PEDIATRIC EMERGENCY DEPARTMENT CLINICAL GUIDELINE: DEHYDRATION-REHYDRATION

Population:
- Patients with vomiting and diarrhea totaling 10 or more
  (* The decision to use the number 10 is arbitrary, not an absolute)

History and Physical Examination:
- Rapid Cardiopulmonary assessment
- Evaluation of degree of dehydration (general appearance/level of consciousness, breathing pattern, capillary refill, skin turgor/recoil) [TABLE 1]
- Description of vomitus (bilious, nonbilious, blood-tinged)
- Description of diarrhea (voluminous, watery, bloody, etc.)
- Focused examination for evidence of intestinal obstruction (distention, BS, tenderness)
- General Examination for evidence of focal infection
- Estimation of urine output (frequency, color, amount)
- Describe home therapy thus far (type of fluid, amts, frequencies, successes/failures)

Diagnostic evaluation:
- Other than bedside glucose testing and urine dip, diagnostics are usually not necessary
- Individual workup will vary depending on the clinical scenario
- Factors favoring ordering of a urinalysis:
  - Girls - under 2yrs with fever w/o a source (i.e., vomiting but no diarrhea);
  - Boys - circumcised under 6mo with a fever w/o a source (or uncirc’d under 12mo with a fever w/o a source); or
  - Symptomatic (burning with urination), or Hx of UTI’s
- Factors favoring ordering of a BMP (electrolytes, BUN, creatinine, glucose):
  - Infants under 6 months
  - Ill-appearing children who are likely to be admitted
  - Children with bloody diarrhea (risk of HUS 2’ to E.coli 0157)
  - Children requiring IV fluid rehydration
- Factors favoring ordering of a CBC and BCx (least common):
  - Ill-appearing children with fever who are likely to be admitted
  - Children with significant co-morbidities or immunocompromise

Important Caveats:
- In general this Clinical Guideline is intended for simple, uncomplicated gastroenteritis (GE)
- It assumes that there is no evidence of intestinal obstruction
- It assumes that the vomiting is non-bilious
- It assumes that (in general) the child is greater than 6 months of age and that no other serious pathologies are being considered
- It assumes that there are no other significant co-morbidities (congenital heart disease, congestive heart failure, liver disease, kidney disease)

Therapeutic Interventions:
- Determine first whether clinical dehydration exists, not all children with vomiting and diarrhea have clinical dehydration.
If dehydration does not exist, there is usually little need for a “PO Trial.” In contrast, it is usually more helpful to spend time teaching the concept and importance of ORT to the parent/guardian from a maintenance standpoint – i.e., the prevention of dehydration.

If dehydration does exist, decide which method of rehydration will be preferable

**ORT (Oral Rehydration Therapy)** may be the method of choice if:
- If diarrhea is the main component, rather than vomiting
- If the child has been taking PO consistently and is still willing to do so
- If the child has not yet tried a formal ORT regimen

**IRT (IV Rehydration Therapy)** may be the method of choice if:
- If the child has already tried and failed a formal ORT regimen
- If the child has specifically been sent in by a pediatrician with the request for IVF’s
- If the child has recently vomited in ED and/or is refusing to take PO
- If the child appears severely dehydrated or ill in appearance

**MEANS OF REHYDRATION**

**ORT (Oral Rehydration Therapy)**
- Choose appropriate isotonic oral solution (Pedialyte®, Gatorade®, Rehydralyte®)
  - Must be proscribed amount at specific timed intervals
  - Options include 5, 10 or 15cc’s at 1,2 or 5 min intervals
  - Amounts and intervals are based on the age/size of the child and the total volume to be delivered in 1 hr.
  - A reasonable goal is 10cc/kg/hr
  - Requires initial teaching of the parent by either the resident or nurse, and then all of the remaining ORT is done by the parent/guardian

**IRT (IV Rehydration Therapy)**
- Establish IV access (check bedside glucose, obtain tubes for labs – either send or hold)
  - Bolus NS 40cc/kg over 1-2hrs, followed by
  - Continuous infusion D5NS @ 2x maintenance (2400cc/m²/d)

**Antiemetics**
- May consider Ondansetron (Zofran®) 0.15 mg/kg IV (max 4mg)
- Less sedating and fewer side-effects (dystonia) compared to phenergan/compazine
- More expensive short-term, but associated with fewer admissions and bounce-backs
- Should only be used after the possibility of obstruction has been eliminated

**Disposition assignment:**
- Admission recommended for:
  - Ill-appearing children
  - Age less than 3 mo (or less than 6 mo if significant prematurity)
  - Any age if significant co-morbidity
  - Ongoing volume loss (vomiting/diarrhea), or failure to tolerate PO fluids
  - Evidence of poor adherence to recommended therapy or inadequate follow-up
Table 1. Clinical Criteria Commonly used for Classifying Dehydration Severity

<table>
<thead>
<tr>
<th></th>
<th>Mild (3-5%)</th>
<th>Moderate (6-9%)</th>
<th>Severe (&gt; 10%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Appearance/</td>
<td>Well-appearing</td>
<td>Ill-appearing, non-toxic</td>
<td>Lethargic, toxic</td>
</tr>
<tr>
<td>Level of consciousness*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heart Rate</td>
<td>Normal to increased</td>
<td>Tachycardic</td>
<td>Marked tachycardia</td>
</tr>
<tr>
<td>Breathing pattern*</td>
<td>Normal</td>
<td>Increased</td>
<td>Increased, deep</td>
</tr>
<tr>
<td>Pulses</td>
<td>Normal quality</td>
<td>Normal to decreq quality</td>
<td>Poor quality</td>
</tr>
<tr>
<td>Capillary refill*</td>
<td>Normal (&lt; 2 sec)</td>
<td>Normal to sl prolonged (2-4 sec)</td>
<td>Markedly prolonged</td>
</tr>
<tr>
<td>Perfusion</td>
<td>Warm</td>
<td>Cool</td>
<td>Cold, mottled</td>
</tr>
<tr>
<td>Blood pressure</td>
<td>Normal</td>
<td>Normal</td>
<td>Hypotensive</td>
</tr>
<tr>
<td>Eyes</td>
<td>Normal</td>
<td>Slightly sunken</td>
<td>Very sunken</td>
</tr>
<tr>
<td>Tears</td>
<td>Normal</td>
<td>Decreased</td>
<td>Absent</td>
</tr>
<tr>
<td>Mucous membranes</td>
<td>Moist</td>
<td>Tacky</td>
<td>Very Dry</td>
</tr>
<tr>
<td>Skin turgor/recoil*</td>
<td>Instant recoil</td>
<td>Delayed (2 sec)</td>
<td>Very prolonged (&gt; 2 sec)</td>
</tr>
<tr>
<td>Urine output</td>
<td>Normal to slightly decreased</td>
<td>Decreased</td>
<td>Minimal</td>
</tr>
</tbody>
</table>

Adapted as a composite from WHO 1995, Gorelick 1997, Friedman 2004

* 4 items with the highest predictive value for dehydration: general appearance, breathing pattern, capillary refill, and skin turgor/recoil
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REFERENCES:


DISCLAIMER:
This clinical guideline has been developed for the purpose of unifying the general emergency care of patients with dehydration. It is intended to aid, rather than substitute for, professional judgment. It is not intended to serve as a rigid protocol or a written proxy for the standard of care. Failure to comply with this guideline does not represent a breach of the standard of care.