before surgery and on the day of surgery. We gave preoperative i.v. fluids before surgery. We divided patients in 2 groups. Group 1 received inj. Ondansetron 4 mg after induction. Group 2 received inj. Ramosetron 0.3mg after induction. These 2 groups were further subdivided into 2 subgroups a and b. Group a received orogastric tube after induction. intraoperatively, that was removed at the end of surgery, before extubation. Group b did not have this tube. We used specific anaesthesia techniques, which was same in both groups. We started early feeding within 6 hours. 160 patients enrolled in this study, the data were recorded and analyzed using statistical analysis. It was found that incidence of PONV was very low in group 2a. We used multimodal approach, anxiolysis with tab Alprazolam night before and on the same morning of surgery, proper hydration, gastric desufflation with orogastric tube intraoperatively, use of specific anaesthesia regime plus IV Ramosetron 0.3mg [group2a] and early oral intake [within 6 hours] were very effective in reducing PONV. These measures permitted early discharge.

**Keywords:** *Laparoscopic Cholecystectomy, PONV, Multimodal Approach*

### **INTRODUCTION**

Laparoscopic surgeries are increasing day by day because for lesser hospital stay, small incisions decreased post operative pain early ambulation and return to work.

Initially, in the beginning of laproscopic era, it was confined to short diagnostic gynecological procedures carried out on young healthy females. It has extended to various intraabdominal surgeries now a day. The progress in laproscopic procedures has largely been due to technological advances in instrument. Although they are minimally invasive to the patients, the intraoperative requirements c of laproscopic surgical procedures, produce significant physiological changes on the human bodies, which causes some side effects e.g. hypertension, tachycardia, respiratory complications, PONV. Insufflation of CO<sub>2</sub> increases IAP leading to significant changes in hemodynamics.

The patients undergoing laproscopic cholecystectomy are prone to PONV, with the incidence of 53%-72% (Medsen and Jensen, 1992; Nagcod *et al.*, 1996; Paxton *et al.*, 1995).

In an attempt to decrease such a incidence, many antiemetics were studied, but because of the multifactorial origin of PONV, none was proved to be very effective.

### **MATERIALS AND METHODS**

This study was done in SRMSIMS, Hospital Bareilly in two years.

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An approval was obtained from Hospital Ethical Committee. After receiving informed written consent 160 healthy female patients, aged 15-45 years belonging to ASA I & II were taken for laparoscopic cholecystectomy under general anesthesia.

Exclusion criteria were body weight more than 30% above the ideal body weight, H/O vomiting in 24 hours before the operation, H/O allergy to drug or addicted to narcotics, H/O movement disorder, H/O high level of BUN or creatinine. We excluded those cases, who were converted to open cholecystectomy. We also excluded those cases where IAP used was more than 12mmHg. We excluded male patients.

The patients were randomly assigned into two groups I&II. The groups were further subdivided into two subgroups a & b.

At the time of entry to the operation room, the routine monitoring NIBP, pulse oximeter and ECG were attached.

For all patients, similar anesthetic technique was followed. Induction was done with Midazolam 0.05mg/kg, Fentanyl 2mcg/kg, Propofol 2-2.5mg/kg and Vecuronium 0.1 mg/kg.

Patients were intubated with appropriate size endotracheal tubes. Maintenance was done with O<sub>2</sub> 33%+N<sub>2</sub>O 67% and Sevoflurane 1-2% and patients were kept on controlled mode of ventilation. Vecuronium was repeated according to the requirement of patients while monitoring with nerve stimulator.

Injection Paracetamol 1gm. aq. Solution drip was started in the after the removal of gall bladder. Ventilation of the patients was performed by CMV in such a way that ET CO<sub>2</sub> was maintained for approximately 30-35 mmHg.

GROUP I -received inj Ondansetron 4mg IV after removal of gall bladder. This group was again subdivided into 2 subgroups

GROUP Ia –received orogastric drainage, which was put orally. This tube was kept for intraoperative period only.

GROUP Ib – received no orogastric drainage tube.

GROUP II –received injection Ramosetron 0.3mg intravenously after removal of gall bladder. This group was again subdivided into 2 subgroups.

GROUP IIa- received orogastric drainage intraoperatively.

GROUP IIb - received no orogastric drainage.

Abdomen was insufflated with CO<sub>2</sub> at flow rate of 0.2 L/min.

IAP was maintained between 10-12mmHg. If we had to use IAP more than 12 mmHg, then these patients were excluded from the surgery.

After the surgery, it was checked to make sure that the abdomen was completely desufflated.

Anatomization was carried on remaining muscles nerve block by applying 0.04mg/kg Neostigmine and 0.02mg/kg Glycopyrrolate.

Patient was extubated following extubation criteria.

