DOI: https://doi.org/10.53350/pjmhs22161944

ORIGINAL ARTICLE

Ondansetron vs Domperidone in the Treatment of Vomiting in Children with Acute Diarrhea: A Randomized, Double-Blind Study

IBRAHIM[1], FARHANA AHMAD[2], ANILA FARHAT[3], NAYAB BUTT[4], MUHAMMAD ATTIQUE SADIQ[5], ABID RAFIQ CHAUDHRY MD[6]

[1]Assistant Professor Peads Medicine, Swat Medical College / Swat Medical Complex Teaching Hospital, Saidu Sharif Swat
[2]Assistant Professor Pediatrics, Central Park Medical College, Lahore
[3]Associate Professor Paediatrics, Frontier Medical College, Abbottabad
[4]Senior Registrar Pediatric Medicine, Chaudry Muhammad Akram Teaching and Research Hospital/Azra Naheed Medical College, Lahore
[5]Associate Professor, General Surgery, Foundation University Medical College, Fauji Foundation Hospital, Rawalpindi
[6]Consultant Pediatrics and Critical Care Medicine, Fatima Memorial College of Medicine and Dentistry, Lahore
Corresponding author: Anila Farhat, Email: paeds_doctor@yahoo.com, Cell: +92 321 9809131

ABSTRACT

Objective: The aim of this study is to compare the efficacy of oral ondansetron with oral domperidone in reducing vomiting in children with acute diarrhea.

Study Design: Randomized control trial

Place and Duration: The study was conducted atChildren Medical Center (CMC) / Dr Habibun Nabi Children Hospital, Airport Road Mingora Swat and Paediatrics department of Central Park Teaching Hospital, Lahore during the period fromJanuary 2020 to September 2020.

Methods: Total one hundred and fifty children with ages 1-7 years were presented in this study. Children had diarrhea and vomiting from the last 24-48 hours. Informed written consent was taken from guardians for detailed demographics age, sex, weight, height and residency were calculated. Children were equally split into two groups. Group A received 0.15 mg/kg oral ondansetron with 75 children and group B received 0.5 mg/kg oral domperidone with 75 patients. Post treatment blockage of vomiting was observed after 12-24 hours. SPSS 24.0 version was used to analyze all data.

Results: Majority of the patients were males 45 (60%) in group A and 42 (56%) in group B while rest were females 30 (40%) in group A and 33 (44%) in group B. Mean age of the patients in group A was 4.3 ±2.17 years and in group B mean age was 3.08±6.88 years. Mean weight of the patients were 15.07±8.23 kg and 15.02±3.09 kg in group A and B respectively. In group A mean height was 98.07±11.14 cm and in group B mean height was 97.67±18.24 cm. After 12 hours vomiting stopped in group A was 61 (81.3%) and 54 (72%) patients in group B. Efficacy after 24 hours were significantly higher among patients of group A in 69 (92%) children as compared to group B in 60 (80%) cases with p value < 0.05.

Conclusion: In this study we concluded that for reducing vomiting in children with acute diarrhea use of oral ondansetron was effective and useful as compared to oral domperidone.

Keywords: Acute Diarrhea, Ondansetron, Domperidone, Vomiting

INTRODUCTION

Acute Gastroenteritis (AG) is a leading cause of vomiting in children and one of the leading causes of hospitalization under the age of three years. In the United States, 1.5 million children under the age of 5 are diagnosed with AG each year, and 13% of these children are hospitalised [1]. Esophagitis, gastroenteritis, and a variety of digestive system illnesses are the leading causes of hospitalisation in children in Italy [2]. WHO, the AAP, and the European Society of Paediatric Gastroenterology, Hepatology, and Nutrition (ESPGHAN) working group and the Cochrane Library database suggest the use of ORT for mild to moderate gastroenteritis and rapid realimentation.

