Oral Rehydration Therapy for Kids
A More Palatable Alternative

Parents no longer need to struggle to get their kids to drink electrolyte solutions during episodes of mild gastroenteritis; apple juice works just as well.

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PRACTICE CHANGER

Recommend that parents give half-strength apple juice to children ≥ 24 months of age who are minimally dehydrated following a case of simple viral gastroenteritis. The juice reduces the need for further intervention better than oral rehydration therapy.

STRENGTH OF RECOMMENDATION

B: Based on a single, good-quality randomized controlled trial (RCT).[1]

A 3-year-old boy is brought in by his mother for vomiting and diarrhea that started in the middle of the night. On examination, he is slightly dehydrated but does not have an acute abdomen or other source of infection. He is drinking from a sippy cup. What fluids should you recommend?

Acute gastroenteritis is a common cause of vomiting and/or diarrhea in children, resulting in 1.5 million outpatient visits and 200,000 hospital admissions annually in the United States.[2] Children with gastroenteritis are at risk for dehydration, and the recommended treatment for anything less than severe dehydration is oral rehydration therapy (ORT) and early resumption of feeding upon rehydration.[2]

In 2002, the World Health Organization recommended an ORT with an osmolarity of 245 mOsm/L.[3] However, cultural preferences, cost, taste, availability, and caregiver and professional preference for IV hydration have all been barriers to the use of ORT.[2,4-8] In fact, a study of ORT preferences in 66 children ages 5 to 10 years found that less than half of the children would voluntarily drink the ORT again.[5]

This study evaluated the use of diluted apple juice as a more palatable alternative to ORT in children with vomiting and/or diarrhea.

STUDY SUMMARY

In kids older than 2, apple juice will do

This study was a single-center, single-blind, noninferiority RCT conducted in the emergency department (ED) of a tertiary care pediatric hospital in Canada. The researchers compared the use of half-strength apple juice to a standard ORT for rehydration in simple gastroenteritis.[1] Participants were 6 months to 5 years of age, weighed more than 8 kg (17.7 lb), and had vomiting and/or diarrhea for less than 96 hours (with ≥ 3 episodes over the past 24 hours). They also had a Clinical Dehydration Scale (CDS) score < 5 and a capillary refill of < 2 seconds (see Table).[9] Of the total, 68% of the children had a CDS score of 0; 25.5%, of 1 to 2; and 6.4%, of 3 to 4. Exclusion criteria included chronic gastrointestinal disease or other significant comorbidities (eg, diabetes) that could affect the clinical state and potential acute abdominal pathology.

Children were randomly assigned to receive half-strength apple juice (intervention group, n = 323) or an apple-flavored sucralose-sweetened electrolyte maintenance solution (EMS; control group, n = 324). Immediately on triage, each child received 2 L of their assigned fluid, to be used while in the ED and then at home. The children received 5 mL of fluid every two to five minutes. If a child vomited after starting the fluid, he or she was given oral ondansetron.

At discharge, caregivers were encouraged to replace 2 mL/kg of fluid for a vomiting episode and 10 mL/kg of fluid for a diarrhea episode. At home, children in the juice group could also drink any other preferred fluid, including sports beverages. The EMS group was instructed to drink only the solution provided or a comparable ORT. Caregivers were contacted daily by phone until the child had no symptoms for 24 hours. They were also asked to keep a daily log of vomiting and diarrhea frequency, as well as any subsequent health care visits. At least one follow-up contact occurred with 99.5% of the children.

The primary outcome was treatment failure, defined as the occurrence of any of the following within seven days of the ED visit: hospitalization, IV rehydration, further health care visits for diarrhea/vomiting in any setting, protracted symptoms (ie, ≥ 3 episodes of vomiting or diarrhea within a 24-hour period occurring > 7 days after enrollment), 3% or greater weight loss, or CDS score ≥ 5 at follow-up.

TABLE

Clinical Dehydration Scale

Characteristic	Score: 0	Score: 1	Score: 2
General appearance	Normal	Thirsty, restless, lethargic, but irritable when touched	Drowsy, limp, cold, or sweaty; may or may not be comatose
Eyes	Normal	Slightly sunken	Very sunken
Mucous membranes (tongue)	Moist	Sticky	Dry
Tears	Present	Decreased	Absent

Total CDS score: 0 = no dehydration; 1-4 = some dehydration; ≥ 5 = moderate/severe dehydration.
Source: Goldman et al. *Pediatrics.* 2008.[9]

Treatment failure occurred in 16.7% of the juice group, compared to 25% of the EMS group (difference, 8.3 percentage points; number needed to treat [NNT], 12), consistent with noninferior effectiveness. The benefit was seen primarily in chil-

dren ≥ 24 months of age. In children < 24 months, the treatment failure for juice was 23.9% and for EMS, 24.1%. In older children (those ≥ 24 months to 5 years), the treatment failure with juice was 9.8% and with EMS, 25.9% (difference, 16.2 percentage points; NNT, 6.2).

IV rehydration in the ED or within seven days of the initial visit was needed in 2.5% of the juice group and in 9% of the EMS group (difference, 6.5 percentage points; NNT, 15.4). There were no differences in hospitalization rate or in diarrhea or vomiting frequency between groups.

WHAT'S NEW

Kids drink more of what they like

This study, in a developed country, found rehydration with diluted apple juice worked just as well as ORT. In children ≥ 24 months of age, there were fewer treatment failures.

CAVEATS

Infants may not benefit; ondansetron played a role

Children in this study were only mildly dehydrated. The study did not include infants younger than 6 months of age, and the greatest benefit was seen in children ≥ 24 months of age.

Also noteworthy was that most of the children (67.4%) received an oral dose of ondansetron (0.1 mg/kg). Although ondansetron is expensive, it would be considered cost-effective if one dose prevents a hospitalization. Previous studies of oral ondansetron show it reduces vomiting (NNT, 5); lowers the rate of IV hydration in the ED (NNT, 5); and reduces the hospitalization rate from the ED (NNT, 17).[10]

Lastly, there are a variety of fluid replacement guidelines. In this study, fluid replacement was 2 mL/kg for a vomiting episode and 10 mL/kg for a diarrhea episode.

CHALLENGES TO IMPLEMENTATION

Given the ease of swapping diluted apple juice for ORT, there are no foreseen barriers to implementation. **CR**

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