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A COMPARATIVE STUDY ON EFFICACY AND SAFETY OF ONDANSETRON V/S GRANISETRON IN PATIENTS RECEIVING CANCER CHEMOTHERAPY

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ABSTRACT

Background and Objectives: Chemotherapy has brought wonders to human race but also has got many adverse reactions. Out of which nausea and vomiting rank among top three adverse drug reactions. The desire to control chemotherapy induced nausea and vomiting (CINV) is strong that patients postpone or even refuse the treatment. Ondansetron and Granisetron are the most common drugs used for treatment of CINV. Hence this study is carried out to compare the efficacy and safety of these two drugs. **Methods:** This is a prospective observational study conducted in oncology department, KR Hospital, Mysuru. 100 participants who satisfied the inclusion criteria were enrolled for the study. Among them, 50 were given Ondansetron and rest of them were given Granisetron for prevention of CINV. A well-designed data collection form was prepared to collect the data. Efficacy of antiemetics was assessed using NCI-CTC grading score. **Result:** The study showed that 14% experienced CINV while giving Granisetron plus Dexamethasone and 32% experienced CINV while giving Ondansetron plus Dexamethasone which indicates that Granisetron along with Dexamethasone is slightly better than the other. **Conclusion:** Though Granisetron regimen is found to be more effective, the choice of drug depends on the cost.

KEYWORDS: Chemotherapy, Dexamethasone, Granisetron, Nausea, Ondansetron, Vomiting.

INTRODUCTION

Cancer is a group of diseases that can start in any organ or tissue of the body characterized by uncontrolled growth and spread of abnormal cells to other part of the body. Though causes of cancer are not completely understood, numerous factors are known to increase the occurrence that includes modifiable and non-modifiable. These factors may act simultaneously or in sequence to initiate and /or promote cancer growth. Cancer is the second leading cause of morbidity and death globally. According to WHO 18.1 million new cases and 9.6 million deaths are reported in 2018. In developing and under developed countries, low access to the early detection and quality management of cancer due to less income is one of the reasons for mortality.[1]

Treatment of cancer includes chemotherapy, radiotherapy and surgery. The types of treatment given depend on the type of cancer and the progression of the disease. Radiotherapy uses high dose of radiation to kill cancer cells and shrink tumours. Surgery is a procedure in which the tumour is removed from the body surgically. [2] Chemotherapy uses chemicals to kill cancer cells or modify growing cells. There are many drugs used currently in which some are given as monotherapy and some are given in combination.[3] The development of chemotherapy has brought wonders to human race but also a new threat in the form of adverse drug reaction (ADRs) has been developed.[4] These ADRs occur based on the type and amount of chemotherapy and how the body reacts to chemotherapy. Some of the common ADRs are fatigue, hair loss, myelosuppression, nausea and vomiting.[5]

Chemotherapy induced nausea and vomiting is the most common ADR accounting up to 80%.[6] The desire to avoid nausea and vomiting is so strong that patients have postponed or even refused to take treatment. CINV can impose limitation on the patient's ability function socially, maintain employment or complete daily activities.[7] Frequent vomiting causes loss of body fluids and electrolyte imbalance. It also reduces tendency to eat or drink, if this continues it causes fatigue and weight

loss. All these situations make the prevention of CINV an important part in cancer chemotherapy.[8]

Different antiemetics are used based on CINV risk levels. The most effective ones are 5-hydroxytryptamine$_3$ (5-HT$_3$) receptor antagonist, neurokinin 1(NK-1) receptor antagonist and corticosteroids. And the drugs with lower therapeutic index include metoclopramide, butyrophenones, phenothiazines, cannabinoids, olanzapine and benzodiazepines. These antiemetics are given singly or in combination.[9]

5- HT$_3$ antagonists are the most commonly used antiemetics for CINV prophylaxis that include Ondansetron, Granisetron, Dolasetron, and Palonosetron. The main adverse effects of these agents are mild head ache, transient elevation of aminotransferase levels, fatigue and constipation. The effect is increased when corticosteroids are given along with 5-HT$_3$ receptor antagonist.[10] So, in this study we are comparing the efficacy and safety of Ondansetron to Granisetron since these are the common antiemetics used for prevention of CINV in K.R Hospital.

MATERIALS AND METHODS

This study is a prospective observational study conducted at oncology department, K.R Hospital, Mysuru. The study was carried out for three months, starting from 01/05/2020 to 31/07/2020. After attaining ethical clearance from Institutional Ethical Committee of K.R Hospital, 100 participants were chosen randomly for the study that satisfied the inclusion eligibility. Patients above 18 years of both sexes and who was receiving cancer chemotherapy were included. Patients who were not willing for the study were excluded. Data were collected from patient case note, treatment chart and patient or patients care taker interview and were documented in a suitably designed data collection form.

Out of 100 participants, 50 were administered Granisetron 3mg plus Dexamethasone 8mg and rest of them were given Ondansetron 8mg plus Dexamethasone 8mg intravenously as premedication. They were monitored and followed up. The grade score of nausea and vomiting of National Cancer Institute- Common Toxicity Criteria (NCI-CTC) and causality assessment of Naranjo Scale were used to evaluate the clinical outcome. The obtained data were recorded in MS Excel Sheet and was analysed.

Table 1: National Cancer Institute-Common Toxicity Criteria grading score.