Vomiting is a common symptom in the early stages of viral Gastroenteritis. As a result, 75 percent of children infected with rotavirus during the first 1 to 3 days of illness experience recurrent vomiting [6]. There are no current guidelines for the treatment of vomiting in children with acute gastroenteritis (AG) [3]. It is also important to note that vomiting isn't just a direct cause of fluid loss, but it can also hinder oral rehydration therapy (ORT). Many doctors believe vomiting is a contraindication to ORT. Intravenous fluid therapy (IVT) is the preferred treatment for mild to moderate dehydration in paediatric patients in the emergency department [7,8]. IVT use might be significantly reduced if effective treatment of vomiting could be achieved with antiemetic drugs and their therapeutic application. Children with gastroenteritis have been treated with a variety of antiemetic medications to help them avoid or lessen vomiting [9]. Dopamine antagonists, phenothiazines disrupt the chemoreceptor trigger zone in the central nervous system. Opiates, general anaesthetics, and cytotoxics, to name a few, can all cause nausea and vomiting, that is why these medications are commonly used to treat or prevent it. Phenothiazines can cause severe dystonic responses, especially in youngsters.

In the treatment of vomiting in children, the anti-emetic metoclopramide has been found to be effective. Ondansetron (81 percent) and metoclopramide (72 percent) were found to be equally effective in halting vomiting in a research assessing their therapeutic efficacy. 9 Researchers observed that metoclopramide was linked to drowsiness, aggression, and extrapyramidal reactions in some studies. [10,11] However, it is possible that these side effects are due to the dosage utilized; this is still up for debate.

To treat vomiting caused by chemotherapy, radiotherapy, or surgery, ondansetron has been frequently

utilized. Ondansetron's use in paediatric ERs for AGE-related vomiting is increasing, according to recent studies. [12,13] Compared to placebo, ondansetron increased the likelihood of vomiting cessation up to one hour after drug administration, according to a new meta-analysis, but there was no difference between the groups after four, 24 and 48 hours. Ondansetron reduced the likelihood of oral rehydration therapy failure and reduced the risk of hospitalization when compared to placebo. An ondansetron research in the United States and Canada revealed that 86 percent of physicians advised its usage, citing its effectiveness in enhancing ORT success and its fair cost as the reasons. [14]

Purpose of this study is to compare the efficacy of oral ondansetron with oral domperidone in reducing vomiting in children with acute diarrhea.

MATERIAL AND METHODS

This Randomized control trial was conducted at Children Medical Center (CMC) / DrHabibunNabi Children Hospital Airport Road Mingora Swat and Paediatricsdepartment of Central Park Teaching Hospital, Lahore during the period fromJanuary 2020 to September 2020 and consisted of 150 children. Informed written consent was taken from guardians for detailed demographics age, sex, weight, height and residency were recorded. Children had renal, liver diseases, congenital heart disease, malignancy, immune deficiency and those did not give any written consent were excluded from this study.

This study included children who experienced diarrhoea in the previous 24-48 hours and were presented to the researchers. Patients in Group A received 0.15 mg/kg oral ondansetron, while patients in the Group B received 0.5 mg/kg oral domperidone, for a total of 75 participants. The research medicines were administered to both groups while they were in the ED. If a child experienced an acute episode of vomiting after receiving the medicine, a second dose of the prescribed antiemetic was administered within 15 minutes. Children were allowed to drink any liquid they desired for the first 30 minutes after receiving the medication was administered. Following the administration of the prescribed medication, the children were monitored for 12 hours. After the children had been vomiting-free for at least 40 minutes, the ORT procedure was attempted. ORT tolerance was evaluated in both groups, and those who tolerated it were sent home with the necessary oral anti-emetic medication. Upon discharge from the emergency department, parents were advised to continue to provide the recommended antiemetic at the same dose if their children had nausea or continuous vomiting, but only at intervals of greater than 12 hours. Furthermore, families were urged to bring their children back for a follow-up visit after 24 hours of treatment. Those who were critically dehydrated as a result of vomiting were admitted to the hospital and were excluded from the study. At the time of the follow-up appointment, parents were asked how many vomiting episodes their child had experienced in the previous 24 hours in order to determine whether or not their child had experienced any vomiting. All of the data was analyzed using the SPSS 24.0 software. For categorical variables, frequencies and percentages were employed to represent the data.

