

Role of Apfel's Score in Predicting Postoperative Nausea and Vomiting after Laparoscopic Cholecystectomy

Devendra Shrestha¹, Sunil Shrestha², Narendra Vikram Gurung¹, Dilip Baral¹

¹Department of Surgery, Pokhara Academy of Health Sciences, Western Regional Hospital, Pokhara.

²Department of Surgery, Nepal Medical College Teaching Hospital, Kathmandu.

Correspondence

Dr. Devendra Shrestha, MS
Department of Surgery,
Pokhara Academy of Health Sciences, Western
Regional Hospital, Pokhara.

E-mail: dsth10@yahoo.com

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ABSTRACT

Introduction: Incidence of post-operative nausea and vomiting (PONV) following laparoscopic surgery under general anesthesia ranges from 50-70% depending on surgical and patient related factors. Several PONV risk scores are available, among which Apfel's score considers four risk factors which includes 1) female gender, 2) previous history of motion sickness or post-operative nausea and vomiting, 3) nonsmoking status 4) use of postoperative opioids.

Materials and Methods: A prospective study was conducted from December 2011 to January 2013 on all patients undergoing laparoscopic cholecystectomy, without the use of prophylactic anti-emetics to predict postoperative nausea and vomiting using Apfel's score. Perioperative anesthetic care was standardized in all patients. Rescue opioid analgesic (Pethidine) was given if not relieved by standardized analgesics. Patients were then observed for PONV for 24 hours. Those who suffered from PONV received appropriate anti-emetics if required.

Results: Total 122 patients underwent laparoscopic cholecystectomy during the study period. Female to male ratio was 3.2:1. PONV was present in 49.2% of patients. In our study the predictive percentage of patients suffering from PONV for scores 0, 1, 2, 3 and 4 were 0%, 11.1%, 46.6%, 66.6% and 70% respectively. P value was significant with all factors except previous history of PONV/motion sickness.

Conclusion: In our study, Apfel's score was found to be a good predictor for PONV in laparoscopic cholecystectomy. Out of four risk factors except previous history of PONV/motion sickness, remaining were individually statistically significant in predicting PONV. Those patients with high Apfel's score require prophylactic anti-emetics.

Keywords: Apfel's score, Laparoscopic Cholecystectomy, PONV

INTRODUCTION

Gallstones are among the most common gastrointestinal illness requiring hospitalization and frequently occur in young, otherwise healthy people with a prevalence of 11% to 36% in autopsy reports. Female sex, obesity, pregnancy, fatty foods, Crohn's disease, terminal ileal resection, gastric surgery, hereditary spherocytosis, sickle cell disease, and thalassemia are all associated with an increased risk for developing gallstones¹. Laparoscopic cholecystectomy has become the treatment of choice for cholelithiasis due to its associated advantages of reduced morbidity and a shorter hospital stay^{2,3}. The latter advantage has been negated by PONV, which is turning out to be the leading cause of unexpected re-admission after ambulatory surgery⁴.

Patients undergoing general anesthesia for laparoscopic cholecystectomy have a high incidence of PONV, the etiology being multifactorial, including patient demographics, nature of the underlying disease, anesthetic technique and postoperative care⁵.

The main patient related factors are age, sex, obesity, menstrual cycle, and history of motion sickness and/or previous post carbon dioxide insufflations on residual stretching and irritation of the peritoneum⁶. Several PONV risk scores are available to classify patients. One score by Sinclair, Chung and Mezei⁷ considers sex, age, previous PONV, history of motion sickness, duration of anesthesia, anesthetic technique, and type of surgery as predictors (Sinclair-score) while another, by Apfel's and colleagues, considers just four risk factors (Apfel's-score).

The four risk factors included in the Apfel's score are female gender, prior history of motion sickness or post-operative nausea and vomiting, nonsmoking, and the use of postoperative opioid. Each of these risk factors is supposed to elevate the incidence of PONV by about 20%. If no or only one risk factor is present the incidence of PONV may vary between about 10% and 21%, whereas if at least two risk factors are present it may rise to between 39% and 78%. Therefore this score might be useful for patient selection in anti-emetic trials⁸.

Table 1: Apfel's variables

| Variables | Yes | No |
|----------------------------------|-----|----|
| Female gender | 1 | 0 |
| Previous PONV or motion sickness | 1 | 0 |
| Non-Smoking status | 1 | 0 |
| Postoperative use of Opioids | 1 | 0 |

MATERIALS AND METHODS

A prospective study performed at the department of surgery, Nepal Medical College Teaching Hospital, Kathmandu, Nepal, between December 2011 and January 2013. The total number of patients was 131.

All patients who were planned for elective laparoscopic cholecystectomy and fulfilled the selection criteria were included in the study. Thorough history, physical examination and investigations were reviewed and a proforma was filled. Nine cases were excluded due to conversion.

A prophylactic antibiotic was given preoperatively in all the cases at the time of induction of anesthesia. The patients were given Diclofenac or Ketorolac on a regular basis, the frequency and dose depending upon the surgeon. Rescue opioid analgesic (Pethidine) was given if not relieved by Diclofenac or Ketorolac alone.

All episodes of nausea and vomiting after surgery were recorded at

- Zero to 8 hour
- 8 to 16 hour
- 16 to 24 hour intervals.

The frequency of nausea and vomiting was assessed and noted by nursing staff and investigator with

- Direct observation,
- On basis of patients complains and
- Direct questionnaire.

