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RESEARCH ARTICLE

"USEFULNESS OF APFEL SCORE FOR RISK STRATIFICATION AND PROPHYLACTIC ADMINISTRATION OF ANTI-EMETICS FOR PONV IN LAPAROSCOPIC GYNECOLOGICAL SURGERIES"

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Abstract

Postoperative nausea & vomiting (PONV) is the 2nd most common distressing symptom commonly seen after surgeries under GA incidenc e being 20-30%.[1,2] Laparoscopic surgeries are associated with high incidence of PONV as high as 40-75%[3]. PONV decreases patient's comfort,satisfaction & may cause dehydration & electrolyte imbalance, aspiration of gastric contents, suture dehiscence & bleeding.[2,4,5] Apfel et.al (1999) developed a score that included 4 risk factors namely, female sex, h/o of PONV or motion sickness, nonsmoking status & use of postop opioids to predict the incidence of PONV. Each of these risk factors is supposed to elevate the PONV incidence to 20%[6]. This scoring system is simplified to a 4-item risk score which was defined as the no. of predictors present. If 0, 1, 2, 3 or 4 of these predictors present, the predicted risk of PONV is 10%, 21%, 39%, 61% & 79% respectively[7].Effective management of PONV should include treatment strategies (single therapy, combination therapy & multimodal) based on risk scores predicted by the Apfel scoring system[8]. Guidelines for the management of PONV by Gan.T. et al suggested that adult PONV management should consist of identification of PONV risk factors, risk alleviation, risk stratification, prophylaxis & rescue treatment as a complete care[9].

Introduction: -

Apfel scoring system have been used to identify patient, anesthesia & surgery-related risk factors[2]. With the help of the scoring system, identification of patients at high risk of PONV allows targeting prophylaxis to those at high risk. 2 & 3 antiemetic combinations should be considered for patients at high risk for PONV[8].To improve patient experience & outcome after ambulatory surgery prophylactical administration of antiemetics to high-risk groups for PONV can be yielded into cost savings through reduction in PACU stay[10]. With this background, we started this observational study with the primary aim of evaluating the usefulness of the Apfel score in identifying high-risk patients for PONV undergoing laparoscopic gynecological surgeries & to study efficacy in reducing the incidence of PONV after prophylactic administration of anti-emetics.

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Material and Method: -

This prospective observational study was conducted on 70 patients posted for laparoscopic gynecological surgeries like lap. assisted vaginal hysterectomy, diagnostic video laparoscopy, lap. ovarian cystectomy, lap. removal of ectopic pregnancy during period July 2021-December 2021. Thorough preoperative evaluation by an anesthesiologist was ensured. The patients were included in the study by applying the following Inclusion & exclusion criteria

Inclusion Criteria:
Patients between
The age group of 18-65years
ASA class – I & Class –II
BMI<30

Exclusion Criteria:
Patient nonacceptance
ASA grade : grade III & IV
Allergy to any anti-emetics drug used in the study
Liver or renal disease

During PAC patients were grouped based on the given scores as per Apfel scoring system. The 4 risk factors were female gender, nonsmoking status, h/o motion sickness or PONV & the use of postoperative opioids. Each risk is a score of 1. The total risk is 0-4. As recommended by the fourth Conesus guidelines for PONV management we developed our institutional protocol for PONV prophylaxis according to risk stratification given by the Apfel score which is as follows. Prophylactically antiemetics were administered as per score(as described in table 1 and table 2)[9,11,12].

Table no.1.Apfel scoring system

Female gender	**1**
Nonsmoker	1
H/O PONV or motion sickness	1
Post-op opioids	1
Total	0-4

Table no.2 shows antiemetic prophylaxis protocol as per Apfel scoring system

Score	Antiemetics prophylactically to be administered
1	Inj.Ondansetron 4 mg
2	Inj.Ondansetron 4 mg + inj. dexamethasone 8 mg
3	Inj.Ondansetron 4 mg + inj. dexamethasone 8 mg + Iv propofol 25 mg

