Acute Gastroenteritis/Dehydration

ED Clinical Pathway

Nationwide Children's — When your child needs a hospital, everything matters.

Center for Clinical Excellence

Inclusion Criteria:

- Age ≥3 mos
- Vomiting and/or diarrhea of recent onset not due to chronic disease, with or without fever, nausea, or abdominal pain

Exclusion Criteria:

- Age <3 mos
- Toxic appearance
- Diarrhea >14 days
- Bloody diarrhea
- Comorbid conditions
- Bilious emesis
- On diuretic therapy
- Hyper- or Hyponatremia
- Acute surgical abdomen

Is an accurate **pre**-illness weight available to determine dehydration severity?

Yes

Weight- based % dehydration
(most accurate)
[(Pre-illness wt – Current wt) ÷ Pre-illness wt] x 100 = % fluid deficit

No

Table of Clinical Findings

1. Poor overall appearance
2. Capillary refill >2 seconds
3. Abnormal respirations
4. Decreased skin elasticity
5. Absent tears
6. Dry mucous membranes
7. Sunken eyes
8. Abnormal radial pulse
9. Tachycardia
10. Decreased urine output

Minimal to No Dehydration
(<5%)
<3 Findings

Moderate Dehydration
(5-9%)
3-6 Findings

Extreme Dehydration
(≥10%)
≥ 7 findings

Off Pathway
Individualized Management

Tolerates PO?

No

- POC glucose level. Treat glucose < 70.
- Ondansetron. Wait 15-20 minutes. Consider holding if chief complaint is diarrhea.
- Oral Challenge. Consider using SIP Sheet.

Passed oral challenge?

Yes

No

- Consider Ondansetron if not already given or tolerated.
- Place NG or PIV; consider checking electrolytes if placing PIV.

NG or IV Fluid Rehydration

- Pedialyte NG (20ml/kg over 60 mins (Max dose 600ml) isotonic (LR or NS) IV fluid bolus, 20ml/kg (Max dose 1L). Repeat once if needed based on reassessment of VS and clinical findings.

Ready for oral challenge?

Consider using SIP Sheet

No

Admit for IV/NG Fluid Therapy

See IP IV Fluid Therapy Pathway

Yes

Passed oral challenge?

Yes

Yes

Ready for Discharge:

- Discharge instructions: Encourage oral rehydration at home for 4-6 hours then resume regular diet.
- ED Acute Gastroenteritis discharge instructions, ORT Helping Hands and SIP sheet.
- Follow-up with PCP as indicated.
- Consider ondansetron home-going prescription.

Recommended Treatments

Treatments NOT Recommended

Signs of Deterioration

- Vital sign instability
- AMS/somnolence/ lethargy
- Severe abdominal pain
- Bilious emesis
- Bloody diarrhea
- Hypoglycemia
- Fluid overload

Diagnostic Timeout

Definition & Diagnosis

- Acute gastroenteritis is a **diarrheal disease** of rapid onset, with or without accompanying symptoms and signs, such as nausea, vomiting, fever, or abdominal pain.
- Acute gastroenteritis is a clinical diagnosis based on history and exam.

Differential Diagnoses

- Inflammatory bowel disease
- Increased intracranial pressure (especially with vomiting only)
- Bowel obstruction
- Intussusception
- Extra-intestinal infection
- Appendicitis
- Food-borne illness
- Urinary tract infection
- Ingestion
- Allergic reaction

Red Flags

- Recurrent oral ulcers
- Bloody diarrhea
  - Red currant jelly stools
- Frequent urination
- Urine discoloration
- Constipation
- Abdominal distention
- Sudden pain in lower right side of abdomen
- Blurred vision
- Headache (and/or confusion)
- Petechial rash

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Dehydration Assessment

Percent Fluid Deficit: The gold standard for determining severity of dehydration should be determined by calculating percent fluid deficit (*Evidence Quality: Moderate; Recommendation Strength: Strong)*:

$$\frac{Pre-illness\ weight - Current\ weight}{Pre-illness\ weight} \times 100$$

Clinical Findings: If an accurate pre-illness weight is unavailable, the level of dehydration needs to be based on clinical findings. *Evidence Quality: Moderate; Recommendation Strength: Strong*

1. Poor overall appearance
2. Capillary refill >2 seconds
3. Abnormal respirations
4. Decreased skin elasticity
5. Absent tears
6. Dry mucous membranes
7. Sunken eyes
8. Abnormal radial pulse
9. Tachycardia
10. Decreased urine output

Severity	Fluid Deficit	Estimated # of Clinical Findings
No Dehydration	0%	0
Mild Dehydration	<5%	<3
Moderate Dehydration	5-9%	3-6
Severe Dehydration	≥10%	≥7

