Comparison between Metoclopramide and Dexamethasone Versus Acupuncture Point Injection at p6 Point for Prevention of Postoperative Nausea and Vomiting in Laparoscopic Cholecystectomy

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ABSTRACT

Background: Laparoscopic cholecystectomy is among the surgeries that have a high incidence of postoperative nausea and vomiting. Non-pharmacological methods are used to prevent postoperative nausea and vomiting, such as acupuncture.

Objectives: To compare the antiemetic effect of acupuncture at p6 point with 0.2 ml 50% dextrose versus metoclopramide and dexamethasone IV for prevention of postoperative nausea and vomiting.

Methods: A randomized clinical trial study that conducted at General Surgery operation room at Baghdad Teaching Hospital, Medical City Complex for a period of three months from 1st Jul. to 1st Oct. 2015.

It included 59 adult female patients who underwent laparoscopic cholecystectomy during the study period. They were divided randomly into two groups: Group A included 25 patients received bilateral PC6 acupoints injection as antiemetic 10 minutes before reversal and group B included 27 patients received IV dexamethasone 8 mg after induction of general anesthesia and metoclopramide 10 mg IV. Vital signs were recorded preoperatively (baseline). Postoperative nausea and vomiting was assessed by Bellville score. Vital signs and Bellville score were assessed at recovery, then at 1st, 3rd, and 6th hr. after discharge from recovery room.

Results: One hour after recovery, 16% of group A and 14.8% of group B complained from nausea. At 3rd hour, 12% of group A and 7.4% of group B complained from vomiting. No statistical significant differences detected between study groups in Bellville score and ondansetron 4 mg iv was given as rescue antiemetic to those patients with Bellville score > 2.

Conclusion: Non-pharmacological method of therapy (acupoint injection) at the pericardium 6 (P6) (Nei-Guan) meridian point, can effectively use to reduce early postoperative nausea and vomiting, same as dexamethasone and metoclopramide in early postoperative period.

Keywords: Laparoscopic cholecystectomy, Nausea, Vomiting, Acupuncture, Iraq.

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Postoperative nausea and vomiting (PONV) are the most frequent and distressing side-effects after surgical procedures including laparoscopic cholecystectomy (LC)[(1)].

It is usually defined as any nausea, retching, or vomiting that occurs during the first 24 postoperative hours [(2)]. Frequency of PONV is up to 80% in high-risk populations and up to 30% of the general population. Increased medical costs, prolonged hospitalization, and hospital readmission are all common in cases of PONV [(3)]. It can cause clinical complications such as

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decreased quality of life and overall satisfaction, dehydration, electrolyte imbalance, rupture of esophagus, gastric secretions aspiration, bleeding, rising in morbidity, prolonged hospitalization time, delayed return to work, and, more importantly, increased rehospitalization [(4)]. Moreover, the longer hospital stays and medication used for treating PONV may increase treatment costs [(5)]. The most important factors affecting the incidence of PONV include female gender, nonsmoker, and high age [(6)]. LC is among the surgeries that have a high incidence of PONV [(7)]. Based on clinical studies, the primary causes of PONV after surgery are the use of inhalational anesthesia and opioid analgesics [(8)]. LC is the golden choice in the treatment of gallbladder disease and has been proven to be better in the cost-effectiveness-efficiency relation when compared to open surgery[(9)]. Out of 100 LCs performed, between 20 and 42% present a complication, PONV, which delays the patients' discharge[(10)]. To prevent or treat PONV, different drugs are used, such as metoclopramide and ondansetron. But they can cause side effects like drowsiness, hypotension, and extrapyramidal symptoms[(11)]. Non-pharmacological methods are also used, such as acupuncture, electrical stimulation of acu-points, acu-plaster, acupressure, and stimulation of PC6 (Neiguan), all of these methods have only minor side effects [(12)]. The location of PC6 is 2 cun above the wrist crease, between the tendons of palmaris longus and flexor carpi radialis[(13)]. Mechanism of action of acupuncture is still uncertain. It may be that low frequency stimulation of the skin activates A-β and Aα fibers which may influence neuro-transmission in the dorsal horn or higher centers[(14)]. Acupuncture has been practiced for thousands of years in clinical activities. However, scientific research is useful for the further application of acupuncture.

The aim of this study is to evaluate the antiemetic effect of acupuncture at p6 point with 0.2 ml 50% dextrose in comparison to metoclopramide and dexamethasone IV for prevention of PONV.

