Pediatric Dehydration Clinical Pathway

February 2021

Outcomes/Goals	**1.** Effective use of oral rehydration therapy for moderate dehydration **2.** Decrease IV hydration and hospital admissions with aggressive ORT
NURSE	Chief complaint. Onset of nausea/vomiting/diarrhea. Document type and amount of PO intake, number episodes of vomiting and/or diarrhea in the last 24 hours, number wet diapers in last 24 hours. Physical assessment: general appearance or LOC, capillary refill time, skin turgor, absence of moist mucous membranes and/or tears, abnormal respiratory pattern, fontanel, and/or sunken eyes. Initiate isolation if suspected infectious process.
Inclusion Criteria	• Pediatric patients < 20 years old with reported history of vomiting or diarrhea
Exclusion Criteria	• <6 months old, bloody diarrhea, bilious emesis, hypo- or hypernatremia, comorbid conditions (metabolic disorder, cardiac disease, etc.), suspected surgical process
INTERVENTIONS On arrival	ESI Triage I – IV, depending on severity of dehydration Isolation: contact or contact plus Full set of vitals Ondansetron ODT/PO -- Do not give to infants <6 months, see dosing below Initiate ORT if patient has moderate dehydration Place topical Lidocaine (LMX) or order J-tip in anticipation of peripheral IV start Place on monitor if ill appearing Weigh all diapers / document I/O
DIAGNOSTICS	Bedside CBG for moderate to severe dehydration, altered mental status, or lethargic BMP, UA, Stool culture – if indicated
PHYSICIAN (LIP)	
PO Fluids	**ORT PER PROTOCOL** **<10 kg** 5 mL every 5 min (for 20 minutes total) - If tolerated, then advance to 10 mL every 5 minutes (reassess in 30-60 min) **≥10kg** 10 mL every 5 min (for 20 minutes total) - If tolerated, then advance to 20 mL every 5 minutes (reassess in 30-60 min) **≥30kg** 30mL every 5 min (for 40 minutes total) - if tolerated, advance to 60mL every 5 minutes (reassess in 30-60 min) **If emesis after/during first 20 minutes, hold PO for 20 minutes** - Consider additional dose of Ondansetron - Restart ORT after 20 minutes **Document all I/O**
IV Fluids (if indicated)	NS bolus 20 mL/kg x 2. Reassess between boluses for effectiveness. Consider starting with 10 mL/kg boluses for neonates, cardiac, frail, and/or malnourished infants and reassess in between boluses for effectiveness.
Medication Anti-emetics Dextrose (hypoglycemia)	Ondansetron dosing guidelines: Oral dose: 7-14 kg: 1-2 mg 15-26 kg: 2-4 mg >27 kg: 8 mg IV dose: 6 months – 18 years of age: 0.1 -0.2 mg/kg/dose (max 8 mg) D10W bolus 2-5ml/kg bolus, then D5 0.45-0.9NaCl + 20KCl maintenance PRN
ADMISSION	Admit to pediatric ward vs PICU, as appropriate Prepare family/infant for admission process
Discharge Criteria	• Demonstrated ability to tolerate adequate PO fluids • Parents instructed on and able to continue further oral rehydration at home • Vital signs stable / no clinical signs of shock/hypovolemia • Assessment at or near baseline for LOC