4	Inj.Ondansetron 4 mg + inj.dexamethasone 8mg + iv propofol 25 mg + transdermal scopolamine patch(1mg)

Preoperative investigations: -

1. Complete hemogram
2. BT/CT
3. ECG
4. Chest X-Ray
5. Urine routine & microscopy
6. Random blood sugar
7. Blood urea & serum creatinine

Facilities &equipment: -

1. Anesthesia workstation
2. Equipment for laryngoscopy & intubation –appropriate size laryngoscope& endotracheal tubes
3. Noninvasive blood pressure
4. ECG monitor
5. Pulse oximeter
6. Study drugs
7. Resuscitation equipment

Anesthesia Procedure: -

Written informed consent was taken. During PAC patients were grouped based on the given scores as per Apfel scoring system.Antiemetics were prophylactically given as per score[9,11](as mentioned in table 1 and table 2). All patients received tablet alprazolam 0.25 mg night before surgery. Patients arrived at the preoperative room 30 minutes before surgery & preoperative basal HR, non-invasive blood pressure readings (SBP, DBP, MAP), SPO2 were monitored.

An 18G IV cannula was secured.

Induction of Anaesthesia: -

Standard GA technique with tracheal intubation was used in all patients. The induction agent used was propofol 2mg/kg, succinylcholine 1mg/kg for intubation & fentanyl 2 mcg/kg was used for intraoperative analgesia. Anesthesia was maintained with N_2O, O_2, sevoflurane & vecuronium. Postoperative pain was managed by IV paracetamol 1 gm TDS.Standard hemodynamic parameters were recorded in all patients was monitored for first 24 hrs after surgery &PONV grading was done as follows:

Grade 0: No nausea, vomiting
Grade 1: Only nausea
Grade 2: Nausea & vomiting
Grade 3: Intractable vomiting (severe nausea & vomiting)

Apfel score 3 & 4 were graded as a high-risk group, Apfel score 1 & 2 were graded as a low-risk group for PONV. PONV grades 2 & 3 were considered as having positive and grades 0 & 1 were considered negative.

Statistics: -

All data analysiswas done using IBM SPSS statistic software, ver.24.Descriptive statistics were done using chi-square test & Fisher exact tests. P<0.05 considered statistically significant Tabulation & graphical representation was used to present the data.

Result: -

The population was female & the mean age of the total population was 31 yrs posted for gynecological surgeries. Out of 70 patients, observed incidence of PONV was 35.60% Complete response (i.e. complete absence of PONV for 24 hrs.) was 64.40%.(Fig 1)27 patients were stratified as Apfel 2 in which incidence of PONV observed was 18.50%. 41 patients were stratified as Apfel 3 in whichincidence of PONV observed was 46.34% and 2 patients were stratified as Apfel 4 in which incidence of PONV was 50.

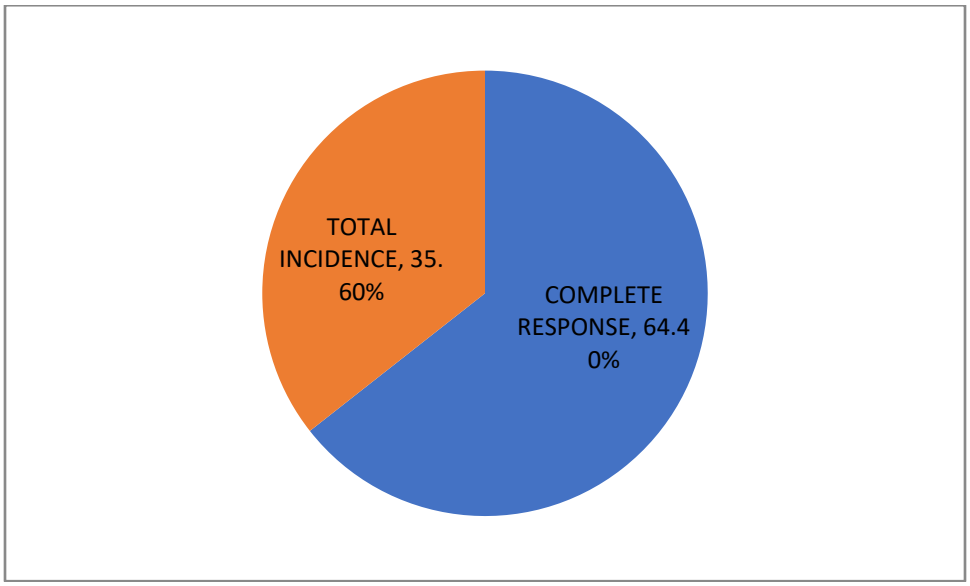

Figure 1. showing of incidence of PONV and complete response

Table 3. showing no. of patients categorized according to Apfel score & PONV incidence observed

