



Pediatric Pearls

Ondansetron for acute gastroenteritis in children

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ABSTRACT

QUESTION In my pediatric practice I see many children with acute gastroenteritis. Their parents ask for antiemetic medications. Ondansetron has been well tolerated when used to control nausea and vomiting in patients receiving chemotherapy. Is there a role for it in managing acute gastroenteritis in children?

ANSWER Use of antiemetics is not indicated for treatment of acute gastroenteritis. Some evidence suggests ondansetron is clinically more effective and better tolerated and has a better side effect profile than other antiemetics, but does not suggest that it reduces hospital admission rates. Use of ondansetron, as with other antiemetics, continues to be at treating physicians' discretion, and potential adverse events should be considered before administration.

RÉSUMÉ

QUESTION Dans ma pratique pédiatrique, je vois beaucoup d'enfants souffrant de gastro-entérite aiguë. Les parents demandent des médicaments antivomitifs. L'ondansétron est bien toléré lorsqu'il est administré pour contrôler la nausée et les vomissements chez les patients en chimiothérapie. Peut-on l'utiliser pour traiter la gastro-entérite aiguë chez les enfants?

RÉPONSE L'utilisation des antivomitifs n'est pas indiquée pour le traitement de la gastro-entérite aiguë. Certaines données suggèrent que l'ondansétron est cliniquement plus efficace, et mieux toléré, et qu'il a moins d'effets secondaires que d'autres antivomitifs. Mais rien ne prouve qu'il réduit les taux d'hospitalisation. L'utilisation d'antivomitifs demeure à la discrétion du médecin traitant, qui devrait toujours considérer les effets indésirables potentiels avant d'en administrer.

Acute gastroenteritis (AGE) is one of the most common infectious illnesses of childhood. In the United States, it accounts for up to 10% of hospital admissions of children younger than 5 years.¹ Symptoms of AGE are pathogen-dependent and frequently include vomiting, diarrhea, abdominal pain, and fever.¹ Nearly all causative organisms are viruses; other causes are bacteria and parasites.¹

While no treatment is needed for self-limited virus-induced AGE, dehydration caused by diarrhea and emesis is of great concern and should be treated vigorously.^{2,3} Currently recommended therapy includes oral rehydration solutions for cases of mild dehydration and intravenous administration of fluids for moderate or severe dehydration.^{2,3} In rare cases of bacterial AGE, antibiotics are required.¹

Interrupting emesis will likely help with rehydration therapy. Antiemetics are more commonly employed by emergency physicians than by pediatricians for treating AGE. They are usually used with the intent of decreasing the rate of dehydration and increasing the efficiency of oral rehydration solutions.^{4,5} The potential benefits of using antiemetics, however, should always be weighed against possible adverse effects, such as lethargy and extrapyramidal symptoms caused by dopamine antagonists, such as metoclopramide.⁴ The Canadian Paediatric Society's current guideline on treating AGE discourages use

of antiemetics, but also notes that protracted vomiting can be a contraindication to oral rehydration solutions and that patients could eventually require intravenous therapy.² Use of a well tolerated antiemetic could reduce the need for IV therapy or avoid admission to hospital due to dehydration.⁶

Ondansetron

While physiologic pathways leading to emesis are complex and not fully understood, evidence has shown that 1 pathway entails serotonin release in the stomach and small intestine to trigger the emetic response.⁷ Ondansetron, a serotonin 5-HT₃ receptor antagonist with no dopamine antagonist activity,^{4,7} is currently recommended for treating and preventing nausea and vomiting associated with antineoplastic treatment in children and adults.^{4,7,8} Ondansetron is unlikely to cause extrapyramidal symptoms because it has no dopamine antagonist activity.⁷ Common adverse events include headaches, constipation, and dizziness.^{7,8}

Use for acute gastroenteritis

While pharmacotherapy is not generally indicated for pediatric AGE, as many as 61% of physicians would administer antiemetics during oral rehydration if they thought them necessary, according to one US national

survey.⁴ The survey of 593 physicians (35.6% response rate) from general pediatrics, emergency medicine, and pediatric emergency medicine also found that 72% of those who had ever used antiemetics for AGE therapy were prompted to use them to prevent worsening dehydration and that the most common concern was the potential for side effects (62.4% of all respondents).⁴

The effectiveness of ondansetron in halting emesis associated with AGE was found to be significantly better than placebo ($P = .048$) in a study comparing ondansetron and metoclopramide with placebo in 36 children aged 6 months to 8 years. The study was designed to determine whether serotonin was important to emesis pathways.⁹ Treatment failures (ie, more than 2 episodes of vomiting in 90 minutes within 4 hours of drug administration) were less common with ondansetron (17%) than with metoclopramide (42%),⁹ one of the antiemetics most commonly used for AGE.^{4,9}

Increased rates of diarrhea were found in the antiemetic groups where 66.7% of ondansetron patients and 83.3% of metoclopramide patients had more than 4 episodes of diarrhea, but only 16.7% of patients given placebo had more than 4 episodes⁹ ($P = .013$ and $P = .004$ for ondansetron and metoclopramide, respectively).

Two studies comparing ondansetron with placebo in conjunction with rehydration therapy in emergency departments had similar outcomes.^{6,10} The first compared oral ondansetron with placebo and oral rehydration for pediatric AGE in a randomized, double-blind trial involving 145 patients who had vomited at least 5 times in the previous 24 hours.⁶ The study found that patients receiving ondansetron had significantly fewer emetic episodes ($P = .001$) and that more of them did not vomit at all during the initial observation period in the emergency department (87% versus 65%, $P = .004$); however, a statistically significant difference was not found during a 48-hour follow-up period.⁶ In the ondansetron group, there were fewer admissions and shorter lengths of stay in hospital, but children receiving ondansetron had a higher rate of return visits, for either persistent vomiting or persistent diarrhea, and a higher mean incidence of diarrhea.⁶

The second study compared intravenous ondansetron with placebo in a randomized, double-blind trial involving 105 patients aged 1 month to 22 years. These patients had needed intravenous fluids to treat AGE and had had at least 3 episodes of vomiting in the preceding 24 hours.¹⁰ In measuring frequency of vomiting, admission rates, and adverse events, the investigators found that children in the ondansetron group had a significantly higher incidence of cessation of emesis than those in the placebo group did (70% versus 51%, $P = .04$).¹⁰ Admission rates were significantly lower among children in the ondansetron group (7% versus 23%, $P = .04$), confirming the cost-benefit ratio associated with ondansetron use.¹⁰ Unlike in the previous study,⁶ the number of episodes of diarrhea

decreased in both groups, and re-admission rates were not significantly different between groups.¹⁰

Limitations

Both these studies are limited by their inclusion criteria. It is possible that considering a set number of emetic episodes within the previous 24 hours could have included patients with milder cases of AGE.^{6,10-12} Also, the claim that ondansetron reduces admission rates implies that its effectiveness would be greatest among those at risk of admission to hospital rather than among patients who might recover with oral rehydration therapy.^{6,10-12} Further, since admission to hospital is influenced by many variables and would be managed differently in different health facilities (based on availability of observation units, admission beds, community follow-up, etc), this outcome measure is less than optimal for the decision to administer ondansetron.

Conclusion

While some evidence supports use of ondansetron for children with AGE, further research is needed to fully evaluate its role in treatment. Current evidence demonstrates some benefits of ondansetron use, but does not establish the clinical circumstances in which its use might be indicated. Although ondansetron is a well tolerated antiemetic, its use for AGE should continue to be at the discretion of treating physicians and then only after potential adverse events have been considered. 🌸

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