The patient was monitored carefully for 6 hours following the operation in the postoperative recovery room, after that for 24 hours in their rooms. The incidence of PONV was counted and recorded in the recovery room. They were assessed according to the following scale.

0-no nausea/vomiting.

1 – Nausea only

2- Retching or/and vomiting.

At PONV score 2 or asked by the patient inj Metoclopramide 10 mg intravenously was used as rescue drug.

After 6 hours, all patients received liquids. Next day they were discharged.

## **RESULTS AND DISCUSSION**

### **Results**

SPSS statistical software (16.0) was used for data analysis. In this study p value < 0.05 has been considered as statistically significant. To calculate the sample size, a power analysis of  $\alpha = 0.05$  and beta

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= 0.80, showed that 40 patients per study group were needed. Datas are expressed as mean and standard deviation. For comparing, the two main groups, Student t test were applied. For qualitative assessment, Chi Square test was done.

**Demographic Data**

	<b>1a</b>	<b>1b</b>	<b>2a</b>	<b>2b</b>	<b>P value</b>
Age	44.4±17.12	42.4±15.16	38.6±13.48	42.7±14.15	NS
Body Weight	61.3±6.02	62.8±7.76	60.3±4.83	63.8±8.19	NS
Height	154.22±5.88	155.7±2.21	153.2±4.70	150.95±3.50	NS
BMI	24.70±3.02	24.99±2.07	25.42±1.89	24.11±1.69	NS

All 160 patients, enrolled in the study had their surgical procedures completed there was no statistically significant difference amongst the four groups, according to patient age, body weight, height, BMI, CO2 insufflations and Fenatnyl consumption.

Hemodynamic profile in both groups including NIBP and Pulse rate were similar. Preoperative and intraoperative hemodynamic profiles were same, because we used same induction and maintenance techniques.

	<b>1a</b>	<b>1b</b>	<b>2a</b>	<b>2b</b>
Duration of Surgery	55.25±3.03	50±2.67	51±11.69	54.75±6.70
Duration of Anaesthesia	71.25±2.98	63.75±4.78	62±10.70	66±6.55

Duration of surgery in all groups was comparable. P value between 1a/1b, 1b / 2a, 1a/2b, 1a/2a, 1b/2b and 1a/2a were 0.785, 0.068, 0.855, 0.526, 0.824 and 0.068 respectively. These values were not significant. Duration of anaesthesia in all groups was comparable. P value between 1a/1b, 1b/2a, 1b/2b, 2a/2b, 1a/2a and 1a/2b were 0.143, 0.181, 0.758, 0.870, 0.270 and 0.306 respectively. These values were not significant. The incidence of nausea and vomiting in each group were recorded. As expected, the incidence of vomiting was less frequent than nausea in all periods, because some patients experience nausea without vomiting.

**Comparison of incidence of PONV in different groups**

<b>Groups</b>	<b>Duration</b>	<b>Pt. With Nausea</b>	<b>Pt. With Vomitting</b>	<b>Total PONV</b>	<b>Needs antiemetics</b>
GROUP 1a	0-6 hours	6	4	6	4
	6-24 hours	8	6	8	6
GROUP 1b	0-6 hours	8	6	8	6
	6-24 hours	8	8	8	8
GRUOP 2a	0-6 hours	2	2	2	2
	6-24 hours	2	4	2	4
GROUP 2b	0-6 hours	5	6	5	6
	6-24 hours	6	6	6	6
<b>P VALUE</b>					
	1a/1b	0.500	1	0.500	1
	1b/2a	0.000	1	0.000	1
	2a/2b	0.000	0.205	0.000	0.205
	1a/2b	0.090	0.500	0.090	0.500
	1a/2a	0.000	0.500	0.000	0.500
	1b/2b	0.070	0.500	0.070	0.500

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Using statistical analysis, on comparing 1a and 2a, p value was 0.00 [significant]. 1b and 2a, p value was 0.00 [significant]. Between 2a and 2b, p value was 0.00 [significant]. On comparing 1 a and 1 b, 1 a and 2 b, 1 b and 2 b p value were more than 0.05. So patients in group 2a experienced less nausea. Similar p values were also there, when we compared incidence of total PONV. As compared to other groups, it had significantly low incidence of PONV.

Post operative analgesia was adequate up to 6 hours postoperatively. It was supplemented with inj Diclofenac Sod. Intravenously in the remaining drip.

The potential side effects include headache, dizziness, anxiety sedation were noted. But they were not significantly different in each group.

### **Discussion**

The aetiology of PONV is multifactorial. In our study, we tried to equate those factors. So we took only female patients in our study.

As female gender is more susceptible for high incidence of PONV in comparison to males. Aetiology is not clear yet (Apfel *et al.*, 1999; Sinclair *et al.*, 1999).