APFEL SCORE	no. of patients	ponv incidence
0	0	0
1	0	0
2	27	18.50%
3	41	46.34%
4	2	50%

In our study, observed incidence of PONV was compared with the predicted incidence of PONV as given in lieratutre as per Apfel score, was found to be statistically significant(P<0.05)(Table 3)(figure 2)

Table 4. shows comparison of observed incidence of PONV & predicted incidence of PONV according to Apfel scoring system

Apfel score	OBSERVED INCIDENCE	PREDICTED INCIDENCE	P-VALUE	ODDS RATIO
0	-	9%	-	
1	-	20%	-	
2	18.50%	39%	0.002	0.376
3	46.34%	61%	0.03	0.55
4	50%	79%	0.001	3.73

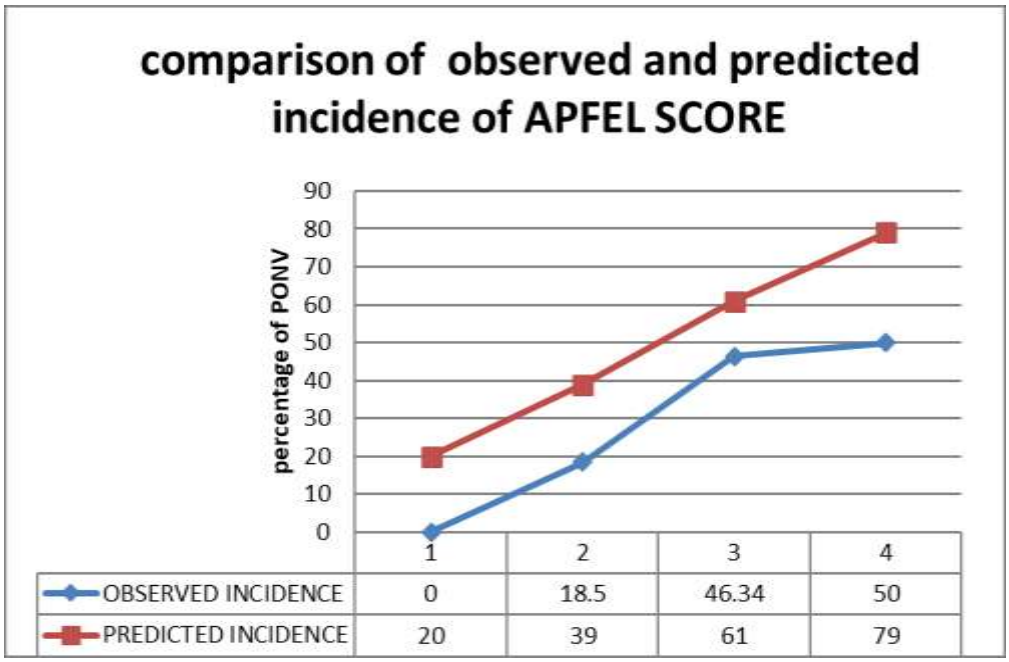

Figure 2. shows comparison of the observed and predicted incidence of PONV in all Apfel scores.

