

## Original Research Article

# Comparative study of acupressure wristband versus palonosetron for prophylaxis of postoperative nausea and vomiting in elective laparoscopic cholecystectomy under general anaesthesia

Suchismita Naik\*, Shweta Kujur, Milton Debbarma, Madhumita G. Murthy

Department of Anaesthesia, Chhattisgarh Institute of Medical Sciences, Bilaspur, Chhattisgarh, India

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### \*Correspondence:

Dr. Suchismita Naik,

E-mail: [drsuschismitanaik@gmail.com](mailto:drsuschismitanaik@gmail.com)

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### ABSTRACT

**Background:** Postoperative nausea and vomiting (PONV) is common complication after general anaesthesia and surgery. This randomized double-blind study was designed to compare the effects of acupressure wrist bands and palonosetron for the prevention of post-operative nausea and vomiting (PONV) in laparoscopic cholecystectomy under general anaesthesia.

**Methods:** Sixty ASA I and II patients undergoing elective laparoscopic surgeries under general anaesthesia were divided into two groups. In Group A patients, acupressure wrist bands were applied on p6 point on both hands half an hour before induction. Group P patients received inj. palonosetron 0.075 m.g. i.v. just before induction. Anaesthesia technique was standardized. Post-operatively patients were monitored for nausea, retching or vomiting upto 24 hours. If patients vomited more than once, they were given inj. Metoclopramide 10mg as rescue antiemetic. Efficacy of drugs was compared using Chi square test. 'p' value of <0.05 is considered significant.

**Results:** The incidence of PONV and requirement of rescue antiemetic were lower in palonosetron group than acupressure wrist band group.

**Conclusions:** Palonosetron is more effective than acupressure wrist band for prophylaxis of post-operative nausea and vomiting in the patients undergoing laparoscopic cholecystectomy under general anaesthesia, but acupressure wrist band can also be used as an alternative non-pharmacological method.

**Keywords:** Acupressure wrist band, IPPV, Nei-guan point, Palonosetron, PONV

### INTRODUCTION

Postoperative nausea and vomiting (PONV) continues to be a highly undesirable outcome of anaesthesia and surgery. This term PONV describes the composite postoperative symptoms of nausea and/or vomiting and/or retching. Post-operative nausea and vomiting remains a significant problem in the modern day anaesthesia practice and continues to be a significant challenge following many types of anaesthetics.<sup>1</sup> The incidence of PONV may be as high as 60–70% and is influenced by various patient related factors, type of surgery, anaesthesia technique and drugs used and

postoperative factors such as pain, dizziness, ambulation, usage of opioids etc.<sup>2-6</sup>

Laparoscopic cholecystectomy predisposes the patient to several stimuli which can induce vomiting. Post-operative nausea and vomiting in addition to being distressing and unpleasant to the patients, has a potential to adversely affect the patient in the form of delayed recovery, unexpected hospital stay, delayed return to work and can also cause post-surgical morbidities like wound dehiscence, pulmonary aspiration, surgical site bleeding and dehydration.<sup>7</sup> During the past decade, anaesthesiologists have been modifying their anaesthetic

techniques to ensure a more rapid and smooth recovery. There has been a general trend towards decrease in the incidence of the problem of PONV because of the use of less emetic anaesthetic agents, improved pre-operative and postoperative medication, refinement of operative techniques and identification of patient predictive factors.<sup>8,9</sup> However in spite of these advances, nausea and vomiting still occurs with unacceptable frequency in association with surgery and anaesthesia and description of it as “the big little problem” encapsulates much of the general perception.<sup>10</sup>

Over the years, numerous drugs have been used in the management of PONV. Various drugs like Dopamine antagonist, histamine antagonist, anticholinergics and recently the 5-HT<sub>3</sub> antagonists have been used to alleviate the symptoms, but have not been devoid of side effects.

Palonosetron is considered as the second generation 5HT<sub>3</sub> antagonist because of its unique chemical structure, greater binding affinity a longer half-life (40 hours) and its highly effectiveness in PONV and chemotherapy, radiotherapy induced vomiting. It induces receptor interlisation. Dose is 0.075 mg just before induction of anaesthesia. Now it is proved to be more effective than ondasetron, the gold standard treatment of PONV.

Side-effects associated with the traditional antiemetics and the high costs of new antiemetics have led many practitioners to investigate alternatives or non-pharmacological methods of preventing postoperative nausea and vomiting. Acupressure, a non-invasive type of acupuncture where manual stimulation is applied unlike acupuncture where skin is pierced by needle. In Traditional Chinese medical practice, the meridian P6 (Neiguan) point has been used to treat nausea and vomiting. The present study was aimed at comparing the effectiveness of acupressure wrist bands with palonosetron in prevention of PONV in patients undergoing laparoscopic surgeries under general anaesthesia.

