

## Referral Support Service

## Paediatrics

### PA03

### Gastroenteritis in Children (0-5 years old)

#### Definition

The passage of three or more loose/watery stools per day

**Paediatric Normal Values (adapted from APLS)**

| Age             | Resp Rate | Heart Rate | Systolic BP |
|-----------------|-----------|------------|-------------|
| Neonate <4w     | 40-60     | 120-160    | >60         |
| Infant <1 y     | 30-40     | 110-160    | 70-90       |
| Toddler 1-2 yrs | 25-35     | 100-150    | 75-95       |
| 2-5 yrs         | 25-30     | 95-140     | 85-100      |

#### Exclude Red Flag Symptoms (risk of progression to shock)

- Appears to be unwell or deteriorating
- Altered responsiveness (e.g. irritable, lethargic)
- Sunken eyes
- Tachycardia
- Tachypnoea
- Reduced skin turgor

#### High risk of dehydration

- Children <1 year of age, especially <6 months
- Low birth weight infants
- Vomited  $\geq 3$  times a day in last 24 hours
- Passing  $\geq 6$  stools in last 24 hours
- Urinated less than twice in last 24 hours
- Not offered or not tolerated oral supplementary fluids
- Infants who have stopped breastfeeding during illness
- Children with signs of malnutrition

#### General Points

- The most common cause of diarrhoea in children is acute gastroenteritis
- In children under 5 years around 80% are attributable to viruses
- Rotavirus is the most common cause of medically treated gastroenteritis in resource rich countries, however, since routine Rotavirus immunisation was introduced, the incidence has reduced dramatically
- Dehydration in obese children is frequently under-estimated
- Young infants (<6 months) may progress to shock more rapidly
- Continue or restart the child's preferred, usual diet as soon as possible, this is particularly important in breastfed children.

#### Important features in the history

- Onset, sequence and duration of symptoms
- Other family members unwell
- Recent foreign travel

- Consumption of possible unsafe food, e.g. takeaway, BBQ.
- Recent visit to petting farms (E.Coli 0157)
- Recent medication use, particularly antibiotics
- Weight loss
- Known immunodeficiency

### Documentation

- Number of episodes of diarrhoea and vomiting in past two to three days.
- Presence of blood in stool.
- Number of times child has urinated in past 24 hours and how many hours since last urine passed.

### Differential Diagnoses

- Systemic infection, e.g. UTI, pneumonia, sepsis.
- Surgical conditions, e.g. appendicitis, intussusception, sub-acute bowel obstruction.
- Metabolic conditions, e.g. diabetes mellitus.
- Antibiotic associated diarrhoea.
- Haemolytic Uraemic Syndrome.

### Features that may indicate diagnoses other than gastroenteritis

- Temperature  $>38^{\circ}\text{C}$  if under 3 months old or  $>39^{\circ}\text{C}$  if over 3 months old.
- Shortness of breath or tachypnoea.
- Altered level of consciousness.
- Neck stiffness.
- Non-blanching rash.
- Blood and/or mucus in diarrhoea.
- Bilious (green) vomiting.
- Severe or localized abdominal pain.
- Abdominal distension or rebound tenderness.
- Bulging fontanelle (in infants).

### Assessment

An overall assessment is more accurate than looking at individual symptoms and signs. Prolonged capillary refill time, abnormal skin turgor and absent tears have been shown to be the best individual examination measures to assess for dehydration. (Freedman et al, 2015) [See table below](#)

### Management

#### When to Arrange Emergency Hospital Admission

- Child appears unwell, there are features suggesting severe dehydration and/or progression to shock.
- There is intractable or bilious vomiting.
- There is acute-onset painful, bloody diarrhoea or confirmed E.coli 0157 infection.
- There is a suspected serious complication, e.g. haemolytic uraemic syndrome or sepsis.

### When to Consider Hospital Admission

- There are clinical features suggesting a serious alternative diagnosis.
- There is an inadequate response to oral rehydration solution.
- There are red flag features indicting risk of progression to shock.
- There are risk factors for developing dehydration.

### Management in Primary Care

#### No features of dehydration

- Continue usual feeds.
- Encourage regular fluid intake.
- Offer low-osmolality oral rehydration salt (ORS) solution if child is at increased risk of dehydration (see maintenance fluid requirements in appendix 1).
- Discourage fruit juices and carbonated drinks.

#### With features of dehydration but safe to manage at home

- Give ORS solution frequently and in small amounts to rehydrate the child.
- 50ml/kg of ORS plus continuing losses should be given over 4 hours (see fluid deficit in appendix 1).
- If breastfed, supplement normal feeds with ORT.
- If not breastfed, consider supplementing with usual fluids (including milk feeds or water, but not fruit juices or carbonated drinks) if child refuses sufficient quantities of ORS solution.
- Avoid giving solid food until the child is rehydrated.