NCI-CTC grade	Nausea	Vomiting
1	Loss of appetite without alteration in eating habits	1-2 episodes in 24hr
2	Oral intake decreased without significant weight loss, dehydration or malnutrition	3-5 episodes in 24 hr
3	Inadequate oral caloric or fluid intake, TPN or hospitalisation indicated	>=6 episodes in 24 hr, Tube feeding, TPN or hospitalisation indicated
4	-	Life threatening consequences; urgent intervention indicated
5	-	Death

G_0=No Nausea /No Vomiting

RESULTS

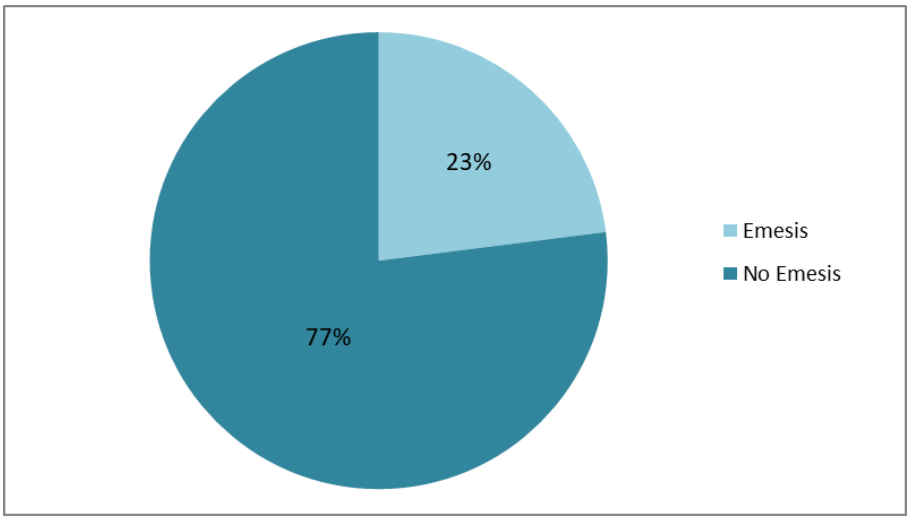

Figure 1: Number Of Emesis In Total Population.

Table 2: Effect of Antiemetic Treatment.

NCI-CTC GRADING	ONDANSETRON + DEXAMETHASONE	GRANISETRON + DEXAMETHASONE
G_0	34	43
G_1	4	5
G_2	11	2
G_3	1	0

Table 3: Adr Of Antiemetics.

SL. NO.	ADRs	GRANISETRON	ONDANSETRON
1.	Fatigue	6	9
2.	Headache	2	2
3.	Constipation	2	2
4.	Diarrhoea	1	0
5.	Dizziness	0	1
6.	Asthenia	0	1
Total		**11**	**15**

DISCUSSION

Females were predominant showing 61% and the most affected age group were above 50 years showing 51%. 89% of the participants were non-smokers and non-alcoholic. 27% of the participants had comorbidities. The major type of cancer was found to be breast cancer showing 31% followed by lung cancer (14%) and ovarian cancer (10%). Majorly used regimen was Paclitaxel and Carboplatin showing 26% followed by Doxorubicin and cyclophosphamide (19%). Doxorubicin induced emesis was found to be more showing 7%.

Out of 50 participants, who were receiving Granisetron plus Dexamethasone as antiemetic regimen for chemotherapy, 7 (14%) of them experienced vomiting. In that 5 (10%) of them showed G_1 and 2 (4%) of them showed G_2, which were assessed using NCI-CTC grading. In rest of the participants, who were receiving Ondansetron plus Dexamethasone, 16 (32%) of them experienced vomiting. In that 4 (8%) of them showed G_1, 11 (22%) of them showed G_2 and 1 (2%) of them showed G_3. The study showed that Granisetron plus Dexamethasone combination have slightly more efficacy when compared to Ondansetron plus Dexamethasone combination. Similar study was carried out by Linda Stewart et al, in which they concluded that Granisetron is more effective than Ondansetron when used in combination with Dexamethasone in the prevention of acute and delayed vomiting caused by highly emetogenic chemotherapy.[11]

There were no serious or unexpected adverse drug reactions. The study showed that Ondansetron induced maximum number of adverse drug reactions (57.6%). Out of which fatigue (60%) were predominant followed by headache, constipation, asthenia and dizziness. Granisetron induced 42.4% of total adverse drug reactions. Out of which fatigue were more (54.5%) followed by headache, constipation and diarrhoea. All these are well established adverse drug reactions. Adverse drug reactions were assessed using Naranjo Scale, in which most of the reactions were found to be possible (88.8%) and rest of them were found to be probable (11.1%). No much significance was seen in safety profile of both group of drugs. Similar study was done by A Stewart et al, in which they concluded that safety profile of Granisetron and Ondansetron showed no much significance.[12]

CONCLUSION

Many clinical trials have been done over past decades to control CINV. The incidence and severity of CINV depends on the treatment and patient related factors. Many antiemetics have been used to prevent CINV based on these factors.

Our study concluded that Granisetron plus Dexamethasone is effective than Ondansetron plus Dexamethasone and there is not much difference in safety profile of both regimens. Though Granisetron is recommended in patients receiving chemotherapy, the choice of the drug depends on the cost as Granisetron is expensive than Ondansetron.

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