Managing diarrhoea and vomiting in children

How should children be assessed?

What advice should be given on feeding?

What are the red flags?



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DIARRHOEA AND VOMITING ARE COMMON SYMPTOMS IN CHILDREN IN THE COMMUNITY. Most children will have uncomplicated infective gastroenteritis and will recover spontaneously within a few days.[1] In the majority of cases all that is required is some basic advice on management and appropriate reassurance. However, a few children will be at greater risk of complications or will deteriorate and require hospitalisation for further assessment and medical intervention. GPs need to be able to differentiate between these groups and recognise the symptoms and signs requiring more active intervention.

The recently published guidance from NICE on the diagnosis, assessment and management of diarrhoea and vomiting in children under five provides a synthesis of evidence to aid GPs in the process.[2] Importantly, it also challenges some of the popular lay and professional myths that have developed around the management of gastroenteritis. »

Table 1

Frequency of common causes of infective gastroenteritis in children in Europe aged up to 5 years[3]

Pathogen	Frequency, %
Rotavirus	10–35
Norovirus	2–20
Campylobacter	4–13
Adenovirus	2–10
Salmonella	5–8
Cryptosporidium	0–3
Giardia	1–3
No agent detected	45–60

Table 2

Key aspects of examination which may indicate alternative diagnoses in a child with diarrhoea and vomiting

Examination	Clinical signs	Possible alternative diagnoses
Temperature	>38°C in infants up to 3 months and >39°C in older children	Non-enteric infections such as urinary tract infection, otitis media, or meningitis
Respiratory rate	Shortness of breath or tachypnoea	Pneumonia
Conscious state	Drowsiness or irritability	Meningitis
Abdominal examination	Abdominal distension with significant tenderness and/or rebound	Bowel obstruction, ischaemia or intussusception

AETIOLOGY

In many children with symptoms of presumed infective gastroenteritis no causative organism can be isolated, reflecting the transient nature of the illness. In those where a pathogen is found, a virus is usually the cause. Rotavirus is the most common culprit in sporadic cases and norovirus is increasingly being identified in relation to clusters of illness. Campylobacter is the most frequent bacterial pathogen, with salmonella less frequent but potentially more serious.

Table 1, above, shows the prevalence of common causative organisms across Europe, although these are subject to local variation.[3] In the future, rotavirus vaccination may be available to reduce the impact of gastroenteritis in children.

CLINICAL ASSESSMENT AND EXAMINATION

The two aims of examining a child with suspected gastroenteritis are to exclude alternative diagnoses and to assess the severity of the condition, particularly in relation to the risk of dehydration.

The combination of sudden onset diarrhoea and vomiting in a previously well child is nearly always caused by infective gastroenteritis. However, sometimes one or other of the symptoms predominates, or the illness has developed more gradually. In these situations it is essential to exclude other diagnoses.

Atypical symptoms such as bilious vomiting and bloody stools should raise the suspicion of alternative diagnoses. Important aspects of examination and clinical signs are shown in table 2, above.

Clinical evaluation of a child with mild dehydration can be extremely difficult. Several earlier guidelines had proposed that dehydration can be classified according to severity. However, the NICE guideline development group took the view that it is only possible to distinguish the absence of any clinical signs of dehydration from signs that dehydration is present and signs of clinical shock. The presence of signs of dehydration suggests that a child is somewhere in the spectrum between the two extremes, but clinical judgement, including assessment of the trajectory of the illness (i.e. getting worse or better) is essential to the decision-making process about the management required.

'Most children with diarrhoea and vomiting caused by suspected gastroenteritis do not require any investigation in the community'

Some children are likely to be more at risk of dehydration than others. Factors associated with greater vulnerability include:

- Younger age (especially under one year)
- Low birthweight
- Frequent vomiting
- Frequent diarrhoeal stools
- Inability to tolerate oral fluids
- Prior malnutrition or illness

Table 3, opposite, shows the clinical features that should be used in the assessment, and highlights the 'red flags' that should raise particular concerns.

INVESTIGATIONS

Most children with diarrhoea and vomiting caused by suspected gastroenteritis do not require any investigation in the community. Requests for stool culture, in uncomplicated clinical situations, rarely provide clinically useful information in an appropriate timescale.

Stool culture should be considered by GPs in the following situations:

- The child may have acquired the infection abroad
- Diarrhoea has not improved by day 7 of the illness
- There is uncertainty about the diagnosis of gastroenteritis
- There is blood or mucus in the stool

Stool culture should also always be performed where the diagnosis occurs in the context of suspected septicaemia or in immunocompromised children. However assessments in such situations should usually be carried out in hospital.

