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FPIN's Clinical Inquiries

Intravenous Fluids for Children with Gastroenteritis

Clinical Question

In children with acute vomiting and diarrhea (gastroenteritis), does treatment with intravenous fluids improve recovery compared with oral rehydration therapy (ORT)?

Evidence-Based Answer

Most children with gastroenteritis do not require intravenous fluids and will respond favorably to ORT. Intravenous fluids do not shorten the duration of gastroenteritis and are more likely to cause adverse effects than ORT. [Strength of recommendation: B]

Evidence Summary

Dehydration from gastroenteritis is one of the most common reasons for hospitalization of children, and intravenous fluids are often part of the treatment regimen. However, treatment guidelines and the results from multiple studies suggest that ORT usually is appropriate as first-line therapy and that intravenous fluids should be reserved for use in patients with more severe dehydration1-5 (see accompanying table).3,5

Fluid Replacement in Children with Gastroenteritis

Level of dehydration (percent body-weight loss)	ORT	Intravenous fluids
Mild (3 to 5)	50 mL per kg over three to four hours	Not recommended*
Moderate (6 to 9)	100 mL per kg over three to four hours	Not recommended*
Severe (10 or higher)	100 to 150 mL per kg over three to four hours†	20 mL per kg bolus over one hour‡
Ongoing body-weight loss	10 mL per kg for each stool or emesis	10 mL per kg for each stool or emesis

ORT = oral rehydration therapy.

*-If able to take ORT.

†-If clinically stable, alert, and taking ORT well.

‡-Normal saline or lactated Ringer's solution.

Information from references 3 and 5.

A meta-analysis1 of international studies comparing ORT with intravenous fluids in children with mild to severe dehydration found that ORT shortened the length of hospital stay by up to 29 hours. There were no significant differences in weight gain or duration of intestinal losses between the treatment groups, although the rate of major adverse events was lower in children receiving ORT (relative risk, 0.36; 95 percent confidence interval, 0.04 to 0.89). The number needed to harm was 59 for intravenous fluids, meaning that there was one additional major adverse event for every 59 patients receiving intravenous fluids instead of ORT. In developing countries, treatment with ORT instead of intravenous fluids resulted in a number needed to treat of 37 to have one fewer seizure or death.

The results of a second review2 confirm that ORT shortens the duration of hospitalization in children with mild to severe dehydration and suggest that ORT has superior effects on weight gain and duration of diarrhea compared with intravenous fluids. The results of other reviews3,6 based on similar populations show little difference between ORT and intravenous fluids in weight gain, duration of illness, or length of hospital stay, but maintain the superiority of ORT in reducing the risk for seizure during correction of hypernatremic dehydration. The results of a systematic review4 show that ORT corrects dehydration and acidosis more quickly and safely than intravenous fluids, although the degree of dehydration in the study population was unclear.

Intravenous fluids are overused in many emergency departments because of the false perception that this form of rehydration is a faster therapy and decreases the length of hospital stay. In a case series study7 involving mild to moderate dehydration among children in an urban emergency department, the average time for rehydration with intravenous fluids was 5.4 hours, which exceeds the four-hour period recommended for ORT.5,7

Recommendations from Others

The American Academy of Pediatrics recommends the use of ORT in the treatment of gastroenteritis in children with mild to moderate dehydration (see accompanying table). The use of intravenous fluids should be reserved for use in children with severe dehydration, shock, or inability to tolerate oral fluids.5

Clinical Commentary

It is reassuring that the best treatment for routine gastroenteritis in children is the easiest and least invasive approach. Not only will this delight children, it should make physicians and parents feel more comfortable about delaying hospitalization and managing rehydration initially at home. This message also should encourage confidence in the effectiveness and efficiency of ORT among emergency physicians and guide hospital personnel to admit only children with severe dehydration or children whose social situations would not permit adequate monitoring or aggressive ORT at home.

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