

Gastroenteritis Guideline – as part of the Nasogastric Rehydration Project:

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Definition of gastroenteritis: Inflammation of the gastrointestinal tract manifesting as a decrease in the consistency of stools (loose or liquid) and/or an increase in the frequency of evacuations (typically ≥ 3 in 24 hours), with or without fever or vomiting (1).

Inclusion Criteria:

- Children 6 months - 3 years old with suspected acute gastroenteritis.

Likely Exclusion Criteria: *Discuss all such cases with a Senior Doctor.*

- < 6 months (<8Kg)
- Isolated vomiting – consider differential (e.g. UTI, appendicitis, acute surgical causes etc)
- Short gut syndrome
- Ileostomy
- Complex/cyanotic congenital heart disease
- Renal transplant or renal insufficiency
- Poor growth
- Use of fortified feeds
- Recent overuse of potentially hypertonic fluids (e.g Lucozade)
- Other chronic disease
- Repeated presentations for same/similar symptoms

Red Flags! *Not Suitable for NG Rehydration – consider IV fluid resuscitation and discuss with Senior Doctor immediately.*

- Appears very unwell (shocked)
- Severe abdominal pain
- Signs of peritonism
- Signs of sepsis
- Bloody diarrhoea
- Bilious vomiting

Suspect **hypernatraemic dehydration** if any of the following are present:

- Jittery movements
- Increased muscle tone
- Hyperreflexia
- Convulsions
- Drowsiness or coma

Clinical assessment should include consideration of red flag features, hypoglycaemia, and an estimation of dehydration.

Always consider alternative diagnoses in the child with isolated vomiting or severe abdominal pain.

Children with significant hypoglycaemia (<2mmol or altered consciousness) should proceed straight to IV therapy.

Estimating degree of dehydration: The use of clinical signs to calculate a precise fluid deficit is known to be inaccurate. The gold standard for precise calculation of body water deficit from dehydration relies on the difference between current naked body weight and pre-morbid weight. As this is often not available, clinical signs may be useful to give an estimation of the child's volume deficit (2-5). Prolonged CRT, abnormal skin turgor, abnormal respiratory pattern are the best individual examination measures for predicting >5% dehydration (6).

Mild Dehydration (<4%):

Typically, no clinical signs
May have increased thirst

Moderate Dehydration (4-6%):

Prolonged CRT >2sec
Abnormal skin turgor
Increased respiratory rate

Severe Dehydration / Clinical Shock:

Decreased LOC
Mottled
Cool peripheries
Hypotension, Tachycardia, Tachypnoea
Very prolonged CRT >3sec

Treatment approach:

1. **Rehydration regimens** – Children with no/mild dehydration can be discharged home immediately after ORT education. Patients with moderate dehydration should be considered for NG rehydration in the event of ORT failure. Oral, nasogastric (NG), or intravenous (IV) rehydration regimens are detailed below
2. **Consider single dose ondansetron** (0.1mg/Kg) – Evidence suggests reduced need for IV or hospital admission with oral/IV dosing (6). However, a retrospective observational study examining whether the increased use of ondansetron led to decreased IV rehydration and admission showed no difference before and after the adoption of a high use ondansetron policy (7). Avoid if <6months (<8Kg), known prolonged QTc, patient taking QTc-prolonging medications, or hypokalaemia / hypomagnesaemia.
3. **Dietary considerations** - Children who are not dehydrated should continue to eat a regular diet. Those who are moderate-severely dehydrated should be encouraged to recommence a regular diet once rehydrated and orally tolerant. Regular diet is generally more effective than restrictive diets and has consistently been shown to produce a reduction in the duration of the diarrhoea (8). Children with diarrhoea who are fed throughout the illness lose less weight and recover more quickly.

Oral Rehydration Therapy in the ED: ORT works via the sodium glucose co-transport mechanism, which optimises intestinal absorption of water. Utilising the correct electrolyte solution is critical for its success. Suggested fluids include ORS (e.g. Dioralyte) or ½ apple juice / water.

