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Evaluation of the benefits of stem cell therapy in healing Anterior Cruciate Ligament (ACL) injuries

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ABSTRACT

PONV (Post Operative Nausea and Vomiting) or post-operative nausea and vomiting is a side effect that is often found after surgery and anesthesia. For patients, PONV is felt to be very disturbing, so PONV is called the big little problem. Factors related to PONV are patient factors, anesthesia factors, and surgical factors. Regarding surgical factors, the type of surgery that is at high risk for PONV is orthopedic surgery (22%). In addition, the relatively long duration of surgery and excessive surgical manipulation can also cause PONV in orthopedic surgery. To identify risk factors for PONV, a calculation for PONV has been developed. Based on research from (Donnerer, 2003), data from Koivuranta et al was combined with Apfel et al in developing this PONV risk score. The PONV risk score indicates that there are 4 (four) initial factors in determining PONV risk factors, namely female gender, history of PONV or motion sickness, history of not smoking, and history of using postoperative opioids to treat pain. Not only PONV risk factor scores for adult patients, there are also PONV risk factor scores for pediatric patients or Postoperative Vomiting in Children score. POVOC score is simplified as follows with the risk factor of duration of surgery >30 minutes, age >3 years, strabismus surgery, and positive history of PONV or motion sickness from parents or siblings. In preventing the occurrence of PONV, two approaches can be taken, namely a pharmacological approach and a non-pharmacological approach. The pharmacological approaches used are ondansetron and metoclopramide. Ondansetron is a 5-HT3 receptor antagonist. Whereas Metoclopramide inhibits dopamine (D2) receptors centrally and peripherally. This study aims to examine studies on the use of antiemetic drugs in preventing postoperative nausea and vomiting in orthopedic surgery patients at Rumkital in April 2023. The research was conducted in a cross-sectional-prospective manner and has been declared "ethically appropriate". The inclusion criteria for the research sample were patients undergoing orthopedic surgery who received antiemetic drug therapy as prophylaxis for postoperative nausea and vomiting in April 2023. From the results of research on orthopedic surgery patients who received antiemetic drug therapy as prophylaxis in preventing post-operative nausea and vomiting in accordance with the inclusion criteria, namely 31 patients, dominated by male patients (74.2%) with the highest age being < 40 years (51.6%). Type of orthopedic surgery undertaken by Of the 31 patients, the largest were ORIF (19.4%) and Femur Column Fracture (ORIF) (19.4%). In this study, there were only 2 types of risk factors that patients had, namely 3 patients with a frequency of PONV who had 1 number of risk factors (history of not smoking) and as many as 3 patients with a frequency of PONV who also had 2 number of risk factors (female and history of not smoking). Meanwhile, the types of antiemetic drugs used were metoclopramide 10 mg IV (64.5%) and ondansetron 2 mg, 4 mg, and 8 mg IV (35.5%). The dose of antiemetic drug given and the time of administration to the patient are in accordance with literature recommendations. PONV only occurred in 9 patients (29%) of 31 orthopedic surgery patients in this study. Of the 9 patients, 8 patients used metoclopramide 10 mg IV and 1 patient used ondansetron 8 mg IV. This indicates that metoclopramide 10 mg IV is not effective in preventing PONV. Furthermore, 2 types of DRP were identified where one patient could experience more than one type of DRP. The DRP identified included drug side effects such as constipation, dizziness, chest pain, GI tract disorders and potential drug interactions, namely dexamethasone with ondansetron (9.7%) and tramadol with ondansetron (16.1%).

Kata kunci: Stem Cell Therapy, ACL

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INTRODUCTION

Postoperative nausea and vomiting or commonly abbreviated as PONV (Post Operative Nausea and Vomiting) are side effects that are often found after surgery and anesthesia (Faranak et al, 2001). Approximately 71 million patients per year undergo surgery in the United States, with PONV incidence ranging from 20–30% of all general surgery and approximately 70–80% in high risk groups. Furthermore, approximately 0.2% of all patients experience PONV that is difficult to treat (Gan et al, 2007). In many surgical cases, avoiding PONV is even very important for the patient because it can turn a successful surgery into a problematic one (Koivuranta et al, 1997; Macario, 1999). Even though it is rarely fatal, PONV is felt by patients to be very disturbing, so PONV is often referred to as the big little problem. Apart from that, PONV can cause medical complications, psychological effects, hamper the overall therapy process thereby reducing the recovery rate post-operative patients and impact the economic burden. Other dangers that can occur are dehydration, electrolyte disturbances, surgical wound sutures becoming tense and the possibility of dehiscence occurring, hypertension, increased risk of pulmonary aspiration due to decreased airway reflexes, and ulceration of the gastric mucosa.

Factors related to PONV are patient factors, anesthesia factors, and surgical factors. Regarding surgical factors, the type of surgery that is at high risk for PONV is orthopedic surgery at 22% (Philip et al., 2007). The occurrence of PONV in orthopedic surgery can be caused by hypotension, causing vagal reflexes or vice versa. In addition, the relatively long duration of surgery and excessive surgical manipulation can also cause PONV in orthopedic surgery [1].