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Testing

- **Point of care blood glucose level** is recommended during initial assessment and if patient with moderate dehydration. *Evidence Quality: Moderate; Recommendation strength: Weak*
- **Basic metabolic panel** is recommended at the time of IV placement, if moderate dehydration by clinical assessment. *Evidence Quality: Moderate; Recommendation strength: Weak*
- **EKG or laboratory testing** is not recommended prior to administration of a single dose of ondansetron in a previously healthy patient with mild to moderate dehydration due to gastroenteritis. *Evidence Quality: Moderate; Recommendation Strength: Strong*
- **GI film array and stool studies** are not recommended in previously healthy children with uncomplicated gastroenteritis. *Based on Consensus decision. Agree with ESPGHAN/ESID Guidelines.*

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Hypoglycemia Treatment

If patient is able to tolerate oral intake:

- 0.5 ml/kg to a maximum of 15g of glucose gel should be given.
- Recheck blood glucose in 15 minutes.
- Repeat oral carbohydrates if blood glucose is < 70.
- Once blood glucose is above 70, check blood glucose hourly until levels are stable.

If patient is not able to tolerate oral intake:

- Place IV and administer 10% Dextrose 2-4ml/kg bolus (max 250ml).
- Recheck blood glucose in 15 minutes.
- Repeat 10% Dextrose 2-4ml/kg bolus if blood glucose is < 70.
- Once blood glucose is above 70, check blood glucose hourly until levels are stable.

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Ondansetron Dosing

For infants ≥6 months, children, and adolescents:

Oral (ODT):
≥8 kg to 15 kg: 2 mg once

15 to 30 kg: 4 mg once

>30 kg: 4-8 mg once

The dose may be repeated if the patient vomits within 15 minutes of administration.

IV:
0.15mg/kg/dose once, up to max of 8 mg

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Oral Challenge

Oral Challenge Readiness
No strict criteria has to be met
Potential indicators for readiness for oral challenge:

- Interested in PO
- Awake
- ≤1 episode of vomiting in last 4 hours
- Intake>Output

ED
Patients should be evaluated after ondansetron administration and/or after fluid bolus administration.

Inpatient
Patients should be evaluated at a minimum of every 4 hours.

How to Use Satisfactory Intake Plan (SIP) sheet
1. Identify what volumes are indicated for Phase 1 and 2 based off of age of patient.
2. Write in the volumes in the blank spaces for phase 1 and 2.
3. Provide tool, syringe/cup, and desired fluid to families.
4. Instruct families on how to use the tracking tool.

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Satisfactory Intake Plan (SIP) Sheet

Your child is getting a plan for taking fluids by mouth. A satisfactory intake plan (SIP) is designed to help your child take enough fluids to treat and prevent dehydration. Your child will drink fluids that contain small amounts of sugar and salts.

How to Use the SIP Sheet:

- Using the chart below, your provider will tell you how much fluid is needed for Phase 1 and 2 of SIP. This is decided based on the age of your child.
- Your provider will write in the mL volume your child needs to drink in the blank spaces for phase 1 and 2.
- Your provider will direct you to use a syringe or cup and provide the fluid for you to use.
- They will explain how to use the tracking tool. Ask if you have any questions.

Age	Phase 1	Phase 2
6 – 12 months	5 mL	10 mL
12 months – 3 years	10 mL	20 mL
>3 years	15 mL	30 mL

Recommended Fluids: Half-strength apple juice, Gatorade™/Powerade®, formula, electrolyte solution (example: Pedialyte®), water, breast milk.
Note that a 4 fl. oz. Popsicle® = 120mL.

Phase 1:

- Fill a syringe/cup to the _____ mL mark with fluid.
- Give your child _____ mL of fluid every 5 minutes.
- Draw an 'X' in the box each time your child drinks without throwing up.
- Repeat 3 more times.
- If your child successfully completes phase 1, move onto phase 2.

Phase 1	5 minutes	5 minutes	5 minutes	5 minutes
Record the Time				
_____mL every 5 minutes				

Phase 2:

- Fill a syringe/cup to the _____ mL mark with fluid.
- Give your child _____mL of fluid every 5 minutes.
- Draw an 'X' in the box each time your child drinks without throwing up.
- Repeat 3 more times.