RESULTS

Majority of the patients were males 45 (60%) in group A and 42 (56%) in group B while rest were females 30 (40%) in group A and 33 (44%) in group B. Mean age of the patients in group A was 4.3 ±2.17 years and in group B mean age was 3.08±6.88 years. Mean weight of the patients were 15.07±8.23 kg and 15.02±3.09 kg in group A and B respectively. In group A mean height was 98.07±11.14 cm and in group B mean height was 97.67±18.24 cm.(table 1)

Table 1: Baseline detailed demographics of enrolled cases

Variables	Group A	Group B
Gender		
Male	45 (60%)	42 (56%)
Female	30 (40%)	33 (44%)
Mean age (years)	4.3 ±2.17	3.08±6.88
Mean weight (kg)	15.07±8.23	15.02±3.09
Mean height (cm)	98.07±11.14	97.67±18.24

Dehydration was mild to moderate found in 48 (64%) in group A and 50 (66.7%) in group B. Second dose of medication was given to 10 (13.3%) in group A and 18 (24%) in group B within 30minutes. (table 2)

Table 2: Association of dehydration and second dose of medication

Variables	Group A	Group B
Dehydration		
Mild to Moderate	48 (64%)	50 (66.7%)
No	27 (36%)	25 (33.3%)
2nd doze of medication		
Yes	10 (13.3%)	18 (24%)
No	65 (86.7%)	57 (76%)

After 12 hours vomiting stopped in group A was 61 (81.3%) and 54 (72%) patients in group B. Efficacy after 24 hours were significantly higher among patients of group A in 69 (92%) children as compared to group B in 60 (80%) cases with p value < 0.05.(table 3)

Table 3: Post-treatment effectives among both groups

Variables	Group A (n=75)	Group B (n=75)
Vomiting Stop		
At 12 hours	61 (81.3%)	54 (72%)
At 24 hours	69 (92%)	60 (80%)

DISCUSSION

Even while under-five death rates have dropped by half in the last three decades, the discrepancy between low- and middle-income nations remains large, according to UNICEF. Infectious illnesses, such as diarrhoea and pneumonia, are among the leading causes of under-five mortality [15]. Childhood mortality and morbidity due to acute gastroenteritis (AGE) is high in impoverished nations.

In this randomized control trial one hundred and fifty children with ages 1-7 years were presented. Children had diarrhea from the last 24-48 hours. Children were equally split into two groups. Group A received 0.15 mg/kg oral ondansetron with 75 children and group B received 0.5 mg/kg oral domperidone with 75 patients. Majority of the patients were males 45 (60%) in group A and 42 (56%) in group B while rest were females 30 (40%) in group A and

33 (44%) in group B. Mean age of the patients in group A was 4.3 ±2.17 years and in group B mean age was 3.08±6.88 years. Mean weight of the patients were 15.07±8.23 kg and 15.02±3.09 kg in group A and B respectively. In group A mean height was 98.07±11.14 cm and in group B mean height was 97.67±18.24 cm. Findings of current research was comparable o the studies conducted in past.[16,17] Dehydration was mild to moderate found in 48 (64%) in group A and 50 (66.7%) in group B. Second dose of medication was given to 10 (13.3%) in group A and 18 (24%) in group B within 30minutes.[18]

In current study we observed that, after 12 hours vomiting stopped in group A was 61 (81.3%) and 54 (72%) patients in group B. Efficacy after 24 hours were significantly higher among patients of group A in 69 (92%) children as compared to group B in 60 (80%) cases with p value < 0.05.[17,19,20] With ORT and domperidone, RCTs have demonstrated that the rate of vomiting cessation is non-significantly greater than with ORT alone (79 percent vs. 73%, respectively) or with placebo or metoclopramide [21]. On the other hand, trials comparing domperidone and ondansetron have yielded a mixed bag. Rerkshuppaphol et al. found that the ondansetron group had an insignificantly larger percentage of children who had stopped vomiting at the 24-hour mark than the domperidone group did. There were considerably fewer doses of domperidone and ondansetron needed over 24 hours to stop vomiting in the ondansetron group [22]. Ondansetron has also been shown to reduce the rate of hospitalization and the need for IV rehydration [23].

A single dosage of ondansetron reduced the length of stay in the hospital by half and also reduced the number of in-hospital vomiting episodes as compared to domperidone in a multicenter double-blind RCT conducted by the SONDO Investigators group. Freedman et al. also found that a single dose of oral ondansetron was very efficient in suppressing vomiting and allowing oral rehydration [25].