Methods

This was a randomized clinical trial study that conducted at General Surgery operation room at Baghdad Teaching Hospital, Medical City Complex for a period of three months from 1st July to 1st October 2015.

The study included 59 adult female patients who underwent LC during the study period. They were operated upon as elective cases. Patients aged > 70 years, smokers, with history of PONV or motion sickness, body mass index > 35 kg/m^2, pregnant or breastfed patients, patients on menses, those who used antiemetic 24 hours before surgery, had allergy to drugs used, and those who refused to participate were excluded from this study. Seven cases were dropped from the study as four cases were complicated surgery and converted from LC to open surgery, and three cases received fentanyl IV intraoperatively for increased blood pressure or/and tachycardia. All the patients were verbally informed about the study giving them full information about the treatment option, then they signed an informed consent to undergo this treatment as long as the patient anonymity and confidentiality of their medical records are maintained. They were divided randomly into two groups: Group A: Included 25 patients received bilateral PC6 acupoints injection as antiemetic, 10 minutes before reversal. Group B: Included 27 patients received IV dexamethasone 8 mg after induction of general anesthesia and metoclopramide 10 mg IV.

Randomization was done as each patient assigned with a number, then patients with odd numbers were assigned as group A (25 patients) and patients with even numbers were assigned as group B (27 patients). Detailed history was taken from each patient, physical examination, vital signs, and laboratory investigation were done.

Anesthetic management for all patients. Standard monitoring was used for vital signs. All patients received the same anesthetic technique premedication as

midazolam 0.02 mg/kg, with fentanyl 1 µg/kg, pre-oxygenation 100% oxygen for three minutes. Anesthesia was induced with propofol up to 2.5 mg/kg, orotracheal intubation was facilitated by 0.6-0.8 mg/kg rocuronium IV. Anesthesia was maintained by isoflurane 1.2%. Muscle relaxant were administered as repeated boluses depending on clinical examination. Intravenous fluid was administered to replace fluid deficits from preoperative fasting to maintain maintenance fluid requirement and to replace ongoing fluid losses. Minute ventilation was controlled VT of 6 ml/kg and frequency of 14 bpm. During laparoscopy, intra-abdominal pressure was monitored and automatically maintained at 12 mmHg by CO_2 insufflator.

For patients of group A, acupuncture was performed as bilateral PC6 acupoint injection of 0.2 ml 50% dextrose 10 min before reversal and the acupoint injections are likely to be related to the fluid deposit at PC6 acupoint. The location of PC6 is 2 cun above the wrist crease, between the tendons of palmaris longus and flexor carpi radialis (One cun is equal to the space between the distal interphalangeal joint). All patients were extubated after adequate signs of recovery and receiving reversal from muscle relaxant (neostigmine 0.04 mg/kg with atropine 0.02 mg/kg).

Vital signs were recorded preoperatively (baseline). PONV was assessed by Bellville score as the following (0: No symptoms, 1: Nausea, 2: Retching, 3: Vomiting) [15]. Vital signs and Bellville score were assessed at recovery, then at 1st, 3rd, and 6th h after discharge from recovery room.

All patients with score 3 or 4 (vomited once or more) received ondansetron 4 mg IV.

The data analyzed using Statistical Package for Social Sciences (SPSS) version 26. The data presented as mean, standard deviation and ranges. Categorical data presented by frequencies and percentages. Independent t-test (two tailed) was used to compare the continuous variables accordingly. A level of P value less than 0.05 was considered significant.

Results

In this study, patients' age was ranging from 18 to 63 years with a mean of 37.01 ± 5.9 years. No significant differences (P ≥ 0.05) in age, body mass index (BMI), mean arterial pressure (MAP) and pulse rate (PR) between study groups, (Table 1).

As shown in table 2, no incidence of nausea or vomiting detected at recovery time in both groups; while after one hour, four patients (16%) of group A and four patients (14.8%) of group B complained from nausea. At 3rd hour, three patients (12%) of group A and two patients (7.4%) of group B complained from vomiting. After six hours, no nausea or vomiting were detected in both groups.

No statistical significant differences (P ≥ 0.05) detected between study groups in Bellville score and ondansetron need in all follow up periods, (Table 3).

Table 1: Comparison between study groups by general characteristics.