To prevent the occurrence of PONV, two actions can be taken, namely providing antiemetic drug prophylaxis and providing non-pharmacological therapy such as acupuncture. Prophylactic administration of antiemetic drugs can reduce the risk of PONV and several studies have examined several types of antiemetics. Usmani et al compared the efficacy of ondansetron (0.1 mg/kg), dexamethasone (0.15 mg/kg), and the combination of ondansetron (0.1 mg/kg) + dexamethasone (0.15 mg/kg) for the prevention of PONV in a randomized, double-blind study that included 90 patients with ASA (American Society of Anesthesiologists) status I and II. From this study, it was concluded that giving a combination ondansetron with dexamethasone is better than if given personally. Another study also compared the use of selective 5-hydroxy tryptamine type 3 receptor antagonist (5-HT3) combined with dexamethasone in pediatric patients, which resulted in the conclusion that the combination was better than administering these drugs alone [2]. In Indonesia, ondansetron has been approved for circulation since 1992 with the indication to treat nausea and vomiting induced by cytotoxic chemotherapy and radiotherapy, and is also indicated to prevent and treat PONV. The use of a single dose of ondansetron 32 mg intravenously (iv) has the potential to cause serious heart risks. The recommended intravenous dose of ondansetron in the prevention and treatment of PONV in adult patients should avoid using a single dose of 32 mg (BPOM RI, 2013). Apart from using ondansetron, another therapy for nausea and vomiting is metoclopramide. Medicines Evaluation Board (MEB) in the Netherlands, use of metoclopramide in children restricted due to the increasing number of reports of extrapyramidal symptoms. MEB said metoclopramide is used for the treatment of severe nausea and vomiting of unknown cause, or if treatment with other drugs is ineffective or not possible.

Based on data on the use of post-operative nausea and vomiting therapy at clinic. it is known that there are various types of antiemetic drugs used, such as ondansetron, metoclopramide, and domperidone. These three drugs have possible side effects. Ondansetron can cause headaches, constipation (difficulty defecating), and heart rhythm disturbances, namely QT prolongation, while metoclopramide and domperidone cause extrapyramidal effects, sedation, diarrhea, CNS depression, and agitation [3]. The doses used to treat nausea and vomiting vary, either alone or in combination. Therefore, when using antiemetic drugs before surgery or when surgery is about to end, the patient's condition must be taken into account in relation to the type of drug, dose adjustment, frequency and duration of use, route of use and the possibility of drug side effects and potential drug interactions so that research on studies is needed. use of antiemetic drugs in preventing postoperative nausea and vomiting in surgical patients orthopedics clinic as an effort [4].

RESEARCH METHOD

This type of research is descriptive observational research conducted in a cross-sectional-prospective manner. This research was conducted to examine the type, dose, frequency and duration of use, therapeutic outcomes, identification of DRP and analysis of the use of antiemetic drugs alone or in combination in preventing postoperative nausea and vomiting in orthopedic surgery patients.

Inclusion criteria:

Patients undergoing orthopedic surgery who received antiemetic drug therapy as prophylaxis for postoperative nausea and vomiting in April 2023.

Exclusion criteria:

a. Patients undergoing orthopedic surgery but not receiving antiemetic drug therapy as prophylaxis for postoperative nausea and vomiting

b. Patients who died while undergoing orthopedic surgery
c. Patients who were forced to go home because they did not want to undergo further treatment
d. Patients undergoing orthopedic surgery with malignant comorbidities such as malignant bone cancer.
e. The Health Medical Record (RMK) is not clear.
f. Class I patients undergoing orthopedic surgery who receive antiemetic drug therapy as prophylaxis for postoperative nausea and vomiting.
g. Patients undergoing orthopedic surgery who receive antiemetic drug therapy as prophylaxis for postoperative nausea and vomiting but who undergo surgery not through the Central Surgery Department.

Data analysis was carried out based on data obtained from RMK, including:

1. Describe the types of antiemetic drugs based on drug class and drug regimen including route of use, drug dose, frequency of use and duration of use in the form of a table or diagram.
2. Examine the relationship between antiemetic drugs given and the type of orthopedic surgery and therapeutic outcomes in post-orthopedic surgery patients who receive antiemetic drug therapy as prophylaxis for post-operative nausea and vomiting.

Analyze DRP related to drug use including potential drug side effects and potential drug interactions and analyze the relationship between risk factors and therapeutic outcomes in post-orthopedic surgery patients who receive antiemetic drug therapy as prophylaxis for post-operative nausea and vomiting

RESULTS AND DISCUSSION

From research that has been conducted on patients undergoing orthopedic surgery who received antiemetic drug therapy to prevent postoperative nausea and vomiting at the Clinic Surgery Installation. Clinic for the April 2023 period, 31 patients were obtained as research subjects. Further, patient demographics based on gender in this study can be seen in Figure 1. The research subjects were mostly male with a percentage of 74.2%. Meanwhile, patient demographics based on age can be seen in Table1. Most of the research subjects were <40 years old with a percentage of 51.6%.

