

**POSTOPERATIVE NAUSEA AND VOMITING EFFECTS OF PROPOFOL AND
THIOPENTONE ANAESTHESIA AFTER CHOLECYSTECTOMY AND RECOVERY FROM
IT: A COMPARATIVE STUDY**

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Abstract:

Postoperative nausea, vomiting, retching and other emetic sequel were found to be the most prevalent cause of morbidity after anesthesia and surgery. Postoperative nausea and vomiting if become forceful can produce some very serious side effects like it can cause tension on suture line, can cause hypertension. Any effective clinical anesthetic which can lower or free from such side effects will certainly be the choice of anesthesia. Present study was also aimed to compare the score of emesis sequel and recovery of patients from anesthesia between the patients given with Propofol and conventional anesthetics (Thiopentone + Halothane). Total of 64 adult, ASA Grade I and II patients of either sex, scheduled for elective mini cholecystectomy were enrolled in the study. The patients were randomly divided into two groups consisting 32 patients in each group. Group-I was given Propofol as anesthetic whereas the other Group-II received Thiopentone and Halothane. All the patients were observed for any emesis sequence and its protraction. Mean emesis score and score for the recovery from the anesthesia were recorded. Group of the patients given with Propofol showed more incidence of nausea (21.88%) when compared to Group-II (15.63%) in first 2 hrs, whereas later during 2-24 hrs it becomes more in Group-I (15.63) when comparison to Group-II (3.12%). Incidences of Retching and only Vomiting were found more in Group-I when compared to Group-II at every interval of observation. Also, it was reported that the overall recovery score was higher in case of patients anaesthetized with Propofol.

Keywords: PONV, Nausea and Vomiting, emesis, antiemetic, anesthesia, propofol, thiopentone and halothane.

Introduction:

The commonest cause of morbidity after anesthesia and surgery are pain and postoperative nausea and vomiting (PONV).

Palazzo MGA and Strunin, 1984 studied and reported that the two are interrelated, unrelieved pain is a common cause of postoperative nausea and vomiting. Opioids

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were used for the pain relief which used to cause postoperative emesis. As with pain, PONV is difficult to measure. Extreme forceful vomiting has resulted in dehiscence of abdominal wounds and even ruptures of the esophagus. Forceful retching or vomiting can cause tension on suture line hypertension and bleed under skin flaps.¹

In past two decades postoperative pain has undergone an enormous amount of investigation, undoubtedly phenomenal advances have been made in the management of this symptom in contrast to postoperative nausea and vomiting has received lesser attention.²

However, both acute postoperative pain relief and prevention and treatment of postoperative nausea and vomiting has recently assumed great importance in anesthesia as the focus has shifted from mortality or morbidity.³

Cholecystectomy is associated with the remarkably high rate of PONV. Apart from strabismus surgery, the laparoscopic procedure is regarded as a standard operation for the study of postoperative nausea and vomiting (PONV).⁴ The surgical technique is highly standardized therefore the choice of aesthetic is the main variable to influence PONV.

Causes of more vomiting after cholecystectomy may include stimulation of sympathetic nervous system, an increased abdominal detention due to nitrous oxide diffusion and due to manipulation and traction of gut stimulating the vagal afferent and causing PONV.⁴

Most of the anesthetics used for the clinical study are themselves responsible for PONV. As halothane in sub-aesthetic doses has got antiemetic properties which do not hold good for cyclopropane, nitrous oxide and ether as they are involved with higher incidences of emesis.⁵

Prevalence of post-operative cholecystectomy and other abdominal surgeries with balanced anesthesia by

thiopentone-halothane was found higher in comparison to total intravenous anesthesia by propofol.⁶ In various studies done it was reported that sub-hypnotic propofol infusion 1 mg/kg per hour effectively reduced the incidences of PONV from 65% to 10% without untoward sedative or cardiovascular effects.^{7,8}

Hence the present research is designed with an objective to study the comparative effects of propofol and thiopentone anesthesia on postoperative nausea and vomiting after cholecystectomy.

Material and Method:

Statistical Analysis: Chi-square test was used to evaluate the analysis of non-parametric data. One-way ANOVA and student ‘t’ test was also used to analyze the other parameters. $P < 0.5$ was considered as significant.

Selection of patients:

After due approval from ethical committee adult patients of either sex of ASA (American Society of Anaesthesiologists’) Grade I and II, scheduled for elective mini cholecystectomy were enrolled in the study.⁸

Informed consent was obtained from every case and thorough preoperative check-up and investigations were done to and patients were excluded as per the exclusion parameters:

1. Patients with jaundice and history of jaundice.
2. History of any cardiovascular and respiratory disorder or hepatic dysfunction.
3. Patients with a history of lipid allergy.
4. Patients currently taking antiemetic.
5. Patients were enquired about drug therapy especially corticosteroids, antibiotics, diuretics, antihypertensive were noted.