### Objectives

- To evaluate and compare the efficacy of acupressure wristband with Palonosetron as prophylactic antiemetic in patients undergoing laparoscopic cholecystectomy under general anaesthesia
- To evaluate any side effect and complications of acupressure wristband and any adverse effects of Palonosetron
- To evaluate the requirement for rescue antiemetics

### METHODS

Following approval from the institutional Ethical Committee, Chhattisgarh Institute of Medical Sciences, Bilaspur, and informed consent was obtained from all sixty patients of either sex, aged between 20 and 50 year,

ASA grade I–II, scheduled for laparoscopic. Cholecystectomy. The study was carried out from 1/9/2015 to 1/7/2016 .Exclusion criteria were patients with history of motion sickness and/ or PONV, prolonged cardiac conduction/QTc interval, h/o gastro-esophageal reflux, liver or renal disease, diabetes, increased intra-abdominal pressure, history of allergy hypersensitivity to 5-HT<sub>3</sub> antagonists, body mass index >35 and those who had received antiemetic premedication in the past 72 hours. Patients were assigned by closed envelope randomization schedule to one of two groups - Group A (n=30), on whom acupressure wrist band were applied and Group P (n=30) received Palonosetron 0.075 mg IV prior to induction.

All patients were kept fasting for at least 8 hours prior to surgery. Half an hour before surgery, patients of Group A were applied a wrist band at P6 point on both hands which is the number 6 meridian point in the pericardium channel of hand-Jueyin located on the anterior surface of forearm, 2 inches proximal to distal wrist crease between Palmaris longus tendon and flexor carpi radialis tendon. Both bands were concealed from the observer with the use of a soft cotton roll. Also Group P patients, also cotton rolls were applied without applying acupressure band to make observer blind. The patients of both groups received inj. Diclofenac sodium 75 mg I.V. half an hour before surgery. In the operation theatre, routine monitories such as ECG, NIBP, pulse oxymeter were connected and base line reading were obtained. Patients wore them continuously in postoperative period upto the completion of study. No other antiemetics were given preoperatively or intraoperatively.



**Figure 1: Location of P6 meridian point and the proper application of the acupressure wristband.**

The standard anaesthesia technique was used. Patients were given with Inj. Glycopyrrolate 0.2mg, and Inj. Midazolam 2 mg. Following pre- oxygenation for 3 minutes by face mask, patients were induced with Inj. Thiopentone sodium 5mg/kg and intubation was facilitated with Inj. Suxamethonium 2mg/kg. Endotracheal intubation was done with appropriate size endotracheal tube. Anaesthesia was maintained with IPPV and NO 60% + oxygen 40% + isoflurane. Muscle

relaxation was achieved by intermittent Inj. Vecuronium Bromide @ 0.1 mg/kg. Ryles tube was inserted. Pulse rate, blood pressure, SPO2 and EtCO2 were monitored. Neuromuscular block was reversed with and Inj. Neostigmine 0.05mg/kg and inj. Glycopyrrolate 0.04mg/kg. Postoperative analgesia was provided by inj. Diclofenac sodium 75 mg i.m. whenever required.

Post-operatively patients were monitored for nausea, retching or vomiting upto 24 hours. Data was collected immediately after surgery, then at the interval of 0-2hrs, 2-4 hours, 4-12 hours and 12-24 hours. The incidence of the emetic episodes was compared in two groups according to nausea and vomiting score, 0=complete response (no nausea, no vomiting), 1 (only episodes of

nausea), 2 (retching/vomiting). If patient vomited more than once, inj. Metoclopramide 10mg was given i.v. as rescue antiemetic. Any side effects like drowsiness, headache, abdominal discomfort, pain were also observed post-operatively and treated accordingly. All data was expressed as mean ± standard deviation. Demographic data was assessed using unpaired ‘t’ test. PONV data and the efficacy of drugs were compared using Chi square test. ‘P’ value of <0.05 is considered significant.

**RESULTS**

Patients were comparable in both groups with regard to age, sex, height, weight and duration of surgery (Table 1).