PONV increases during menstruation and preovulatory phase of the menstrual cycle due to sensitive CTZ to FSH and Oestrogen. So we removed this factor in our study, by choosing those females who were in ovulatory phase (Sinclair *et al.*, 1999; Beattie *et al.*, 1993).

Middle aged females were selected because incidence of PONV decreases after puberty and is minimal in adults (Sinclair *et al.*, 1999; Beattie *et al.*, 1993). We also selected female patients, because according to Hiwa Omer Ahmed, laproscopic cholecystectomies in male patients take longer time (Hiwa, 2012; Nadia and Shamin, 2010). He could do surgeries in fewer periods in comparison to the groups, where it was not used, because increasing the duration of surgeries by 30% will increase the risk of PONV by 60% (Lewis *et al.*, 2001; Nelson *et al.*, 2007). So we removed this confounding factor in our study.

We ruled out open cholecystectomy in our study, because according to Litomi T, Toriumi S, PONV is greater in early post operative period in laproscopic cholecystectomies than open cholecystectomies.

They considered it due to the effect of residual stretching and irritation of the peritoneum (Litomi *et al.*, 1995). We did preoperative anxiolysis and aggressive hydration (25 ml/kg). It was seen in various studies, that preoperative fasting increases gut ischemia. If we preload patient then chances of PONV are less (Ahmed *et al.*, 2009).

Ondansetron is selective 5HT<sub>3</sub> antagonist that is used for its effect in nausea and vomiting due to chemotherapy and radiotherapy in addition to surgery (Gautam *et al.*, 2008; McKenzie *et al.*, 1994).

It was found that incidence of vomiting and the need for antiemetic drug in the group that received Dexamet has one was significantly higher, than the groups, who received Ondansetron (Mohammad and Hamid, 2012).

Canosen described effectiveness of Ondansetron in patients with previous H/O PONV. IV Ondansetron 4mg & 8mg were given prophylactically in adult patients without H/O PONV (Canosen, 1999).

Paul. F White and Mehernoor demonstrated efficacy of prophylactic antiemetic therapy in high risk gynecologic laproscopic surgery. He found a higher percentage of satisfied patients 90% versus 67% who received Ondansetron administered near the end rather than before surgery (Tang *et al.*, 1998).

In second group we used Ramosetron. Ramosetron is a newer selective 5HT<sub>3</sub> antagonist. It has long duration of action. According to Ryu and Sym, incidence of PONV was less in Ramosetron plus Dexamethasone than Ramosetron alone group (Ryu *et al.*, 2010; Ansari *et al.*, 2010). They also told that Ramosetron is better than Ondansetron in the prevention of PONV in laproscopic cholecystectomies. They told that Ramosetron is better in preventing PONV for more than 24 hours in cases of laproscopic cholecystectomies.

We used orogastric tube intraoperatively after the induction and removed before extubation, as nonpharmacological means. It was seen that, if we use nasogastric tube orally, then it reduces chances of unpleasant nasal stinging sensation and finally rhinitis. Our purpose of using this tube was to deflate stomach, because some air goes to stomach at the time of mask ventilation. This air again increases the potential for PONV. Oral route causes less discomfort and finally, less nausea than nasal route. The

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purpose of temporary putting of orogastric tube was dual (Lewis *et al.*, 2001; Nelson *et al.*, 2007), first because of presence of orogastric tube, all gastric contents came out easily in intraoperative periods. It was seen in our study that the incidence of PONV was very low when we used orogastric tube along with the antiemetic drug. As in group 2a (shown in charts).

Secondly according to society of laproendoscopic surgeons, they recommend deflation of stomach contents before Veress needle placement. It avoids trauma to the intraabdominal contents. Due to deflation of stomach by the orogastric tube, visualization of the surgical field for surgeon also becomes easy (John *et al.*,). Surgeons do not recommend placement of naso or orogastric tube for long time, because chances of paralytic ileus and pulmonary infections are more if we are using it for long time. So we used it for very short intraoperative period. We started liquids orally after 6 Hours. It also reduces the incidence of paralytic ileus. Thus causing less PONV (Nelson *et al.*, 2007). Liquid diet was started after 6 Hours. From next day patients used to start taking soft diet then they are discharged on the next day.

## Conclusion

With the advancement in surgical field like laproscopic surgeries, it is our duty to provide fancy anaesthesia. Our aim was to give smooth emergence and normal feel by the patient. It required a multidisciplinary approach to per operative care to permit earlier discharge.

Measures like anxiolysis with tab Alprazolam night before and on the same morning surgery, proper hydration, gastric desufflation with nasogastric tube intraoperatively, use of specific anaesthetic regime plus IV Ramosetron 0.3mg (gp2a) and early oral intake (within 6 Hours) were very effective in reducing PONV. These all multimodal measures permitted early discharge of the patients.