Clinical Pathway Decision Making Process: Pediatric Dehydration

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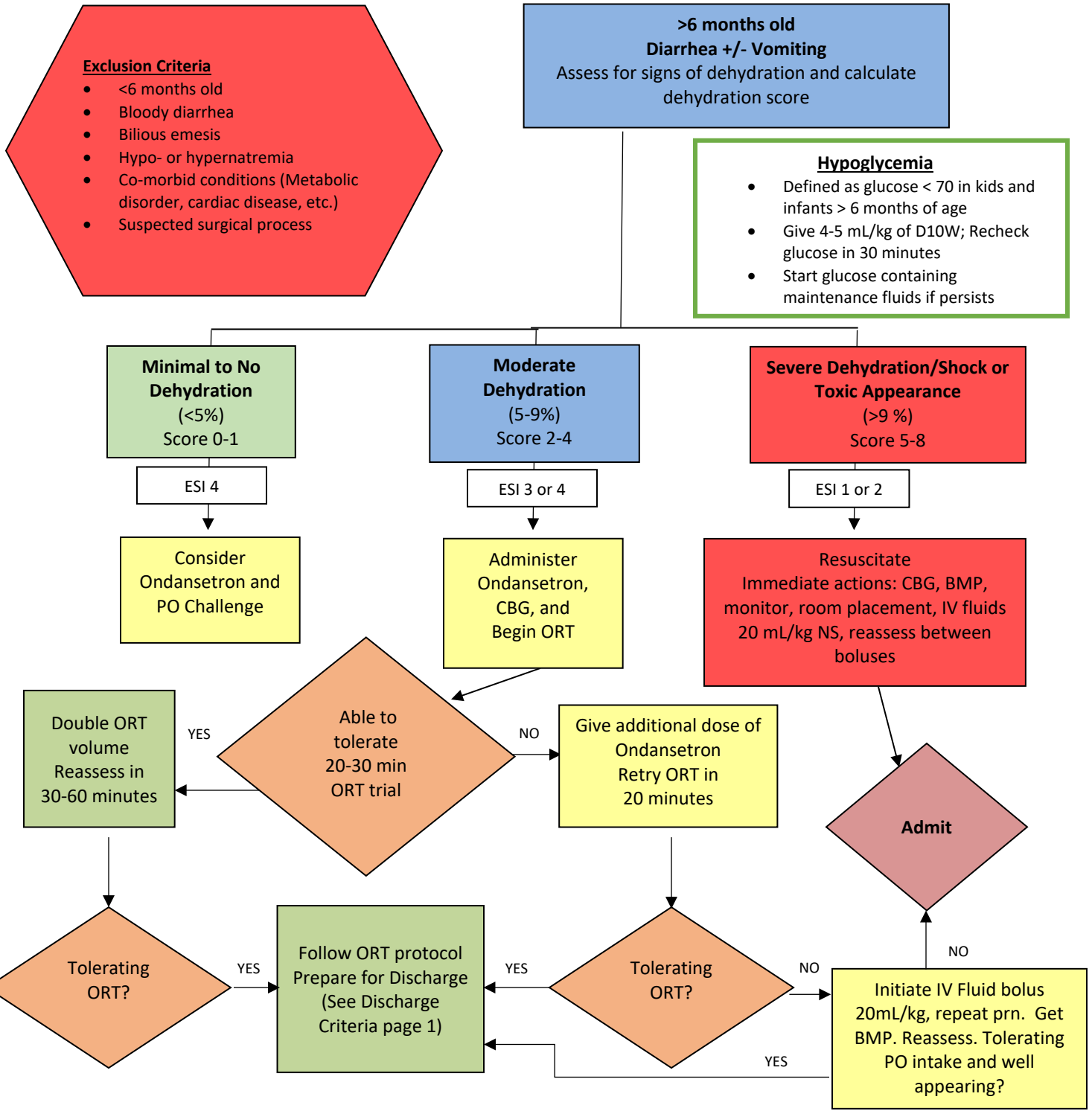

Oral Rehydration

- Children with no/mild dehydration can be discharged home after successful PO trial and education
  <10 kg 5 mL every 5 min (for 20 minutes total): If tolerated, advance to 10mL every 5 minutes (reassess in 30-60 min)
  ≥10kg 10 mL every 5 min (for 20 minutes total): If tolerated, advance to 20 mL every 5 minutes (reassess in 30-60 min)
  ≥30kg 30mL every 5 min (for 40 minutes total): if tolerated, advance to 60mL every 5 minutes (reassess in 30-60 min)

Definition of Oral Rehydration Failure

- Emesis after second Ondansetron dose OR Refusal to take from syringe/cup for > 30 minutes

Pediatric Dehydration: Goals of Clinical Pathway

1. Rapid identification and treatment of children with moderate to severe dehydration
2. Effective use of oral rehydration therapy per protocol for moderate dehydration prior to intravenous therapy
3. Team-oriented approach to efficient, timely evaluation and workup
4. Decrease hospital admissions due to care in ED and parental education for at-home care

Data Considerations	Interventions	Rationale
Anti-emetics	Ondansetron	Gastroenteritis accounts for more than 1.5 million pediatric outpatient visits and 200,000 hospitalizations annually. Vomiting limits the success of oral rehydration. Physicians are more likely to choose intravenous over oral rehydration when vomiting is a major symptom. Ondansetron (Zofran) is a safe, effective anti-emetic that improves the success of ORT. Children receiving ondansetron are less likely to vomit, vomit less often, have greater oral intake and are less likely to be treated by intravenous rehydration in multiple studies.
Rehydration	Oral Rehydration Therapy (ORT)	Despite the fact that ORT is the preferred method of rehydration the full benefits of ORT for acute gastroenteritis have not been realized in developed countries. ORT is widely available, effective, safe and cost-effective, but continues to be underutilized. Indeed, ORT has even been demonstrated to be faster than intravenous therapy (IVT). Although Intravenous fluids (IVF) are sometimes necessary for severely dehydrated children and the rare child that does not respond to ORT, IVT is often initiated before adequate attempts at oral rehydration have failed. Gastrostomy and nasogastric tubes can be effectively used to administer ORS.

