

Dehydration

Definition / Supporting Information

Dehydration is an excessive loss of body water, for example, due to diarrhoea or vomiting, or an intake of water that is inadequate to replace water losses during normal physiological processes.

Hypovolaemia is a consequence of intravascular fluid loss, which may be a consequence of eg, dehydration, blood loss, or burns.

Keywords / also known as: reduced fluids, fluid loss

Essential History

Evaluation should progress only after the ABCs (airway, breathing, and circulation) of resuscitation have been addressed.

Ask about:

- Risk factors for dehydration
 - Children younger than 1 year
 - Infants who were of low birth weight
 - Children who have passed more than five diarrhoeal stools in the previous 24 hours
 - Children who have vomited more than twice in the previous 24 hours
 - Children who have not been offered or have not been able to tolerate fluids before presentation
 - Infants who have stopped breast or bottle feeding
 - Children with signs of malnutrition
- Fluid intake / feeding history
 - Consider neglect (see Child maltreatment: when to suspect maltreatment in under 18s [[NICE clinical guideline CG89](#)])
- Recent (pre-illness) weight and weight loss
- Known long-term conditions (eg, complex cardiac, chronic kidney and bowel problems)
- Medication history (eg, diuretics, laxatives)

'Red Flag' Symptoms and Signs

Evaluation should progress only after the ABCs (airway, breathing, and circulation) of resuscitation have been addressed.

See Diarrhoea and vomiting caused by gastroenteritis in under 5s: diagnosis and management [[NICE clinical guideline CG84, section 1](#)].

Ask about:

- Altered responsiveness
 - Irritable
 - Lethargic / drowsy
- Jittery movements
- Convulsions
- Hyperglycaemia / diabetic ketoacidosis
- Projectile vomiting
- Decreased urine output
 - Number of wet nappies / 24 hours

Look for:

- Dry mucous membranes
- Decreased conscious level
- Reduced skin turgor
- Sunken eyes
- Pale or mottled skin
- Cold extremities
- Signs of malnutrition
- Tachycardia
- Tachypnoea
- Altered responsiveness
- Increased muscle tone
- Hyper-reflexia
- Prolonged capillary refill time
- Hypotension

Differential Diagnosis

Potential causes of dehydration

- Diarrhoea
 - Infectious
 - Rotavirus
 - Norovirus
 - Adenovirus
 - *Salmonella* spp.
 - *Shigella* spp.

- *Campylobacter jejuni*
- *Yersinia enterocolitica*
- *Vibrio cholerae*
- *Escherichia coli*
- *Clostridium difficile*
- *Giardia lamblia*
- *Entamoeba histolytica*
- *Cryptosporidium*
- Non-infectious
 - Laxatives or cathartics that contain high concentrations of sugars
 - Sugar-free medicines that contain sugar alcohols such as sorbitol.
 - Acute onset of inflammatory bowel disease
- Vomiting
- Losses through the skin
 - Burns
 - Premature birth
 - Radiant warmers
 - Phototherapy
 - Fever
- Renal losses
 - Diuretic use or abuse
 - Diabetes mellitus
 - Chronic kidney disease
 - Nephrogenic diabetes insipidus
 - Central diabetes insipidus
- Inadequate intake of fluids
 - Ineffective breastfeeding
 - Child maltreatment
 - Children with communication difficulties, particularly on fixed feeding regimens via nasogastric or gastrostomy tubes

Investigations

Evaluation should progress only after the ABCs (airway, breathing, and circulation) of resuscitation have been addressed.

See Diarrhoea and vomiting caused by gastroenteritis in under 5s: diagnosis and management [[NICE clinical guideline CG84, section 1.2.2](#)]

To be undertaken by specialist practitioners (eg, Emergency Department / General Paediatric Team(s)):

- Measure plasma sodium, potassium, urea, creatinine, and glucose concentrations if:
 - Intravenous fluid therapy is required, **or**
 - There are symptoms and / or signs that suggest hypernatraemia
 - Jittery movements
 - Increased muscle tone
 - Hyper-reflexia
 - Convulsions
 - Drowsiness or coma, (see Altered Conscious Level) **or**
 - If there are risk factors for acute kidney injury (see Acute kidney injury: prevention, detection and management [[NICE clinical guideline CG169, section 1](#)])
- Measure venous blood acid–base status and chloride concentration if shock is suspected or confirmed.

Treatment Approach

Treatment should progress only after the ABCs (airway, breathing, and circulation) of resuscitation have been addressed.