Table 5. showing Sensitivity, specificity, PPV & NPV values calculated for Apfel score in 70 patients

	Value
Sensitivity	46.51%
Specificity	81.48%
Positive Predictive Value	80.00%
Negative Predictive Value	48.89%
Accuracy	60.00%

Discussion: -

The incidence of PONV in patients undergoing gynecological procedures is estimated to be in the range of 56-93%[13,14]. Due to the high incidence of PONV after gynecological laparoscopic surgeries, its control remains a difficult task.The Apfel score is a useful tool for objective assessment of the risk of PONV. The goal of our study is to use the Apfel risk score to stratify patients who are at risk of PONV and implement evidence-based guidelines for management of PONV in females undergoing laparoscopic gynecological surgeries. Apfel. C.C. et al(2002) conducted study on 1566 patients & compared six predictive models of PONV out of which he simplified scores from Apfel &Koivuranta& their colleagues appeared to be suitable tools for putting rational antiemetic concepts into practice[15].

By using Apfel score we can objectively document patients who are at risk of PONV, guidelines can be followed for management of PONV with effective treatment strategies. In our study, all patients had an Apfel score greater than 1 because all patients were non-smoking women. After giving prophylactic antiemetics incidence of PONV observed was 18.50% ,46.34% & 50% in Apfel score 2,3,4 respectively. The incidence of PONV was reduced which was statistically significant($P<0.05$) as compared to predicted incidence of PONV by Apfel if no intervention was done. Mayeur C et al (2012) conducted prospective observational study on 823 patients in whichtreatment was given according to the number of risk factors & the incidence of PONV was recorded in postoperative anesthetic care unit (PACU) & at the 24th postoperative hour which resulted in the implementation of a prophylactic PONV strategy was associated with a decrease of nausea in PACU ($P<0.001$) & at 24hr ($P<0.001$). Vomiting decreased from ($P<0.001$) in PACU & at 24h ($P<0.001$)[16].

In a study conducted by Sheriff et al[1] results were obtained corresponded well to Apfel's predicted results which are the incidence of PONV in Apfel 0, I, II, III, and IV was 8.3%, 25.5%, 37.8%, 64.6%, & 83.3% respectively which was without any intervention & correlated well to the predicted incidence of 10%, 21%, 39%, 61%, & 79%, respectively. Gunawan et al[17] conducted a study on 100 patients who underwent elective surgery under GA & assessment using Apfel, Koivuranta, & Sinclair scores were done. The Apfel score obtained had a sensitivity value of 79.5%, a specificity of 45.9% when compared to other 2 scoring systems. In our study sensitivity of Apfel score was found to be 46.51% & specificity 81.48%. Out of 43 patients who were predicted to be high risk 23 patients (53.4%) did not have PONV but out of 27 patients who were predicted to be low risk by Apfel stratification only 5 patients (18.5%) had nausea & vomiting.

In the present study, we have only taken into consideration the scoring system published by Apfel & have not compared it with any other scoring systems. Apfel score does not take into consideration factors like duration of surgery, use of intraop opioids & inhalational agents using N_2O, type of surgery. Van den Bosch et al. had taken into consideration two scoring systems derived by Apfel et al. and Koivuranta et al. from 1388 adult patients undergoing a wide range of surgical procedures[18], & they concluded that scoring system of Koivuranta et al. appeared to be stronger across different populations. Pierre et al.[7] compared Apfel's scores with Sinclair's scores for predicting PONV. 500 adult inpatients included undergoing general & gynecological surgeries, in addition to the factors in Apfel scoring, duration, type of anesthesia, and type of surgery included by Sinclair. The two scores were compared & they concluded that the simplified Apfel score presented favorable discrimination & calibration properties for predicting the risk of PONV compared to the Sinclair score.

Multimodal approaches involving the use of 2 or more prophylactic antiemetic drugs, avoiding highly emetogenic anesthetics, analgesics & ensuring ample hydration are strongly recommended for patients at high risk for PONV[19,20]. Despite these approaches & use of multimodal combinations, PONV remains a common problem for high-risk surgical populations. The occurrence of PONV has multivariate etiology having said that it is observed that it can be person-specific even in absence of identifiable risk factors. In our study, we have followed a protocol that was suitable for our

institution. In future, modification can be done in these guidelines for effective reduction of PONV incidence for better patient outcome

Conclusion: -

This study will provide an initiative for the administration of prophylactic antiemetics in patients who are at a high risk of PONV predicted by Apfel scoring system which will result in lowering the incidence of PONV achieving an ultimate goal to improve patients' satisfaction.

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