#### Seek review if

- Not taking requirements.
- Not keeping fluids down.
- Becoming more unwell.
- Has a reduced urine output.

#### Medication

- Advise that drug treatment with anti-diarrhoeal drugs, anti-emetics, zinc supplements and probiotics is **not** recommended for use in children in primary care.
- Do **not** routinely prescribe antibiotics to children with gastroenteritis
  - Arrange treatment of confirmed microbial pathogens, if appropriate, following stool culture and sensitivity testing.

#### After rehydration

- Restart the child's preferred, usual diet as soon as possible, this is particularly important in breastfed children.

#### Stool culture

- Recent foreign travel.
- No improvement in diarrhoea by day 7.
- Recent hospitalisation and/or antibiotic treatment.

Reducing cross-infection

- Hand washing.
- Prompt disinfection of contaminated surfaces.
- Prompt washing of soiled clothes.
- Avoid public swimming pools for 2 weeks after diarrhoea has resolved.

The following table should be used to help make an assessment of progression to shock.

| <b>Traffic light system for identifying severity of illness</b> |  |   |  |
|---|--|---|--|
|   | <b>Green – Low Risk</b>  | <b>Amber – Intermediate Risk</b>  | <b>Red – High Risk</b>   |
|   | <ul style="list-style-type: none"> <li>• Appears well</li> </ul>   | <ul style="list-style-type: none"> <li>• Appears unwell or deteriorating</li> </ul>   |  |
| <b>Activity</b>   | <ul style="list-style-type: none"> <li>• Responds normally to social cues</li> <li>• Content/smiles</li> <li>• Stays awake/awakens quickly</li> <li>• Strong normal cry</li> </ul>   | <ul style="list-style-type: none"> <li>• Altered response to social cues</li> <li>• No smile</li> <li>• Reduced activity</li> </ul>   | <ul style="list-style-type: none"> <li>• Not responding normally or no response to social cues</li> <li>• Unable to rouse or if roused does not stay awake</li> <li>• Weak, high pitched or continuous cry</li> <li>• Appears ill</li> </ul> |
| <b>Skin</b>   | <ul style="list-style-type: none"> <li>• Normal skin colour</li> <li>• Normal turgor</li> <li>• Warm extremities</li> </ul>  | <ul style="list-style-type: none"> <li>• Normal skin colour</li> <li>• Warm extremities</li> </ul>  | <ul style="list-style-type: none"> <li>• Pale, mottled, ashen</li> <li>• Cold extremities</li> </ul>   |
| <b>Respiratory</b>  | <ul style="list-style-type: none"> <li>• Normal breathing</li> </ul>   | <ul style="list-style-type: none"> <li>• Breathing at high end of normal rate for age</li> </ul>  | <ul style="list-style-type: none"> <li>• Tachypnoea</li> </ul>   |
| <b>Hydration</b>  | <ul style="list-style-type: none"> <li>• Capillary refill &lt; 2 secs</li> <li>• Moist mucous membranes</li> <li>• Normal urine output</li> </ul>  | <ul style="list-style-type: none"> <li>• Capillary refill 2-3 secs</li> <li>• Dry mucous membranes</li> <li>• Reduced urine output (&gt;1 wet nappy in 24h)</li> <li>• Reduced skin turgor</li> </ul>   | <ul style="list-style-type: none"> <li>• Capillary refill &gt;3 secs</li> <li>• Dry mucous membranes</li> <li>• Reduced urine output (no wet nappies in 24h)</li> </ul>  |
| <b>Circulation</b>  | <ul style="list-style-type: none"> <li>• Peripheral pulses normal</li> <li>• Heart rate normal</li> </ul>  | <ul style="list-style-type: none"> <li>• Peripheral pulses normal</li> <li>• Tachycardia</li> </ul>   | <ul style="list-style-type: none"> <li>• Peripheral pulses weak</li> <li>• Tachycardia</li> <li>• Hypotensive</li> </ul>   |
| <b>Eyes</b>   | <ul style="list-style-type: none"> <li>• Normal</li> </ul>   | <ul style="list-style-type: none"> <li>• Sunken eyes</li> </ul>   | <ul style="list-style-type: none"> <li>• Sunken eyes</li> </ul>  |
|   | <b>No Clinical Dehydration</b>   | <b>Clinical Dehydration</b>   | <b>Shock Suspected</b>   |
|   | <ul style="list-style-type: none"> <li>• Can be managed at home</li> <li>• Continue usual feeds</li> <li>• Encourage regular fluid intake</li> <li>• Offer ORS if child is at an increased risk of dehydration</li> <li>• Discourage fruit juices and carbonated drinks</li> <li>• Offer further on the day review if parents concerned about symptoms and fluid replacement</li> <li>• Give gastroenteritis advice leaflet</li> </ul> | <ul style="list-style-type: none"> <li>• Consider ORS in small amounts with same day review either in practice or out of hours</li> <li>• 50ml/kg of ORS plus continuing losses given over 4 hours</li> <li>• If breastfed, supplement normal feeds with ORS</li> <li>• Avoid giving solid food until rehydrated</li> <li>• If clinical concern discuss with paediatrician on-call</li> </ul> | <ul style="list-style-type: none"> <li>• Bleep paediatrician on-call</li> <li>• Consider appropriate means of transport</li> <li>• If appropriate commence relevant treatment to stabilise child for transfer</li> </ul>                     |