Table 1. Dehydration Score

Point Value for Calculation	0	1	2
Appearance	Normal	Thirsty, Restless, or lethargic but irritable when touched	Drowsy Limp, cold, or sweaty, +/- comatose
Eyes	Normal	Slightly sunken	Very sunken
Mucous Membranes (tongue)	Moist	Sticky	Dry
Tears	Tears	Decreased tears	Absent tears
Point values are added up to obtain a final score. Zero indicates no dehydration; 1-4 mild dehydration; 5-8 indicates moderate to severe dehydration.			

Adapted from: Hendrickson et al, *Pediatric Emergency Care,* 2018; 34: 227–232

Table 2. Further Estimating the Degree of Dehydration

Dehydration	***Minimal to none***	***Mild to Moderate***	***Severe***
Weight Loss	<3-5%	5-9%	>9%
Mental Status	Well, alert	Normal, fatigued or restless, irritable	Apathetic, lethargic, unconscious
Thirst	Normal, may refuse	Thirsty, eager to drink	Drinks poorly, unable to drink
Heart rate	Normal	Normal to increased	Increased
Quality of pulses	Normal	Normal to decreased	Weak, thready, or impalpable
Breathing	Normal	Normal; fast	Deep
Mouth and Tongue	Normal, moist	Dry	Parched
Eyes	Normal	Slightly sunken	Deeply sunken
Tears	Present	Decreased	Absent
Skin fold	Instant recoil	Recoil in <2 seconds	Recoil in >2 seconds
Capillary Refill	Normal	Prolonged	Prolonged; minimal
Extremities	Warm	Cool	Cold, mottled, cyanotic
Urine output	Normal to decreased	Decreased	Minimal

Adapted from: https://www.cdc.gov/mmwr/preview/mmwrhtml/rr5216a1.htm#tab1

Table 3.

Risk Factors for Dehydration or More Severe Illness

- Young age (e.g., aged <6 months) or weight <8.5kg
- Premature birth, history of chronic medical conditions or concurrent illness
- Fever >38 °C (100.4 °F) for infants aged <3 months or >39 °C (102.2 °F) for children aged 3–36 months
- Visible blood in stool
- High output diarrhea, including frequent and substantial volumes of stool
- Persistent vomiting
- Caregiver's report of signs consistent with dehydration (e.g., sunken eyes or decreased tears, dry mucous membranes, or decreased urine output)
- Change in mental status (e.g., irritability, apathy, or lethargy)
- Suboptimal response to oral rehydration therapy already administered or inability of the caregiver to administer oral rehydration therapy

References:

1. Bellemare, S., Hartling, L., Wiebe, N., et al. Oral rehydration versus intravenous rehydration therapy for treating dehydration due to gastroenteritis in children. *The Cochrane Database of Systematic Reviews*. 2003.
2. Freedman S.B., Oleszczuk S.A., Gouin S, et al. Treatment of acute gastroenteritis in children: an overview of systematic reviews of interventions commonly used in developed countries. *Evidenced Based Child Health*, 2013. 8:1123-1137.
3. Friedman JN, Goldman RD, Srivastava R, et al. Development of a Clinical Dehydration Scale for Use in Children between 1 and 36 Months of Age. *Journal of Pediatrics, 2004*(145), 201-207.
4. Hendrickson MA, Zaremba J, Wey AR, et al. The Use of a Triage-Based Protocol for Oral Rehydration in a Pediatric Emergency Department. Pediatr Emerg Care. 2018 Apr;34(4):227-232.
5. Rutman L, Klein EJ, Brown JC. Clinical Pathway Produces Sustained Improvement in Acute Gastroenteritis Care. Pediatrics. 2017 Oct;140(4):e20164310.
6. Steiner, M.J. DeWalt, D.A., Byerley, J.S. Is this child dehydrated? *JAMA* (2004). 291 (22), pp 2746-54.