Phase 2	5 minutes	5 minutes	5 minutes	5 minutes
Record the Time				
_____mL every 5 minutes				

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Discharge Criteria

- Improved clinical status
- Tolerating fluids or regular diet
- IV/NG fluids not needed
- Adequate family teaching completed
- Follow-up available

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Recommended Treatments

Triage dose of Ondansetron
Ondansetron can be considered to be given in triage to a patient with active vomiting who meets the inclusion criteria* and based on discussion with nurse and provider.
Evidence Quality: Weak; Recommendation Strength: Weak

Ondansetron
Oral or IV Ondansetron, on a weight-based regimen of 0.1-0.15 mg/kg/dose (up to a max of 8mg) is recommended for management of vomiting associated with gastroenteritis in previously healthy patients with no underlying medical problem. Ondansetron can be given in patients ≥6 months or ≥8 kg.
Evidence Quality: Moderate; Recommendation Strength: Strong

Oral Rehydration Therapy
Oral rehydration therapy (ORT) should be attempted for all patients with mild to moderate dehydration due to acute gastroenteritis. The Satisfactory Intake Plan (SIP) sheet (appendix A*) should be used to guide oral rehydration challenge. Instructions for nursing staff to assess for readiness for PO and how to initiate oral rehydration challenge found in appendix B*. Hypo-osmolar ORT solution achieves a quicker resolution of dehydration than iso-osmolar solution. Palatability needs to be taken into consideration when fluid is given PO.
Evidence Quality: Moderate; Recommendation Strength: Strong

Intravenous fluid
Intravenous (IV) fluid is recommended for patients with acute gastroenteritis who do not tolerate oral rehydration challenge.

- In the ED: A bolus of 20 ml/kg (max 1000 mL) of isotonic fluid should be administered for patients who do not tolerate rehydration challenge. An additional bolus may be given if no clinical improvement with first bolus.
- In the Hospital: After initial clinical assessment on admission, an additional isotonic fluid bolus may be administered if indicated. If bolus is not indicated, give IV dextrose containing isotonic fluids at maintenance rate. Once patient is ready for oral challenge reduce fluids to KVO (keep vein open) @ 5mL/hour.

Evidence Quality: Weak; Recommendation Strength: Moderate

Choice of Nasogastric (NG) Route for Rehydration
NG rehydration is a safe and effective way to provide hydration to patients who do not tolerate oral challenge. Evidence shows that NG placement is less labor intensive and associated with less complications compared to IV fluids. Parents and patients should be involved in the decision making of how to rehydrate their child. If decision is made to move forward with NG placement, placement should be confirmed per hospital policy.

- In the ED: A bolus of 20 ml/kg (max 600 mL) of Pedialyte may be administered over 60 minutes for patients who do not tolerate oral rehydration challenge. An additional bolus may be given if no clinical improvement with first bolus.
- In the Hospital: After initial clinical assessment on admission, an additional Pedialyte fluid bolus may be administered if indicated. If bolus is not indicated, give Pedialyte at maintenance rate.

Evidence Quality: Strong; Recommendation Strength: Strong

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Treatments Not Recommended

- **Use of anti-motility agents** is not recommended for routine management of acute diarrhea. They do not appreciably decrease stool volume in young children and may cause paralytic ileus and prolong infection by delaying elimination of the causative organisms. *Agree with ESPGHAN/ESID Guidelines.*
- **Lactobacillus** is not routinely recommended in acute gastroenteritis as current evidence is inconclusive. Two large randomized control trials failed to demonstrate benefit or harm compared to placebo. *Evidence Quality: Moderate; Recommendation: Weak*
- **Antibiotics** are not recommended for children with acute gastroenteritis. The cases for which antimicrobials should be considered include serious bacterial infection or evidence of infection with Giardia lamblia or Cryptosporidium. *Agree with ESPGHAN/ESID Guidelines.*
- **Change in diet** such as restrictive or progressive diets (example: BRAT diet), a clear liquid diet, or a lactose-free formula (unless previously-known lactose intolerance) is not recommended. *Agree with ESPGHAN/ESID Guidelines.*

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References

- Guarino A, Ashkenazi S, Gendrel D, et al. European Society for Pediatric Gastroenterology, Hepatology, and Nutrition/European Society for Pediatric Infectious Diseases evidence-based guidelines for the management of acute gastroenteritis in children in Europe: update 2014. *J Pediatr Gastroenterol Nutr*. 2014;59(1):132-152. doi:10.1097/mpg.0000000000000375.

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Origination Date: *December, 2019*

Last Revision Date: *April, 2024*

Next Revision Date: *April, 2029*

Clinical Pathway Development

This clinical pathway was developed using the process described in the NCH Clinical Pathway Development Manual Version 6, 2022. Clinical Pathways at Nationwide Children's Hospital (NCH) are standards which provide general guidance to clinicians. Patient choice, clinician judgment, and other relevant factors in diagnosing and treating patients remain central to the selection of diagnostic tests and therapy. The ordering provider assumes all risks associates with care decisions. NCH assumes no responsibility for any adverse consequences, errors, or omissions that may arise from the use or reliance on these guidelines. NCH's clinical pathways are reviewed periodically for consistency with new evidence; however, new developments may not be represented, and NCH makes no guarantees, representations, or warranties with respect to the information provided in this clinical pathway.

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