Assessment was done till 24 hours postoperatively. If two or more episodes of emesis occurred in each observation period, rescue anti-emetic (Ondansetron 4 mg) was given intravenously.

Inclusion criteria:

All Patients undergoing laparoscopic cholecystectomy during the study period who gave consent to enroll in the study.

Exclusion criteria:

1. Associated pregnancy.
2. Patients with ASA 3 and 4.
3. Patients with conversion of laparoscopic cholecystectomy into open for any reason.
4. Patients taking opioid analgesics for other reasons.

All the results of the cases were recorded in standard proforma and data collected were analyzed using SPSS 18.

RESULTS

During the study period of 13 months, total 122 patients underwent laparoscopic cholecystectomy, out of which 29 were male and 93 were female. Female to male ratio was 3.2:1. Out of 29 male eight (27.6%) had PONV. Among 93 female 52(55.9%) had PONV. Female to male ratio with PONV was 6.5:1. P value of PONV with gender was 0.008. Ninety-two patients were nonsmoker and 30 were smoker. Fifty two (56.5%) among nonsmoker had PONV and eight (26.6%) among smoker had PONV. The P value was 0.005. Two (1.6%) patients had previous history of PONV and only one (50%) patient had PONV. P value was 0.981 which was not significant.

Forty three (35.24%) patients among 122 patients had history of motion sickness. Out of 43 patients, 29 (67.44%) had PONV and among 79 patients with no history of motion sickness, 31(39.24%) had PONV. P value was 0.003. Sixty three (51.6%) patients required postoperative opioid analgesics. Forty (66.66%) of these patients, who required postoperative opioids, had PONV. Among 59 patients who did not need postoperative opioids, 20(33.9%) patients had PONV. P value was 0.001.

In 48 patients PONV occurred in 0-8 hours of surgery, 18 patients had PONV in 8-16 hours of surgery and four of them had PONV in 16-24 hours of surgery. Among these, 10 patients had incidence of PONV which was repeated after 8 hours of first episode of PONV.

The incidence of PONV was present in 60 patients (49.2%) as shown in table 2. Among these 27(22.13%) had only vomiting, 8(6.55%) had only nausea and 25(20.5%) patients had both nausea and

vomiting.

Table 2: Distribution of Apfel's score and PONV

| Apfel's score | PONV | | Total |
|---------------|-----------|-----------|-------|
| | Yes | No | |
| 0 | 0 | 9(100%) | 9 |
| 1 | 2(11.1%) | 16(88.9%) | 18 |
| 2 | 14(46.7%) | 16(53.3%) | 30 |
| 3 | 30(66.7%) | 15(33.3%) | 45 |
| 4 | 14(70%) | 6(30%) | 20 |
| Total | 60(49.2%) | 62(50.8%) | 122 |

The most common Apfel's score was 3, found in 36.9% and 0 was the least common, found in 7.4% as shown in table 2.

In our study among the four factors, except previous history of PONV, all others were significant independent factor for PONV as shown in table 3.

Table 3: Apfel's factors and P value

| Factors | P value |
|--|-------------|
| Sex | 0.008 |
| History of smoking/Previous history PONV | 0.005/0.981 |
| Motion sickness | 0.003 |
| Postoperative use of opioids analgesic | 0.001 |

DISCUSSION

Laparoscopic cholecystectomy has now become the gold standard method of managing benign gallbladder diseases. Although the laparoscopic approach for cholecystectomy has decreased surgical morbidity and has become a popular procedure, PONV is still an unpleasant side effect. Without prophylactic anti-emetics before laparoscopic cholecystectomy, incidence of nausea and vomiting has varied from 50% – 70%⁹. The incidence of PONV in our study was 49.2%, which is similar to other studies done by Koivuranta et al¹⁰ and Pearman et al¹¹. But the incidence of PONV was lower in a study done by Iitomi T et al which was 25.7%⁶ and higher in a study done by Moussa AA et al as 67%¹². This difference in incidence could be attributed to a number of factors, including study population size, age, sex, anesthetic technique and difference in amount of gas used and patient demographics.

Risk assessment scoring systems for PONV have been in use to provide only those in need

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of prophylactic anti emetics with the required medication. Thus unwanted side effects of anti-emetics are avoided. Among the various PONV scoring systems available, the Apfel's-score is a simple system. In our study the predictive percentage of patients suffering from PONV for the scores 0, 1, 2, 3 and 4 were 0%, 11.1%, 46.7%, 66.7% and 70% respectively. If the Apfel's score is higher so is the incidence of PONV. This is almost comparable to the original predictive value of the Apfel's score, where each score carries a predictive value of 20%. But in a study done by Weilbach E et al the incidence of PONV in patients with Apfel's score 3 and 4 were 59.7% and 91.3% respectively¹³, slightly less in patients with Apfel's score 3 and high in patients with Apfel's score 4 in comparison to our study.

Most of the patients in present study have experienced nausea and vomiting within the first 8 hours of postoperative period and the incidence decreases significantly thereafter.

Those patients with a high Apfel's score have a higher incidence of PONV and are most likely to benefit from the use of pre-operative prophylactic anti emetics rather than those patients with a low score. Apfel's scores of 3 and 4 are advised use of prophylactic anti-emetics⁸.

CONCLUSION

The Apfel's score is a simple and good predictor for PONV in laparoscopic cholecystectomy. In our study of the four risk factors except previous history of PONV, all other factors were individually statistically significant in predicting PONV. So we recommend prophylactic anti- emetics will be most beneficial to those with a high Apfel's score.

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