- Aim for 10-20 mls/kg fluid over 1st hour
- Give frequent small amounts every 5mins (1ml/kg every 5mins)
- Increase volume by 1-2ml/kg for ongoing losses in the ED

ORT Failure: 2 or more vomits after Ondansetron and/or refusal to take from syringe/cup for more than 30 minutes or less than 5ml/kg ORT after 60min.

Proceed to NG rehydration unless signs of shock (IV).

*****ALL PATIENTS WITH SIGNS OF SHOCK OR SEVERE ILLNESS SHOULD PROCEED DIRECTLY TO INTRAVENOUS RESUSCITATION AND SENIOR DOCTOR REVIEW *****

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NG Rehydration Protocol:

Introduction: Delivery of ORS via nasogastric tube has been shown to be safe and effective in the treatment of children with gastroenteritis, with lower rates of complications and a decrease in overall hospital stay when compared to intravenous therapy (9). Nasogastric rehydration (NGR) should be considered in any child under 3 years of age with moderate dehydration who is refusing ORS, has intractable vomiting/diarrhoea, or who has failed a trial of ORT. It has persisted as the preferred mode of rehydration for this group in numerous guidance sources today (2,3,5). ORS is the fluid of choice for administration via NG tube (e.g. Dioralyte)

Inclusion criteria: Children aged 6 months – 3 years with moderate dehydration and a clinical diagnosis of acute gastroenteritis who have failed ORT, refused to drink or have significant ongoing losses while in the ED.

Planning for NG insertion: All necessary equipment and a copy of the NG tube insertion SOP will be stored in a designated box in the Paediatric Area of ED. Please take time to explain to patients and parents the rationale for this treatment and ensure consent is acquired per normal practice standards. The use of age-specific distraction techniques before and during the process of insertion is encouraged. Please ensure availability of the appropriate fluid pump prior to NG insertion.

Approach to NG rehydration: An initial rapid rehydration regimen of 25ml/Kg/hr is recommended – a weight-based guide to hourly infusion rates is included below. Rehydration is expected to take 2-4hrs. Once rehydrated, commence maintenance fluids until the child is orally tolerant again. Ensure the child is eating and drinking satisfactorily to keep up with ongoing losses prior to removal of the NG tube.

** Slower rates of NG rehydration may be considered in certain cases involving younger patients, those with significant comorbidities or severe abdominal pain. All such cases should be discussed with a Senior Doctor.*

*** We recommend considering smaller volume rates of NG rehydration in patients less than 10Kg (e.g. 10ml/Kg/hr) – please seek senior guidance at the time of prescribing fluid regimens for these patients.*

Weight	mls/hr	Infusion Time
10 kg	250	4 hrs
12 kg	300	4 hrs
14 kg	300	4.5 hrs
16 kg	300	5 hrs
18 kg	300	6 hrs
20 kg	300	6.5 hrs

Table 1: Weight-based hourly infusion rates for nasogastric rehydration (3).

Approach to ongoing vomiting despite NGR: Most children will cease vomiting shortly after NG placement and commencement of rehydration. In the rare instance of ongoing vomiting, consider single dose Ondansetron or slowing the rate of NG fluid being administered.

Treatment failure: If despite slowing of NG fluid rate vomiting persists, diarrhoea is still profuse, or patients complain of significant abdominal pain consider switching to IV fluid therapy.

Monitoring Rehydration: The following parameters should be considering while reviewing patients undergoing NG rehydration:

- Vital signs
- Clinical appearance
- Ongoing losses
- Worsening abdominal pain
- Suboptimal (<4%) weight gain

Patients who assess as well in these categories and are orally tolerant can be considered for discharge home with ongoing rehydration and red flag advice.

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- 9) Fonseca BK, Holdgate A, Craig JC. Enteral vs intravenous rehydration therapy for children with gastroenteritis: a meta-analysis of randomized controlled trials. *Arch Pediatr Adolesc Med.* 2004 May;158(5):483-9

Intravenous fluid therapy – to follow

Hypernatraemic dehydration – to follow

Discharge plan and health info – to follow

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