Ondansetron has been proven to be more successful than a placebo in treating vomiting and lowering admission rates in several studies. However, some studies indicate diarrhea with the use of ondansetron, perhaps because of its prokinetic impact. Ondansetron, metoclopramide, and a placebo were compared to control vomiting 24 hours after administering anti-emetics. [27] When compared to metoclopramide and a placebo, ondansetron had a better effect on vomiting control than the latter two. The study's sample size was a major drawback. Ondansetron and metoclopramide were shown to be equally efficacious in the treatment of AGE vomiting, according to a study by AlAnsari et al.[28]. [29] Metoclopramide has been linked by some writers to extrapyramidal symptoms and sedation in children who are anxious about the potential adverse effects of antiemetics like diarrhea or dystonic response. [30]

In children ages one to seven, ondansetron was found to be more effective than domperidone in stopping vomiting associated with AGE and mild to moderate dehydration. There is still a need for rigorous clinical trials to develop standard guidelines for the use of oral ondansetron in the emergency management of vomiting.

CONCLUSION

In this study we concluded that for reducing vomiting in children with acute diarrhea use of oral ondansetron was effective and useful as compared to oral domperidone.

REFERENCES

1 Malek MA, Curns AT, Holman RC, et al: Diarrhea- and rotavirus-associated hospitalizations among children less than 5 years of age: United States, 1997 and 2000. Pediatrics 2006, 117:1887-1892.

2 Fontana M, Federico P, Cantucci S: Ilricoveropediatrico in Lombardia: cause, variabilità e possibileinappropriatezza. Medico e Bambino 2007, 26:520-6.

3 King CK, Glass R, Bresee JS, Duggan C: Managing acute gastroenteritis among children: oral rehydration, maintenance, and nutritional therapy. MMWR Recomm Rep 2003, 52(RR-16):1-16.

4 Guarino A, Albano F, Ashkenazi S, et al: European Society for Paediatric Gastroenterology, Hepatology, and Nutrition/European Society for Paediatric Infectious Diseases evidence-based guidelines for the management of acute gastroenteritis in children in Europe: executive summary. J PediatrGastroenterolNutr 2008, 46:619-621.

5 Elliott EJ: Acute gastroenteritis in children. BMJ 2007, 334:35-40.

6 Bass ES, Pappano DA, Humiston SG: Rotavirus. Pediatr Rev 2007, 28:183-91.

7 Ozuah PO, Avner JR, Stein RE: Oral rehydration, emergency physicians, and practice parameters: a national survey. Pediatrics 2002, 109(2):259-261.

8 Reis EC, Goepp JG, Katz S, Santosham M: Barriers to use of oral rehydration therapy. Pediatrics 1994, 93(5):708-711. 9. British National Formulary 54: RPS Publishing London: BMJ Publishing Group Ltd; 2009.

9 Gutiérrez Castrellón P, PolancoAllué I, Salazar Lindo E. Manejo de la gastroenteritis aguda en menores de 5 anos: ˜ unenfoquebasado en la evidencia. AnPediatría. 2010;72:220.e1---20

10 Troncon LE de A. Novasdrogas no tratamento da dispepsiafuncional. ArqGastroenterol. 2001;38:207---12

11 .Marchetti F, Maestro A, Rovere F, Zanon D, Arrighini A, Bertolani P, et al. Oral ondansetron versus domperidone for symptomatic treatment of vomiting during acute gastroenteritis in children: multicentre randomized controlled trial. BMC Pediatr. 2011;11:15

12 Tomasik E, Ziółkowska E, Kołodziej M, Szajewska H. Systematic review with meta-analysis: ondansetron for vomiting in children with acute gastroenteritis. Aliment PharmacolTher. 2016;44:438---46

13 Association of water handling and child feeding practice with childhood diarrhoea in rural community of Southern Nepal. Acharya D, Singh JK, Adhikari M, Gautam S, Pandey P, Dayal V. J Infect Public Health. 2018;11:69–74.

