



Dilute apple juice: rehydration of children with gastroenteritis

Intervention

Oral administration of dilute apple juice (or other preferred fluids) instead of electrolyte-containing oral rehydration solutions (ORS).

Indication

Traditionally, beverages with high sugar content have been discouraged because of their potential to induce osmotic diarrhoea. Recent studies have found this effect to be minimal.

Children aged between 6 months and 5 years of age with mild dehydration due to gastroenteritis.

Levels of dehydration are shown in the table below. This intervention is only for those with **mild** dehydration.

Mild dehydration (<4% deficit)	Moderate dehydration (4–6% deficit)	Severe dehydration (≥7% deficit)
No clinical signs May have increased thirst	Delayed capillary refill time (>2 secs) Increased respiratory rate Mild decreased tissue turgor	Very delayed capillary refill time (>3 secs) Mottled skin Other signs of shock (tachycardia, irritable or reduced consciousness level, hypotension) Deep, acidotic breathing Decreased tissue turgor

Source: The Royal Children's Hospital Melbourne – Dehydration. http://www.rch.org.au/clinicalguide/guideline_index/Dehydration/

Dilute apple juice or other preferred fluids were tested against ORS in a Canadian trial in 2016. Treatment failure (ie need for IV hydration) occurred in 25% of children given ORS and 17% of those given dilute apple juice. For every 12 children given dilute apple juice instead of ORS, one less child experienced treatment failure.

Dilute apple juice tastes better than ORS, which results in greater intake and reduced need for IV hydration.

Contraindications

Dilute apple juice rehydration is not appropriate for children with:

- › a need for immediate IV rehydration
- › possible acute abdomen
- › a history of chronic gastrointestinal disease
- › bilious vomiting
- › bloody diarrhoea.



Precautions

Children younger than 6 months of age may (rarely) be more likely to develop water intoxication through the administration of hyponatraemic solutions (eg apple juice).

The Canadian trial excluded moderately or severely dehydrated children.

Availability

Apple juice is more available than ORS. It can be bought in supermarkets and convenience stores and is therefore available outside chemist hours.

Description

Dilution

Dilute apple juice with water to achieve 50:50 mix. Other preferred fluids can be used at the same dilution.

Dosing

During the consultation, give the child 5 mL aliquots to drink every 2–5 minutes from a spoon or a 5-mL syringe. Continue this at home while symptoms persist and/or until urine output is restored.

As a guide, the child should be given 10 mL/kg for each episode of diarrhoea or 2 mL/kg for each episode of vomiting.

If vomiting and diarrhoea have stopped before rehydration treatment is started, continue rehydration until restoration of normal urine production. (Restoration of hydrated body weight can also be used, but this is rarely known with enough accuracy.)

Tips and challenges

Many guidelines discourage the use of fluids other than ORS due to the potential for osmotic diarrhoea or hyponatraemia. In the Canadian trial one out of 323 in each arm developed hyponatremia. There was no statistically significant difference in episodes of diarrhoea.

Children older than 2 years of age tend to experience the greatest benefit from the dilute apple juice or preferred fluid. Compared with younger children, those older than 2 years are more accustomed to drinking apple juice, more taste discriminating and less likely to become moderately or severely dehydrated.

There is considerable variation in sugar content between different store-bought apple juice products. A product that the child already likes may be a useful first choice. Diluting the apple juice reduces the theoretical risk of osmotic diarrhoea. The sugar provides useful calories while they are not absorbing other nutrients.

Concurrent administration of ondansetron may be beneficial for children older than 6 months of age and greater than 8 kg who are vomiting.

Child's weight	Ondansetron wafer dose
8–15 kg	2 mg
15–30 kg	4 mg
>30 kg	8 mg

Source: The Royal Children's Hospital Melbourne – Gastroenteritis.



Grading

NHMRC Level II evidence

Training

The Royal Children's Hospital Melbourne Clinical Practice Guidelines:

- › Dehydration http://www.rch.org.au/clinicalguide/guideline_index/Dehydration
- › Gastroenteritis http://www.rch.org.au/clinicalguide/guideline_index/gastroenteritis

References

Freedman S, Willan A, Boutis K, Schuh S. Effect of dilute apple juice and preferred fluids versus electrolyte maintenance solution on treatment failure among children with mild gastroenteritis: A randomized clinical trial. <https://www.ncbi.nlm.nih.gov/pubmed/27131100> JAMA 2016;315(18):1966–74.

Consumer resources

NHS Choices: Diluted apple juice 'as good as' rehydration drinks for children <http://www.nhs.uk/news/2016/05May/Pages/dilute-apple-juice-as-good-as-rehydration-drinks-for-children.aspx>