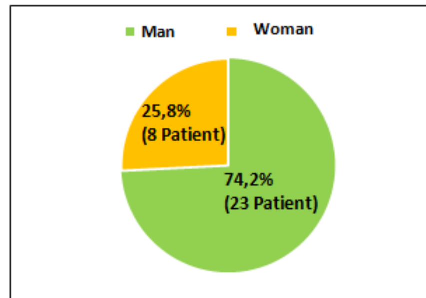

Figure 1. Gender Diagram of Orthopedic Surgery Patients Receiving Antiemetic Drug Therapy

Table 1. Data on the Age of Orthopedic Surgery Patients Receiving Antiemetic Drug Therap

Age (Th)	Number of Patient	Percentage (%)
<40	16	51,6
40-60	8	25,8
>60	7	22,6

Patients undergoing orthopedic surgery who received antiemetic drug therapy to prevent postoperative nausea and vomiting in the Central Surgery Installation for the period 1 – 30 April had comorbidities. The comorbidities of orthopedic surgery patients who received antiemetic drug therapy can be seen in Table 2. There were 7 (seven) patients out of a total of 31 patients who had comorbidities. Most of them have comorbidities by patients, namely diabetes mellitus with a percentage of 16.1% or 5 (five) patients out of 7 (seven) patients had comorbidities.

Table 2. Comorbidities of Orthopedic Surgery Patients Receiving Antiemetic Drug Therapy

Comorbidities	Number Of Pasien	Percentage (%)
Diabetes Melitus	5	16,1
Hipertensi	1	3,2

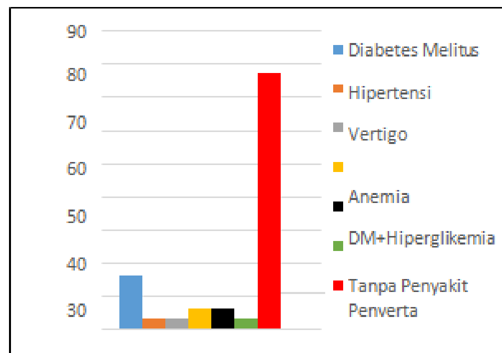

Figure 2. Chart of Concomitant Diseases of Orthopedic Surgery Patients Receiving Antiemetic Drug Therapy

There are 2 types of antiemetic drug regimens given, namely metoclopramide and ondansetron

The antiemetic drug regimen is given to patients via the intravenous route. The antiemetic drug regimen for 31 orthopedic surgery patients can be seen in Table 3, while the dosage correspondence between the dose given to orthopedic surgery patients and the dose that should be given is based on

The literature can be seen in Table 4. The antiemetic drug given to 31 orthopedic surgery patients was mostly metoclopramide with a total of 20 (64.5%) patients.

Table 3. Antiemetic Drug Regimentation in Orthopedic Surgery Patients

Types of Antiemetic	Rute	Number of Patient	(%)
Metoklopramid	i.v	20	64,5
Ondansentron	i.v	11	35,5

Table 4. Therapeutic Outcomes of Antiemetic Drug Use in Orthopedic Surgery Patients

Type Of Medicine	Dose	Types of Orthopedic Surgery	*Outcome* Therapy	Number of Patient	(%)	Ket
Ondansentron	2 mg IV	- ORIF	No nausea of vomiting	1	3,2	
	4 mg IV	- Aff Plate Radius Distal - de Quervein Release Tendon - ORIF*** - PO Repair Tendon - PO Amputasi - Fraktur Column Femur (ORIF)	No nausea of Vomiting	9	29	***There is 4 patient ORIF
	8 mg IV	- Fraktur Column Femur (ORIF)	Nauseous	1	3,2	

CONCLUSION

Based on the results of research regarding studies on the use of antiemetic drugs in preventing postoperative nausea and vomiting in orthopedic surgery patients in clinics with a sample size of 31 patients, the following conclusions can be drawn:

1. Use of antiemetic drugs in orthopedic surgery patients, namely:
   a. Metoclopramide (64.5%)
   b. Ondansetron (35.5%)
2. Selection of dose based on age and time of administration of antiemetic drugs in accordance with literature recommendations.
3. There were 9 patients (29%) who experienced PONV (postoperative nausea and vomiting) of which 8 patients used metoclopramide 10 mg IV and 1 patient used ondansetron 8 mg IV with the type of orthopedic surgery ORIF, Clavicle Fracture (ORIF), Fracture Column Femur (ORIF), PO Repair Tendon, Ulcus Gangren Pedis, and OA Genu pro TKR. Of these 9 patients a total of 8 patients (88.89%) experienced early PONV and 1 patients (11.11%) experienced delayed PONV
4. Two types of DRP have been identified:
   a. Drug side effects

      Constipation (11 patients), Chest pain (1 patient), Headache/dizziness (9 patients) and GI Tract Disorders (2 patients).

   b. Potential drug interactions

      Dexamethasone with Ondansetron (9.7%) and Tramadol with Ondansetron (16.1%). Drug interactions do not occur in orthopedic surgery patients.

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