Variable	Study group		P - Value
	A Mean ± SD	B Mean ± SD	
Age (years)	37.17 ± 5.3	36.95 ± 6.9	**0.831**
BMI (kg/m^2)	24.61 ± 2.0	23.91 ± 2.4	**0.71**
Baseline MAP (mmHg)	79.57 ± 9.1	82.01 ± 7.9	**0.621**
Baseline PR (beats/min)	75.89 ± 12.6	77.23 ± 14.1	**0.815**

Table 2: Incidence of nausea and vomiting in study groups.

Nausea and vomiting	Study group		Total (%) n= 52
	A n= 25 No. (%)	B n= 27 No. (%)	
At Recovery			
No	25 (100.0)	27 (100.0)	52 (100.0)
1st hr. after recovery			
No	21 (84.0)	23 (85.2)	44 (84.6)
Nausea	4 (16.0)	4 (14.8)	8 (15.4)
3rd hr. after recovery			
No	21 (84.0)	25 (92.6)	46 (88.5)
Nausea	1 (4.0)	0 (0)	1 (1.9)
Vomiting	3 (12.0)	2 (7.4)	5 (9.6)
6th hr. after recovery			
No	25 (100.0)	27 (100.0)	52 (100.0)

Table 3: Comparison between study groups in Bellville score and ondansetron need

Time	Study Group		P - Value
	A Mean ± SD	B Mean ± SD	
Bellville score			
At recovery	0 ± 0	0 ± 0	-
1st hr. after recovery	0.16 ± 0.37	0.14 ± 0.36	**0.817**
3rd hr. after recovery	0.28 ± 0.67	0.14 ± 0.53	**0.136**
6th hr. after recovery	0 ± 0	0 ± 0	-
Ondansetron need (mg)			
At recovery	0 ± 0	0 ± 0	-
1st hr. after recovery	0 ± 0	0 ± 0	-
3rd hr. after recovery	0.12 ± 0.33	0.07 ± 0.26	**0.271**
6th hr. after recovery	0 ± 0	0 ± 0	-

——————————Discussion

Strategy to reduce baseline risk and the adoption of a multimodal approach will most likely ensure success in the management of PONV [16]. The current study was designed to compare the effects of acupuncture and metoclopramide with dexamethasone on PONV after LC (one, three and six hours after recovery). The current study results found that no significant difference in the incidence of PONV in both groups; both groups were high risk according to Apfel assessment for prevention and management of PONV which is consistent with other studies when concluded that the use of non-pharmacological method for

prevention of PONV is effective as pharmacological method[17-20].

Different result noticed in a study conducted by Samad K et al [21] when they found that acupoint stimulation failed to show effectiveness in prevention of PONV; this might be due to acustimulation at PC6 was applied on right hand only and half an hour before induction, while in our work, acupoint stimulation was done bilaterally at PC6 acupoint and before conclusion of operation.

Our interest in acupuncture is due to its low cost and low incidence of adverse effects related to this modality. It should be noted that administration of acupuncture requires special training and this may be the reason that even though acupuncture and related techniques were found to be effective for the management of PONV in various studies. The acupoint injections are likely to be related to the fluid deposit at the P6 acupuncture point. This fluid deposit likely creates significant pressure and stimulation effects at the acupoint that continue when the patient has return to the conscious state. Thus, P6 acupoint injection can be performed with the patient during general anesthesia because it has an effect after the patient is awake and conscious. Saline solution and glucose solution have been used as part of this technique. As the amount of saline solution that is needed (3ml) is larger than the amount of glucose solution needed (0.2 ml), we have opted to use glucose solution. The use of 50% dextrose injections at the P6 point for PONV prevention in patients undergoing general anesthesia and surgery has been described.

There were no complaints of pain or local irritation, and there were no symptoms of injury to the median nerve [22]. Investigators used 0.2 ml of dextrose 50% injected at P6 and sham locations at the end of surgery before reversal of anesthesia. This technique was compared with the efficacy of droperidol 10 µg/kg in 190 children aged 7-16 years undergoing day-case surgery. The study design was complicated (randomized, double-blind, sham placebo-controlled) but it was clear that P6 injections were effective[22,23].

In conclusion, non-pharmacological method of therapy (acupoint injection) at the pericardium 6 (P6) (Nei-Guan) meridian point, can effectively use to reduce early PONV, same as dexamethasone and metoclopramide in early postoperative period.

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