Preanesthetic Medication and Anesthetic technique:

Patients were Nil Per Orally (NPO) for at least 6 hours before the operation. All

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patients were premedicated with 5-10 mg diazepam in night alprazolam 0.25 mg in morning before the operation. All the parameters like pulse rate, blood pressure, oxygen saturation was noted and ECG monitoring was established. After preoxygenation all the patients were given 0.01 mg/kg body weight, midazolam 0.03 mg/kg body weight and pentazocine 0.5 mg/kg body weight IV just before induction.⁹

All the selected case was randomly divided into two groups. Each group contains equal no. of patients.

Group-I

General anesthesia was induced with thiopentone 4-7 mg/kg and succinylcholine 1-1.5 mg/kg was given to facilitate endotracheal intubation. Patients were then ventilated with 33% Oxygen in the Nitrous oxide. Anesthesia was maintained on Oxygen-Nitrous oxide (33%-66%) in halothane and vecuronium 0.08 mg/kg. A supplemental dose of pentazocine and midazolam were administered when required. Halothane was discontinued at the time of peritoneum closure. At the end of the operation, patients trachea was extubated after antagonizing the non-depolarising drug

by injecting neostigmine 2.5 mg and atropine 1.2 mg.¹⁰

Group II

General Anesthesia was induced by injection with 1% propofol 2-3 mg/kg along with xylocaine 0.25 mg/kg to reduce the pain on injection. Anesthesia was maintained on Oxygen-Nitrous oxide (33%-66%) in 0.08 mg/kg and propofol infusion at the rate of 9 mg/kg per hour for first 15 mins and 6 mg/kg per hour for next 15 mins and then reduced to 3 mg/kg per hour. A supplemental dose of pentazocine and midazolam were administered when required. Propofol infusion was discontinued just before the skin closure. At the end of the operation, patients trachea was extubated after antagonizing the non-depolarising drug by injecting neostigmine 2.5 mg and atropine 1.2 mg.¹¹

All the patients were monitored by continuous ECG, pulse rate, blood pressure and pulse oximetry (SPO₂).

After extubation, the patients were shifted in the postoperative room and observations were done. Special assessment for nausea, vomiting, and recovery from anesthesia by using the following score:

Table 1: Emesis and Recovery scores⁹

Emesis Score	
No Nausea / Vomiting	0
Slight Nausea	1
Heavy nausea	2
Retching	3
Vomiting 1/min	4
Vomiting >1/min	5
Recovery Score	
Awakefulness	
Fully Awake	4
Drowsy	3
Arousable by shouting	2
Arousable by shaking	1
Not arousable	0
Ventilation	
Airway patient cough or dry	2

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Airway patient breathes easily	1
Airway requires attention	0
Movement	
Purposeful and spontaneous	4
Purposeful on demand	3
Undirected and Spontaneous	2
Undirected on demand	1
No movement	0

Postoperative both scores were calculated at every 30 min interval for a period of 120 min. For emesis, additional scores were recorded till next 24 hr from the discharge of postoperative rooms.

Ondansetron 4 mg was given through IV as rescue medication to counteract emesis if patients have. The time and no. of doses were noted.¹²

Results:

After taking informed consent from the patients a total of 64 patients of either sex were selected for the study. All the subjects were randomly grouped into two groups containing 32 cases in each group. The classification of cases in each group is given in Table 2.

Table 2: Classification of the patients and characteristics of the groups

Characters		Group- I	Group-II
Age (years)		37.25± 10.22	37.06 ± 8.56
Gender	Male	6	4
	Female	26	28
Weight (Kg)	Male	38.33 ± 9.48	40.00 ± 4.24
	Female	37.00 ± 10.36	36.04 ± 8.55
Duration of Operation (min)		30-70	30-70
Induction Dose (Mean)	Thiopentone	5.1 mg/kg	-
	Propofol	-	2.2 mg/kg
Infusion dose of Propofol		-	210 mg

There is no significant difference between the groups (p>0.05) according to demographic data and duration of the operation.

Distribution of patients according to age and sex in the group it was found that majority of patients were female aged between 30-40 yrs in both the groups and the majority of the patients was in the weight group of 45-60 kgs.

Observation of pulse rate and blood pressure:

Mean pulse rate, systolic blood pressure and diastolic blood pressure of patients in Group I at various time interval

were found to be more than Group-II except just after induction.

The emergence of nausea and vomiting after cholecystectomy:

The patients were monitored for the appearance of postoperative nausea, vomiting, and retching. Antiemetic drugs (Ondansetron 4mg IV) were given to counterpart the symptoms and it was found that 12.5% of cases in Group-I and only 3.12% in Group-II required the drug. It was also found that 3.12% (One) patient suffered from retching but did not require the antiemetic administration Table 3.