**Table 1: Demographic data and duration of surgery.**

	Group A (n=30)	Group P (n=30)	P value
Age (years)	36.67± 9.36	36±7.82	0.76
Mean weight (kg)	59.2 ± 9.68	58.67±12.39	0.85
Mean height (m)	1.6±0.04	1.59±0.05	0.93
Duration of surgery (hrs)	2.6 ±0.70	2.7±0.71	0.58

Values are mean±SD. No statistical significant difference between the groups (p>0.05)

**Table 2: Comparison of post-operative nausea and vomiting in both groups.**

Post-operative duration(hrs)	Group A (n=30)		Group P (n=30)	
	Nausea	Vomiting	Nausea	Vomiting
Immediately	2	0	0	0
0-2	3	2	1	0
2-4	3	2	1	1
4-12	0	0	0	0
12-24	0	0	0	0
Total	8	4	2	1
Requirement of rescue antiemetic	4		1	
	P =0.16			

It was observed that 6.67% in Group A experienced nausea immediately post-operatively and in Group P, no patient experienced nausea immediately. Episode of nausea in next 2 hours in group A and P was 10% and 3.33% respectively. Between 2-4 hours, 10% of Group A and 3.33% of Group P experienced episode of nausea. No episode of nausea observed in both groups between 4-12 hours and 12-24 hours. Hence 26.67% Group A and 6.66% in Group P experienced nausea which was statistically significant with p value of 0.037 (<0.05) (Table 2).

No patient in both groups experienced vomiting immediately after surgery. Within first 2 hours and 2-4 hours postoperatively the figure was 6.67% v/s 0%, 6.67% v/s 3.33% in Group A and Group P respectively. After 4 hrs upto 24 hrs, no patients of either group

experienced vomiting. Thus 13.34% in Group A and 3.33% in Group P experienced vomiting which was statistically comparable with p value of 0.16 (>0.05) (Table 2).

**Table 3: PONV score.**

	Group A (n=30)	Group P (n=30)
0 (complete response)	18	27
1 (only episodes of nausea)	8	2
2 (retching/ vomiting)	4	1
P value	0.027	

The incidences of PONV were 60% v/s 90%, 26.67% v/s 6.67%, 13.33% v/s 3.33% in Group A and Group P

respectively. The incidence of antiemetic requirements was 13.33% in Group A and only 3.33% in Group P. No side effects or complications were observed with palonosetron; also due to the placement of acupressure wrist bands expect one patient with tingling sensation on pressure point.

## DISCUSSION

As the post-operative nausea and vomiting (PONV) are very common sequelae of general anaesthesia and is very unpleasant and distressing for the patient. The aetiology of PONV after laparoscopic surgery is multifactorial origin influenced by various patient related factors, type of surgery, anesthesia technique and drugs used and postoperative factors such as pain, dizziness, ambulation, usage of opioids etc. CO<sub>2</sub> insufflation significantly increases peritoneal pressure, reduces intestinal blood flow and leads to intestinal ischemia and release of emetogenic substance. Also, the emetic centre is stimulated by the afferents from the gastro-intestinal track manipulated during surgery. An important intestinal response to ischemia is the release of serotonin, a highly emetogenic substance. The multifactorial aetiology of PONV involving surgical, anaesthetic individual risk factors make it difficult for a single drug approach to control it in the postoperative period. The management of nausea and vomiting has improved greatly in recent years, with the introduction of 5 Hydroxytryptamine (5-HT<sub>3</sub>) receptor antagonists. Palonosetron is the only drug of its class approved by the U.S. Food and Drug Administration drug for prevention of delayed Chemotherapy Induced Nausea and Vomiting. Side - effects associated with the traditional antiemetics and the high cost of new antiemetics developed the use of non-pharmacological methods like acupuncture, acupressure and TENS. The P6 (Nei-Guan) meridian point has been used to treat nausea and vomiting. The mechanism of action of acupressure is not clear. It is based on the belief that an individual's wellbeing depends on the balance of energy in the body. It is postulated that acupressure causes low frequency electrical stimulation of the skin sensory receptors which may activate a  $\beta$  and A  $\delta$  fibres. These fibres synapse within the dorsal horn and may, in turn, cause release of endorphins from the hypothalamus. In addition, serotonergic and norepinephrinergic fibres may be activated and a possible change in serotonin levels has a role in prevention of PONV. Acupuncture and acupressure at the P6 point is associated with mixed clinical results. Fan CF, Ming JL, Agarwal A, Alkaissi A have observed a decrease in the incidence of PONV after P6 stimulation.<sup>11-15</sup> However, P6 stimulation was ineffective in minimizing PONV in children following tonsillectomy and strabismus surgery.

## CONCLUSION

Single bolus dose of Palonosetron (0.075mg i.v.) is very effective for prophylaxis of PONV with longer duration of action and minimal side-effects and more effective

than acupressure wrist band. But it was observed that acupressure wrist band also decreases incidence of PONV. As it is non- pharmacological, noninvasive, inexpensive and without any side-effect, it can be recommended as an alternative measure for prophylaxis of postoperative nausea and vomiting in laparoscopic surgery.

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