

Comparison of efficacy of ondansetron versus domperidone for management of vomiting in children with acute gastroenteritis

Muhammad Bilal Iqbal, Bilal Ali Anjum, Nighat Haider, Izza Nawab, Ayesha Masood, Jai Krishin

Department of Orthopedics, DHQ Hospital, Jhelum, THQ Hospital, Saraialamgir, University of Lahore and Pakistan Institute of Medical Sciences, Islamabad, Pakistan

Objective: To compare the efficacy of ondansetron versus domperidone for management of vomiting in children with acute gastroenteritis.

Methodology: A total of 240 children of both genders, aged 6 months to 5 years, who presented with vomiting were allocated either of two groups; group A and group B. Children in group A received ondansetron and group B domperidone orally. Both groups were followed at intervals of 6 hours and 24 hours after administration of assigned drug. Outcome was measured as number of vomiting at 6 and 24 hours post treatment.

Results: Out of 240 children, 198 (82.5%) completed the study and 119 (49.5%) were male and 121 (50.4%) females. Mean age was 26.62 ± 16.30 months. Of

those 25 children who were vomiting, 15 (12.2%) were on ondansetron and 10 (8.5%) on domperidone. Difference was statistically non-significant ($p = 0.42$). After 24 hours follow up, 27 (11.1%) children had persistent vomiting. Of those, 27 (6%) were on ondansetron and 21 (21.4%) on domperidone. Statistical difference observed was significant ($p = 0.01$). Group A (ondansetron) had better efficacy than Group B (domperidone) after 24 hours followup.

Conclusion: Ondansetron was significantly better in controlling vomiting due to acute gastroenteritis in children compared to domperidone.

Keywords: Gastroenteritis, domperidone, ondansetron, efficacy, children.

INTRODUCTION

Acute gastroenteritis (AGE) is the second leading cause of mortality in children under five, especially in low to middle socio economic countries like ours.¹ The prevalence of diarrhea in children below five years of age is 19% according to 2017–18 Pakistan Demographic and Health Survey (PDHS).² Vomiting is the most troublesome presenting complaint in AGE requiring retention at emergency departments or admission. Vomiting remains a very worrying symptom, even more so for their parents, and if not managed early, it can lead to severe dehydration.³

At present, no guidelines exist for the use of pharmacological agents in the management of vomiting for the children with AGE. Slow oral rehydration therapy could be used to treat mild to moderate dehydration, however associated vomiting becomes a limiting factor for this modality of treatment.⁴ It is very important to treat vomiting adequately in gastroenteritis as it allows the child to take fluid orally potentially decreasing the requirement of intravenous therapy.

Several antiemetic agents are in practice to control vomiting; however not all of them are effective or safe.⁵ Domperidone is commonly used to control vomiting in young children; however, the proof of its effectiveness is not satisfactorily established as yet.⁶ Evidence to use

ondansetron to control vomiting in AGE is strengthened by many studies.⁷ There is limited published data comparing the use of ondansetron versus domperidone for the management of vomiting in children with AGE, especially from Pakistan. This study aimed at comparing the effectiveness of domperidone with ondansetron for the management of vomiting among children under five years of age, presenting with AGE.

METHODOLOGY

This open labeled randomized controlled trial was conducted at Accident and Emergency (A&E) department of the Children Hospital, Pakistan Institute of Medical Sciences (PIMS), Islamabad over the period of one year. Sample size was calculated by using WHO sample size calculator keeping the level of significance 5%, power of test 80% with anticipated proportion of population P1 62% and anticipated proportion of population P2 44%. Calculated sample size turned out to be 240 which were divided into two equal groups having 120 children in each group. Non-probability consecutive sampling technique was used.

Children between 6 months to 5 years of age having acute diarrhea with or without abdominal pain and fever, with three or more episodes of vomiting not containing blood or bile, in 24 hours, were included in the study.

Patients who had taken any antiemetic treatment within 4 hours before enrolment, patients having underlying ailment like renal, hepatic, cardiac or neural diseases and malignancy, children with severe dehydration requiring intravenous fluid replacement, severe malnutrition and known allergy to domperidone or ondansetron were excluded from the study. Approval from the hospital ethical review board was acquired and Informed written consent was attained from parents/caregivers.

Children who were tolerating ORS were sent home with instructions to return for reassessment after 24 hours. Parents were advised to continue the assigned antiemetic medicine orally at eight hourly intervals if vomiting does not stop. Those children, whose vomiting was not settled after 6 hours of initial treatment, were further assessed for admission to the hospital. Those who had persistent vomiting and no improvement or deterioration in hydration status were admitted for management and were no longer the part of ongoing study.

Parents of the patients who came for followup were asked about the episodes of vomiting during the last 24 hours. The antiemetics were stopped if vomiting has settled but rest of supporting management was continued like ORS and Zinc. Those who still had

vomiting were assessed regarding inpatient or outpatient management plan. The number of children in whom there was cessation of vomiting within 24 hours was recorded to measure the primary outcome.

Statistical Analysis: Descriptive statistical analysis was performed through SPSS 20. Chi-square test was applied for comparing the efficacy of medicine in both the drug groups at 6 hours and 24 hours. $p < 0.05$ was considered significant.