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Table 3: Incidence reported for emesis sequence in groups

Episodes of PONV	Group-I				Group-II			
	Antiemetic Drug				Antiemetic Drug			
	Used		Not Used		Used		Not Used	
	No. of Patients	%	No. of Patients	%	No. of Patients	%	No. of Patients	%
Retching	3	9.38	-	-	-	-	1	3.12
Retching and Vomiting	1	3.12	-	-	1	3.12	-	-
Total	4	12.5	-	-	1	3.12	1	3.12

Observation of PONV:

All the patients were observed for incidence of postoperative nausea and vomiting until

24 hrs after discharge from postoperative rooms. All the observations are depicted in Table 4.

Table 4: Episodes of PONV in next 24 hrs after discharge

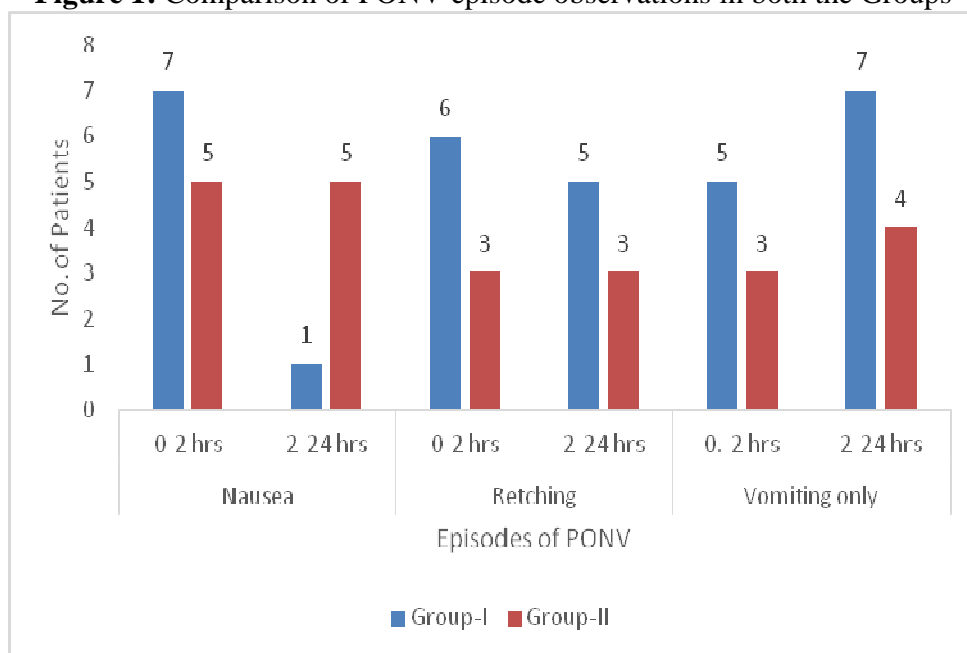
Duration (hrs)		Group-I		Group-II	
		Thiopentone		Propofol	
		No. of Patients	%	No. of Patients	%
Nausea	0-2 hrs	7	21.88	5	15.63
	2-24 hrs	1	3.12	5	15.63
Overall		8	25	10	31.25
Retching	0-2 hrs	6	18.75	3	9.38
	2-24 hrs	5	15.63	3	9.38
Overall		11	34.37	6	18.75
Vomiting only	0-2 hrs	5	15.63	3	9.38
	2-24 hrs	7	21.88	4	12.54
Overall		12	37.50	7	21.88

From the observation, it is evident that incidence of nausea was more in Group I (21.88%) when compared to Group-II (15.63%) in first 2 hrs, whereas it becomes more in Group-I (15.63) in comparison to

Group-II (3.12%) in second phase of observation during 2 to 24 hrs. Incidences of Retching and Vomiting only were found more in Group-I when compared to Group-II at every interval of observation.

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Figure 1: Comparison of PONV episode observations in both the Groups



It was also found that the no. of patients with no emetic sequel was more in Group-II

(20) when compared to Group-I (12) in first two hours of operation.