See Diarrhoea and vomiting caused by gastroenteritis in under 5s: diagnosis and management [[NICE clinical guideline CG84, section 1.3](#)]

To be undertaken by non-specialist practitioners (eg, General Practitioner (GP) Team) or specialist practitioners (eg, Emergency Department / General Paediatric Team(s)):

- Use oral rehydration solutions (ORS) (see disodium hydrogen citrate with glucose, potassium chloride and sodium chloride) to rehydrate children, including those with hypernatraemia, unless intravenous fluid therapy is indicated (see below).
 - Use low-osmolarity ORS solution (240–250 mOsmol/L) for oral rehydration therapy
 - Give 50 mL/kg for fluid deficit replacement over 4 hours, as well as maintenance fluid
 - Give the ORS solution frequently and in small amounts
 - Consider supplementation with the child's usual fluids (including milk feeds or water, but not fruit juices or carbonated drinks) if they refuse to take sufficient quantities of ORS solution and do not have red flag symptoms or signs
 - Consider giving the ORS solution via a nasogastric tube if the child is unable to drink it or if they vomit persistently

- Monitor the response to oral rehydration therapy by regular clinical assessment

To be undertaken by specialist practitioners (eg, Emergency Department / General Paediatric Team(s)):

- Use intravenous fluid therapy for clinical dehydration if:
 - Shock is suspected or confirmed
 - A child with red flag symptoms or signs shows clinical evidence of deterioration despite oral rehydration therapy
 - A child persistently vomits the ORS, given orally or via a nasogastric tube
 - An alternative serious diagnosis (eg, diabetic ketoacidosis) is confirmed
- Treat suspected or confirmed shock with a rapid intravenous infusion of 20 mL/kg of 0.9% sodium chloride solution.
- If a child remains shocked after the first rapid intravenous infusion:
 - Immediately give another rapid intravenous infusion of 20 mL/kg of 0.9% sodium chloride solution, and
 - Consider possible causes of shock other than dehydration.

When to Refer

See Diarrhoea and vomiting caused by gastroenteritis in under 5s: diagnosis and management [[NICE clinical guideline CG84, section 1.7](#)]

Refer (arrange emergency transfer) to specialist practitioners (eg, Emergency Department / General Paediatric Team(s)) if:

- Symptoms or signs suggesting shock or other signs / symptoms of potential life threatening illness

Refer urgently to specialist practitioners (eg, Emergency Department / General Paediatric Team(s)) if:

- Symptoms and signs suggesting an alternative serious diagnosis
 - See Fever in Under 5s: Assessment and initial management - traffic light system for identifying risk of serious illness [[NICE guideline NG143, Table 1](#)]
- Clinical evidence of deterioration despite oral rehydration therapy
- Child persistently vomits the ORS

Consider referral to Paediatric Intensive Care Team if:

- Child remains shocked after the second rapid intravenous infusion.

‘Safety-Netting’ Advice

See Diarrhoea and vomiting caused by gastroenteritis in under 5s: diagnosis and management [[NICE clinical guideline CG84, section 1.7.1.2 and section 1.8](#)]

- Give information for parents and carers on how to:
 - Recognise developing red flag symptoms
 - Get immediate help from an appropriate healthcare professional if red flag symptoms develop

Patient / Carer Information

****Please note: whilst these resources have been developed to a high standard they may not be specific to children.***

- [Dehydration](#) (Web page), the NHS website
- [Dehydration](#) (Web page), NHS Inform
- [Dehydration](#) (Web page), NI Direct

Resources

National Clinical Guidance

[Child maltreatment: when to suspect maltreatment in under 18s](#) (Web page), NICE clinical guideline CG89, National Institute for Health and Care Excellence

[Diarrhoea and vomiting caused by gastroenteritis in under 5s: diagnosis and management](#) (Web page), NICE clinical guideline CG84, National Institute for Health and Care Excellence

[Fever in Under 5s: Assessment and initial management](#) (Web page), NICE clinical guideline NG143, National Institute for Health and Care Excellence

Medical Decision Support

[Neglect](#) (Web page), RCPCH Child Protection Companion

Suggested Resources

****Please note: these resources include links to external websites. These resources may not have national accreditation and therefore PCO UK cannot guarantee the accuracy of the content.***

[Gastroenteritis](#) (Web page), NICE clinical knowledge summary, National Institute for Health and Care Excellence

[Dehydration](#) (Web page – requires log-in), Spotting the Sick Child

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