RESULTS

Two hundred and forty participants were enrolled in the study. There were 123 (51.2%) children in group A and 117 (48.8%) in group B. After 6 hours of study, 25 (10.4%) children still had ongoing vomiting. These were reassessed, admitted to hospital and excluded from study. Seventeen (7%) participants were lost to follow up. Total percentage of participants who completed the study were 198 (82.5%). Mean age of participants were 26.62 ± 16.30 months. There was no gender difference in both the groups as 119 (49.5%) were male while 121 (50.4%) were female. Children in group A 51.2% ($n = 123$) received ondansetron and group B 48.8% ($n = 117$) received domperidone.

Table 1: Comparison of treatment outcome at 6 and 24 hours with Ondansetron and Domperidone.

Treatment given	Sample Size (N)	Ondansetron Group	Domperidone Group	P-Value
At 6 Hours	240	123	117	0.416
Cessation of vomiting	215 (89.5%)	108 (87.8%)	107 (91.4%)	
Persistent of vomiting	25 (10.4%)	15 (12.2%)	10 (8.5%)	
At 24 Hours	198	100	98	0.01
Cessation of vomiting	171 (86.4%)	94 (94%)	77 (78.6%)	
Persistent of vomiting	27 (13.6%)	6 (6%)	21 (21.4%)	

Treatment outcome at 6 hours: After 6 hours of stay in hospital, 25 children (11.4%) had ongoing episodes of vomiting. Of these, 25 who were vomiting, 15 (12.2%) were on ondansetron and 10 (8.5%) were on domperidone. These 25 children needed hospitalization and were excluded from study.

Treatment outcome at 24 hours: After 24 hours follow up, 27 children (11.1%) had persistent vomiting. Of these 27, six (6%) were on ondansetron and 21 (21.4%) on domperidone (Table). The difference was non-significant within 6 hours in hospital, however after 24 hours ondansetron was superior to domperidone for cessation of vomiting ($p = 0.01$).

DISCUSSION

The result in our study was comparable to other available studies. At 24 hour follow up in a study conducted by Rerkshupphaphol and Rerksupphaphol, vomiting cessation was noted in 62% of patients in ondansetron group and in 44% of patients in domperidone group and patients who were on ondansetron group needed a lower number of additional doses to stop vomiting in comparison to group receiving domperidone.⁶ Another similar study from Karachi showed insignificant difference at 6 hours and significant difference at 24 hours i.e 95% versus 85% in ondansetron and domperidone group.⁸ An Indian study concluded that the single dose of ondansetron was

superior to domperidone for cessation of vomiting at 24 hours along with oral rehydration therapy.⁹

In our study, we did not measure the mean time duration to stop vomiting, although it has been measured in other studies. Rerkshupphol and Rerkshupphol compared the mean time duration in both groups to stop vomiting.⁶ According to Kaplan-Meier survival analysis the time taken for vomiting to stop in both groups were almost similar i.e. 8.2 hours in ondansetron group versus 10.8 hours in domperidone group ($p = 0.485$). Marchetti F et al published a multicentric double blind trial from Italy and comparative analysis of ondansetron with domperidone and placebo was done. They also reported lower admission rate to hospital in patients with ondansetron administration, however the rate of readmission in emergency department within 48 hours of discharge is not different among all three groups.¹⁰

The role of ondansetron is well supported by different published articles. Amin and Khan favor the use of ondansetron as a single oral dose as it can facilitate oral rehydration by early cessation of vomiting.¹¹ While study by Golshekan et al concluded that failure of ORT can be prevented by use of ondansetron but they also recommended to conduct further studies to establish this further.¹² Another study from Pakistan found no significant difference of administration of ondansetron in requirement of intravenous therapy in two groups but they took non dehydrated patients with acute gastroenteritis.¹³

A recent meta-analysis has concluded that there is mixed evidence regarding the usefulness of ondansetron for controlling vomiting in children and adolescents.¹⁴ While another meta-analysis assessing safety and efficacy of different antiemetics for vomiting control in patients with AGE found ondansetron to be only effective and safe intervention.¹⁵ In particular, oral ondansetron is most studied agent in children with AGE having vomiting and its used as a single dose has been established in many studies.¹⁶

Our study establishes that ondansetron is useful in controlling vomiting in children with AGE and is significantly more effective than domperidone in this context. The strength of the study lies in its sufficient sample size and design of randomized clinical trial. However the results might be limited by the fact that it was single center study.

CONCLUSION

Ondansetron is an effective anti-emetic when compared to domperidone for children presenting with vomiting due to acute gastroenteritis. More multi centric clinical studies should be conducted to further evaluate the

effectiveness of these two drugs for management of vomiting in children with acute gastroenteritis.

Author Contributions:

Conception and design: Muhammad Bilal Iqbal, Nighat Haider.
Collection and assembly of data: Muhammad Bilal Iqbal, Bilal Ali Anjum.
Analysis and interpretation of data: Muhammad Bilal Iqbal, Nighat Haider, Izza Nawab.

Drafting of the article: Muhammad Bilal Iqbal, Bilal Ali Anjum.

Critical revision of article for important intellectual content: Nighat Haider, Jai Krishin.

Statistical expertise: Nighat Haider, Izza Nawab, Ayesha Masood.

Final approval and guarantor of the article: Bilal Ali Anjum.

Corresponding author email: Nighat: nighathaider@hotmail.com

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