Recover Score after Cholecystectomy:

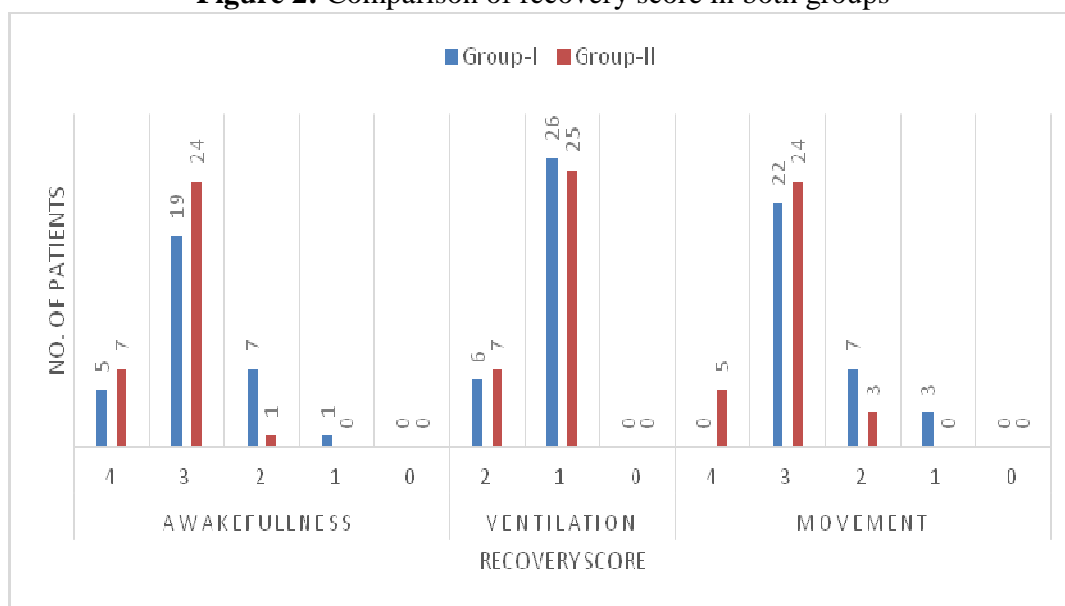
Table 5: Recovery score of patients in both the Groups

Recovery Score	Group-I		Group-II	
	No. of Patients	%	No. of Patients	%
Awakefulness (Score)				
4	5	15.63	7*	21.87
3	19	59.37	24*	75.00
2	7	21.87	1*	3.12
1	1	3.12	0*	0
0	0	0	0	0
Ventilation				
2	6	18.75	7	21.87
1	26	81.25	25	78.13
0	0	0	0	0
Movement				
4	0	0	5*	15.62
3	22	68.75	24*	75.00
2	7	21.87	3*	9.38
1	3	9.38	0*	0
0	0	0	0	0

*p<0.05 Significant

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Figure 2: Comparison of recovery score in both groups



There was a significant difference between no. of patients fully awake in Group I (15.63%) and Group II (21.87%). Whereas the there was no significant difference found in the recovery of ventilation of the patients of both groups. Recovery of movement in the patients of Group-II was more than the patients in Group-I.

Discussion:

Different pre and postoperative factors may contribute to PONV and if not correctly taken into account may introduce bias in the interpretation of the results. In the present study, there was no difference found in the preoperative conditions and their postoperative course. In particular, the amount of opioid used intraperitoneally did not differ between the groups. As the patients represented both groups is homogeneous population. Any difference of emetic symptoms is considered, attributed to the study drug,

In the present study patients treated with propofol found to be the lesser incidence of PONV only 1/3rd of the population (11 out of 32 patients). Although the feeling of nausea was more common with the patients (31.25%), given with

propofol compared to the patients of thiopentone group (25%).

Doze and Shafe and White 1988, studied the patients undergoing abdominal surgery including open cholecystectomy and found that approximately 40% of patients experience nausea after propofol anesthesia. The results are similar to our study where patients in Group-II found more cases of nausea compared to Group-I¹³. In another study, Simeon et al 1991 reported the higher cases of emesis due to N₂O in the patients given propofol as base anesthesia. In the present study, the higher cases of nausea might be because of N₂O in the patients given propofol.¹⁴

The patients given with propofol anesthesia are found with lower emesis score than the patients given with conventional anesthesia (Thiopentone + Halothane). The difference observed between the groups was statistically different ($p < 0.05$). Also, the postoperative recovery from anesthesia was significantly faster in the patients given with propofol than the patients received thiopentone and halothane. This could be evident by another study which states that recovery from anesthesia by total intravenous technique as

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more rapid and associated with decreased incidences of PONV.¹⁴

Conclusion:

The present study was done to compare the postoperative PONV effects of propofol in cholecystectomy than conventional anesthetics like thiopentone and halothane. The study conducted in 64 adult patients of either sex and found that Propofol anesthesia is associated with low postoperative nausea and vomiting and shown an early recovery from the anesthesia. The study was done to a smaller group of patients; a large group of patients can prove the use of propofol profoundly. Further, this study was accounted only for the observations of postoperative nausea and vomiting symptoms after use of propofol, however, the study for the observation and recording of other side effects over a longer period of time is also required.

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