## **Patient information leaflets/ PDAs**

[Patient info/childrens-health/acute-diarrhoea-in-children/gastroenteritis-in-children](http://Patient%20info/childrens-health/acute-diarrhoea-in-children/gastroenteritis-in-children)

[Oxfordhealth.nhs.uk](http://Oxfordhealth.nhs.uk) - Parent Minor Illness Leaflet

## **References**

1. National Institute for Clinical Excellence [NICE] (2009) *Diarrhoea and vomiting caused by gastroenteritis in under 5's: diagnosis and management CG84* [online]
2. National Institute for Clinical Excellence [NICE] (2017) [Gastroenteritis – Clinical Knowledge Summaries](#). [Viewed 12 Aug 2021]
3. Freedman et al. (2015) Diagnosing clinically significant dehydration in children with acute gastroenteritis using non-invasive methods: a meta-analysis. *The Journal of Paediatrics* 166(4), 908-916

## **Appendix 1**

### **Calculation of maintenance fluid requirements**

*The daily fluid requirement can be estimated from the child's weight using the following formula:*

|   |          |         |
|---|----------|---------|
| 1 <sup>st</sup> 10kg of weight                      | 100ml/kg | Per 24h |
| 2 <sup>nd</sup> 10kg of weight                      | 50ml/kg  |         |
| All additional kg of weight above 20kg (up to 50kg) | 20ml/kg  |         |

*For example, a 30kg child*

$$\begin{array}{lll} \text{First 10kg} & = 10\text{kg} \times 100\text{ml/kg} & = 1000\text{ml} \\ \text{Second 10kg} & = 10\text{kg} \times 50\text{ml/kg} & = 500\text{ml} \\ \text{Additional kg} & = 10\text{kg} \times 20\text{ml/kg} & = 200\text{ml} \\ \\ & \text{Total} & = 1700\text{ml}/24\text{h} \end{array}$$

### **Calculation of fluid deficit**

If dry –give 50ml/kg (5%) for fluid deficit replacement, over 4 hours in addition to maintenance fluid requirements

*For example, a 30kg child will require*

$$\begin{array}{lll} \text{Deficit} & = 30\text{kg} \times 50\text{ml/kg} & = 1500\text{ml}/4\text{h} \\ & & \text{(in addition to} \\ & & \text{maintenance fluid)} \end{array}$$

**Trial ORS ml/h according to weight, given in 5-10 min intervals**

| <b>Weight (kg)</b> | <b>Maintenance volume in 24h</b> | <b>Maintenance fluid every 10 min (ml) assuming 12h non-drinking time in 24h</b> | <b>Hourly volume (ml) based on 12h non-drinking time</b> |
|--------------------|----------------------------------|--|--|
| 5                  | 500                              | 7  | 42   |
| 6                  | 600                              | 8.5  | 50   |
| 7                  | 700                              | 10   | 59   |
| 8                  | 800                              | 11   | 67   |
| 9                  | 900                              | 13   | 75   |
| 10                 | 1000                             | 14   | 84   |
| 11                 | 1050                             | 15   | 88   |
| 12                 | 1100                             | 16   | 92   |
| 13                 | 1150                             | 16   | 96   |
| 14                 | 1200                             | 17   | 100  |
| 15                 | 1250                             | 18   | 105  |
| 16                 | 1300                             | 18   | 109  |
| 18                 | 1400                             | 20   | 117  |
| 20                 | 1500                             | 21   | 125  |
| 25                 | 1600                             | 23   | 134  |
| 30                 | 1700                             | 24   | 142  |
| 35                 | 1800                             | 25   | 150  |
| 40                 | 1900                             | 26   | 159  |
| ≥45                | 2000                             | 28   | 167  |

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