

Topic: Pediatric Gastroenteritis Treatment

By Jim Krygowski, MD

Case scenario: You are working in a busy community emergency department when the nurse walks over to you with a partially filled emesis basin and says “this 2 year old child has vomited again and has had diarrhea since yesterday. Do you want an IV?” You assess the child and he appears mild to moderately dehydrated but otherwise well. What should you do?

- Patients:** In pediatric patients who present to the emergency department with mild/moderate dehydration from viral gastritis or gastroenteritis
- Intervention:** Does the use of intravenous fluid rehydration +/- meds
- Compared to:** Oral rehydration therapy (ORT) +/- meds
- Outcome:** Change admission rates or otherwise alter patient outcome?

Search Databases: Medline (Ovid) and Cochrane Library

Relevant Articles:

Author, Date, and Location	Patient Group	Study Type	Outcomes	Key Results	Study Weakness
Gavin et al, <i>American Academy of Pediatrics</i> , July 1996 Santa Barbara	803 3mo-3 year children (one study exception to 14 y/o)	Meta-analysis of RCT comparing ORT w/IV rehydration (6 studies) or ORT w/various solution (7 studies)	A.Failure of ORT compared to IVF B.Sodium content – high vs low in admission rate?	A.Varied greatly (0 to 18%) for overall rate of 3.6%, with 95% CI of 1.4%-5.5% B.High sodium lowest, not stat sig	1. Only English-language papers 2. Study designs greatly varried
Connors et al, <i>Pediatric Emergency Care</i> , October 2000 Rochester, NY	60 Pediatric emergency medicine fellowship directors	Consecutive survey (on website?), 60/67 (89.6%) responded	A.Experience w/ORT B.10 case scenarios (all 10 mild-mod dehydration) C.Open-ended questions D.Innovative score	A.59% - “many times”; 90% rated 3 or better (5 pt scale), none rated a 1 (“very little”) B. Only 17% voted 10/10 for ORT; only 6.7% would chose in own practice; 31% use for mild, but not mod dehydration C. Parents, PCP, time, \$, staff influence D. Not correlated	1. No exhaustive list of peds-em fellowship directors 2. combo w/meds not addressed 3. limited view of clinicians
Nager et al, <i>Pediatrics</i> , April 2002, California	90 children ages 3-36 months in ED (after oral fluid challenge failed)	Prospective, randomized to IVT or Nasogastric rehydration	A.Tx failure B.Weight change C.Electrolyte comparisons	A. 2 IVF and 1 ORT “failed” - 2 NG’s needed repeat, 27 iv’s needed repeat - All who completed d/c’ed to	1. Limited age ranges 2. Limited follow-up 3. Combo

				home w/criteria B. % body wt gained higher in IVF C. No clinically significant differences	w/meds not addressed
Spandorfer et al, <i>Pediatrics</i> , Feb 2005 Philadelphia	73 children (8 weeks-3 years) in CHOP ED w/ moderate dehydration	Prospective, randomized, masked (to MD) clinical trial split into ORT vs IVF	A. Failure rate not >5% of IVF B. ORT require less time to initiate C. Show more improvement at 2 hours D. Hospitalization rate E. Family prefer ORT in future? F. Effective mask (was effective)	A. No difference @ 4 hours (55.6 ORT vs 56.8 IVF rehydrated 95% CI: -24% to 21.6%) B. Mean time to tx shorter in ORT – 15 min vs 36 min (95% CI: -10.3 to -32.1 min) C. no difference in improvement of dehydration score @ 2h (both about 80%) D. Hosp adm rate higher for IVF (48.7% vs 30.6% of ORT, 95% CI: -40.1% to 4%) E. not sig	1. Small sample size leads to limited power 2. Meds not addressed
Freedman et al, <i>New England Journal of Medicine</i> , April 2006, Toronto and Chicago	215 children (6 months-10 years) in ped ED's for gastro and dehydration	Prospective, randomized, double-blind study. One group was given Zofran disintegrating tablets (wt based), other given placebo. Then ORT x 1 hour.	A. Proportion who vomited while getting ORT B. # of vomiting episodes C. Proportion needing IVT or hospitalization D. Adverse events	A. 14% vs 35 % vomited (p<0.001). B. 0.18 episodes/pt vs 0.6 episodes/pt (p<0.001) C. 14% needed IVT vs 31% (p=0.003). Hospital admit rates similar – 4% vs 5% D. no cardiopulm events, urticaria in 1 placebo. Zofran had more diarrhea (1.4 vs 0.5, p<0.001). Kawasaki's – one episode (Z)	1. sponsor by manufacturer +/-
Hartling et al, <i>Cochrane Systematic Reviews</i> , May 2006, Canada	1811 children (<18) in 17 studies w/dehydration 2 nd to acute gastroenteritis, both inpt and outpt in 11 countries	Randomized (& quasi-randomized) controlled trials	A. Rehydration failure B. Death C. Wt gain D. Length of hosp stay (inpt) E. High and low Na F. Duration of diarrhea G. Total fluid intake	A. ORT failed slightly more (1 in 25 or risk diff. of 4%) B. 6 died in ivt, 4 in ort, all low-mod income countries C-H. not sig I. ORT – paralytic ileus IVF – phlebitis J. low osmolarity fluids better for ORT	1. Definitions in studies and combining them. Ex-“failure” 2. No double-blind 3. Adverse events ?? 4. Outlier study → fav

			H.Na intake I.Compliaction s		ored ivf- neonates? 5.Diarrhea primary – 4% vs 0%RD 6.Most (not all) excluded shock
Stork et al <i>Academic Emergency Medicine</i> , Oct 2006, Syracuse	166 children (6 mo-12 years) w/gastroenteritis or gastritis w/vomiting and having failed oral rehydration, comparing iv zofran to iv dexamethasone and placebo	Double-blind RCT	A. Hospitalization rate B. Tolerate fluids at 2 and 4 hours C. Difference in revisits	A. Admit rates lower (4.4% vs placebo 20.5% and dexa 14.9%; p=0.02) B. Zofran vs NS alone tolerated fluids better at 2 (sig), and at 4 (not sig) hours C. No difference in revisits to health care or total vomiting episodes	Study size

Comments:

“Further research comparing ORT and IVT for children with dehydration secondary to gastroenteritis is not warranted and may be unethical. If undertaken, further research should focus on evaluating the efficacy of nasogastric rehydration in children who have persistent vomiting.”

-Hartling, from Cochrane Systematic Reviews, May 22, 2006

Clinical Bottom Line:

Although some clinicians are reluctant to do so, the evidence clearly shows that ORT (oral rehydration therapy) is as effective as IVF regarding rehydration, hospital admissions, and patient satisfaction. The Cochrane Database Systematic Review is fully behind oral rehydration therapy. If given the choice of rehydration solution, choose the oral fluid w/lower osmolality. In addition, the recent New England Journal supporting oral Zofran for the vomiting children prior to ORT is another tool for the armamentarium. Remember to warn mom and dad that it may increase diarrhea. If ORT fails, IV’s can always function as a second option (zofran recommended as well IV in AEM) and if this too fails, further provides evidence for need for the pt’s admission (when speaking with consultants).

Zofran po dose (NEJM article – the disintegrating tablet): 2 mg for children 8-15 kg; 4 mg for children 15-30 kg; 8 mg for children > 30 kg. Then wait 15 minutes and go for ORT. Repeat dose if vomit w/in 15 minutes.

ORT – limit to 30 ml q 5 minutes (enfalyte in NEJM study).

Zofran iv dose 0.15 mg/kg (Ac Em Med).