## REFERENCES

- Ahmed Turkistani, Khalid Abdullah and Essam Manaa (2009).** Effect of preloading on postoperative nausea and vomiting following laproscopic cholecystectomy. *Saudi Journal of Anaesthesia* **3**(2) 48-52.
- Ansari MM, Obaid A Siddiqui and Shahla Haleem (2010).** Comparison of Ramosetron and Ondansetron for control of PONV following Laproscopic cholecystectomy. *Indian Journal of Medical Sciences* **04**(6) 272-280.
- Apfel CC, Laare E, Koivuranta M, Greim CA and Roweer NA (1999).** Simplified risk score for predicting PONV, Conclusions from cross validations between two centres. *Anaesthesiology* **91** 693-700.
- Beattie WS, Lindblad Buckley DN and Forrest JB (1993).** Menstruation increases the risk of PONV after laproscopy. A prospective randomized study. *Anaesthesiology* **78** 272-6.
- Canosen (1998).** Prophylactic Ondansetron for postoperative emesis, meta analysis of its effectiveness in patients with previous H/o PONV. *Acta Anaesthesiologica Scandinavica* **43** 65-67.
- Gautam B, Shrestha BR and Lama P Rais (2008).** Antiemetic prophylaxis against PONV with Ondansetron or Dexamethasone alone for patients undergoing Laproscopic cholecystectomy. *Kathmandu University Medical Journal (KUMJ)* **6**(23) 319-28.
- Hiwa Omer Ahmed (2012).** Gender difference in elective laproscopic cholecystectomy for chronic cholecystitis. *Basrah Journal of Surgery*.
- John H Nguyen and Pedro P Tanaka (No Date).** *Prevention and Management of Laproendoscopic Surgical Complications*, 3<sup>rd</sup> edition, Anaesthesia for Laproscopic Surgeries.
- Lewis SJ, Egger M, Sylverter PA and Thomes S (2001).** Early enteral feeding versus nil by mouth after gastrointestinal. *BMJ* **323** 773-776.
- Litomi T, Toriumi S, Kondo A, Akazerwa T, Nakahara T and Masui (1995).** Incidence of Nausea and Vomiting after Cholecystectomy Performed via Laprotomy or Laproscopy **44**(12) 1627-31.
- Mckenzie R, Tanitsira B, Karambelkar D and Abdelhady H (1994).** Comparison of Ondansetron with Ondansetron plus Dexamethasone in the Prevention of PONV. *Anesthesia & Analgesia* **79**(5) 961-4.
- Medsen MR and Jensen KEJ (1992).** Postoperative pain and nausea after laproscopic cholecystectomies. *Surgical Laparoscopy Endoscopy* **2** 303-305.
- Mohammad Eidy and Hamid Raza Vafei (2012).** Effect of Ondansetron & Dexamethasone on PONV undergoing laproscopic cholecystectomy. *Journal of Minimally Invasive Surgical Sciences* **1**(4) 138-145.

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**Nadia Shamil and Shamin Quraishi (2010).** Is nasogastric decompression necessary in elective enteric anastomosis. *Journal of Ayub Medical College Abbottabad* **22**(4).

**Nagcod M, El Bakry A, Khoshim MH, Channa AB, El Gammal M, El Gammal K and Siddique A (1996).** Prophylactic antiemetic therapy with Ondansetron, Tropisetron, Granisetron & Metoclopramide in patients undergoing laproscopic cholecystectomies – a randomized double blind comparison with placebo. *Canadian Journal of Anesthesia* **43** 223-26.

**Nelson R, Edwards S and Tse B (2007).** CD004929 Prophylactic nasogastric decompression after abdominal surgery. *Cochrane Database System Review* **18**(3).

**Paxton LD, Mckay AC and Mirakpur RK (1995).** Prevention of Nausea and vomiting after day care gynaecologic laproscopy, A comparison of Ondansetron, Droperidol, Metoclopramide & placebo. *Anaesthesia* **50** 403.

**Ryu J, So YM, Wang H and Dosh J (2010).** Ramosetron versus Ondansetron for the prevention of PONV in laproscopic cholecystectomy. *Surgical Endoscopy* **24** 812-7.

**Sinclair DR, Chung F and Mezei G (1999).** Can postoperative and vomiting predicted. *Anaesthesiology* **91** 109-18.

**Tang Jun, Wang Baoguo and White Paul F (1998).** The effect of timing of Ondansetron administration on its efficacy, cost effectiveness and cost benefit as a prophylactic antiemetic in the ambulatory setting. *Anaesthesia and Analgesia* **86**(2).