14 Global, regional, and national causes of child mortality: an updated systematic analysis for 2010 with time trends since 2000. Liu L, Johnson HL, Cousens S, et al. Lancet. 2012;379:2151–2161

15 Levels and Trends in Child Mortality. [Jul;2019];https://data.unicef.org/resources/levels-and-trends-in-child-mortality/ 2018

16 Marchetti, F., Maestro, A., Rovere, F. et al. Oral ondansetron versus domperidone for symptomatic treatment of vomiting during acute gastroenteritis in children: multicentre randomized controlled trial. BMC Pediatr 11, 15 (2011).

17 Hanif H, Jaffry H, Jamshed F, et al. Oral Ondansetron versus Domperidone for Acute Gastroenteritis Associated Vomiting in Young Children. Cureus. 2019;11(9):e5639. Published 2019 Sep 12. doi:10.7759/cureus.5639

18 Alhashimi D, Alhashimi H, Fedorowicz Z: Antiemetics for reducing vomiting related to acute gastroenteritis in children and adolescents. Cochrane Database of Systematic Reviews. 2006, 4: CD005506-

19 Effect of oral ondansetron on decreasing the vomiting associated with acute gastroenteritis in Iranian children. Golshekan K, Badeli H, Rezaieian S, Mohammadpour H, Hassanzadehrad A. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4006506/ Iranian J Pediatr. 2013;23:557–563.

20 Clinical outcome with single dose ondansetron versus domperidone in paediatric gastroenteritis-our experience. Kamal SS, BLK PB, Chandra B, Pathapati RM, Buchineni M. https://www.researchgate.net/profile/Madhavulu_Buchineni/publication/279445812_Clinical_Out_Come_with_Single_Dose_Ondansetron_versus_Domperidone_in_Paediatric_Gastroenteritis_-_Our_Experience/links/55929de008aed7453d462c2d/Clinical-Out-Come-with-Single-Dose-Ondansetron-versus-Domperidone-in-Paediatric-Gastroenteritis-Our-Experience.pdf J Med SciClin Res. 2015;3:6273–6277.

21 Domperidone with ORT in the treatment of pediatric acute gastroenteritis in Japan: a multicenter, randomized controlled trial. Kita F, Hinotsu S, Yorifuji T, et al. Asia Pac J Public Health. 2015;27:174–183

22 Randomized study of ondansetron versus domperidone in the treatment of children with acute gastroenteritis. Rerksuppaphol S, Rerksuppaphol L. J Clin Med Res. 2013;5:460–466

23 Antiemetics for reducing vomiting related to acute gastroenteritis in children and adolescents. Fedorowicz Z, Jagannath VA, Carter B. Cochrane Database Syst Rev. 2011;9:5506

24 Oral ondansetron versus domperidone for acute gastroenteritis in paediatric emergency departments: multicenter double blind randomized controlled trial. Marchetti F, Bonati M, Maestro A, et al. PLoS One. 2016;11:165441

25 Oral ondansetron for gastroenteritis in a paediatric emergency department. Freedman SB, Adler M, Seshadri R, Powell EC. N Engl J Med. 2006;354:1698–1705.

26 Sturm JJ, Pierzchala A, Simon HK, Hirsh DA. Ondansetron use in the pediatric emergency room for diagnoses other than acute gastroenteritis. PediatrEmerg Care. 2012;28:247---50.

27 Cubeddu LX, Trujillo LM, Talmaciu I, Gonzalez V, Guariguata J, Seijas J, et al. Antiemetic activity of ondansetron in acute gastroenteritis. Aliment PharmacolTher. 1997;11:185---91

28 Al-Ansari K, Alomary S, Abdulateef H, Alshawagfa M, Kamal K. Metoclopramide versus ondansetron for the treatment of vomiting in children with acute gastroenteritis. J PediatrGastroenterolNutr. 2011;53:156---60

29 Guarino A, Ashkenazi S, Gendrel D, Lo Vecchio A, Shamir R, Szajewska H. European Society for Pediatric Gastroenterology, Hepatology, and Nutrition/European Society for Pediatric Infectious Diseases evidence-based guidelines forthe management of acute gastroenteritis in children in Europe: update 2014. JPGN. 2014;59:132---52.

30 Carter B, Fedorowicz Z. Antiemetic treatment for acute gastroenteritis in children: an updated Cochrane systematic review with meta-analysis and mixed treatment comparison in a Bayesian framework. BMJ Open. 2012;2:e000622