MANAGEMENT

Fluid balance

The most important principle in the management of diarrhoea and vomiting is to prevent dehydration or to correct fluid losses as early as possible. Breastfeeding and usual fluids should be continued where

Table 3

Clinical features indicating dehydration (modified from the NICE guideline on diagnosis, assessment and management of diarrhoea and vomiting in children under 5)[2]

	No clinically detectable dehydration	Clinical dehydration	Clinical shock
Symptoms Remote and face-to-face assessments	Appears well	▲ Appears to be unwell or deteriorating	-
	Alert and responsive	▲ Altered responsiveness (for example, irritable, lethargic)	Decreased level of consciousness
	Normal urine output	Decreased urine output	-
	Skin colour unchanged	Skin colour unchanged	Pale or mottled skin
	Warm extremities	Warm extremities	Cold extremities
Signs Face-to-face assessments	Alert and responsive	▲ Altered responsiveness (for example, irritable, lethargic)	Decreased level of consciousness
	Skin colour unchanged	Skin colour unchanged	Pale or mottled skin
	Warm extremities	Warm extremities	Cold extremities
	Eyes not sunken	▲ Sunken eyes	-
	Moist mucous membranes (except after a drink)	Dry mucous membranes (except for 'mouth breather')	-
	Normal heart rate	▲ Tachycardia	Tachycardia
	Normal breathing pattern	▲ Tachypnoea	Tachypnoea
	Normal peripheral pulses	Normal peripheral pulses	Weak peripheral pulses
	Normal capillary refill time	Normal capillary refill time	Prolonged capillary refill time
	Normal skin turgor	▲ Reduced skin turgor	-
	Normal blood pressure	Normal blood pressure	Hypotension (decompensated shock)

▲ = Red flag symptoms or signs that may help to identify children at increased risk of progression to shock

possible and oral rehydration salt (ORS) solutions used to compensate for excessive loss. The sodium chloride and glucose in ORS solutions are subject to active intestinal transport which increases water uptake over and above simple water supplementation.

Maintenance requirements are related to body weight:

- 0-10kg: 100ml per kg per 24 hours
- 10-20kg: 1,000ml plus 50 ml per kg over 10kg per 24 hours
- >20kg: 1,500ml plus 20ml per kg over 20kg per 24 hours.

As a general rule, where a child has some early signs of dehydration, an additional 50ml/kg ORS solution should be given over a period of four hours for rehydration. ORS solution supplements can then be continued to compensate for continued loss, over and above maintenance fluids.

Symptomatic treatments

A whole range of specific treatments has been advocated to reduce the duration of the symptoms of gastroenteritis. These include antiemetics, antidiarrhoeal agents (antisecretory, antimotility, and adsorbent agents), micronutrients, and probiotics. While a few of these show promise in preliminary trials, there is insufficient evidence on safety and cost-effectiveness to advocate their use at present. Drugs such as the antiemetic ondansetron may have a limited role in preventing the need for hospital treatment for rehydration in children with persistent excessive vomiting.

Antibiotics

Antibiotic treatment is only rarely indicated for the treatment of diarrhoea and vomiting, particularly in community settings. Exceptions are in cases of septicaemia, or in salmonella infection in children who are under six months or immunosuppressed, who should be cared for in a hospital setting. Specialist advice should be sought for treating symptoms associated with foreign travel.

ADVICE TO PARENTS

In the past parents have received mixed advice from healthcare professionals about how gastroenteritis should be managed. Such advice included stopping diet and milk feeds for varying lengths of time, using diluted milk feeds following resolution of symptoms, and giving carbonated drinks or sometimes fruit juices. There is no significant evidence to support such approaches.

The majority of children with diarrhoea and vomiting can be managed effectively at home by their parents, sometimes with support from healthcare professionals. Table 4, right, lists the key information that should be given to parents. »

Table 4

Ten key facts for parents of children with diarrhoea and vomiting

1 Most children with diarrhoea and vomiting can be looked after safely at home.
2 The biggest risk is of dehydration, so it is important to continue to give both usual fluids and extra supplements to compensate for losses.
3 Children can continue to be breastfed, or receive formula milk. These will not make the symptoms any worse.
4 Usual fluids should be supplemented by commercially available ORS solutions which are the correct concentration to be absorbed most effectively. Do not use other fluids or homemade preparations for this purpose.
5 Giving fluids in small frequent quantities by mouth is likely to be more effective than administering large quantities, although this approach requires patience.
6 Most drinks can be given to encourage fluid intake, but fruit juices and carbonated drinks are best avoided as they can prolong symptoms.
7 Children who are recovering from gastroenteritis can return to eating their usual diet as soon as they are able. There is no need to withhold food for any period of time.
8 Symptoms may last longer than expected: vomiting lasts, on average, 1 or 2 days but should have resolved by day 3; diarrhoea has usually settled by 5 to 7 days but may last up to 14 days.
9 It is important to ensure adequate hygiene to prevent spread of infection to other members of the household. Children should not return to school or childcare facilities until at least 48 hours after the last episode of diarrhoea or vomiting.[4]
10 Seek medical advice if the symptoms are worsening or persistent, or there are signs of dehydration.

key points

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Diarrhoea and vomiting are common symptoms in children in the community. Most children will have uncomplicated infective gastroenteritis and will recover spontaneously within a few days. In the majority of cases all that is required is some basic advice on management and appropriate reassurance. However, GPs need to be able to recognise the symptoms and signs requiring more active intervention.

In many children with symptoms of presumed infective gastroenteritis no causative organism can be isolated but where a pathogen is found viral causes are most frequent.

The combination of sudden onset diarrhoea and vomiting in a previously well child is nearly always caused by infective gastroenteritis. Atypical symptoms such as bilious vomiting and bloody stools should raise the suspicion of alternative diagnoses.

Key aspects of examination which may indicate alternative diagnoses in a child with diarrhoea and vomiting include: temperature >38°C in infants up to 3 months and >39°C in older children, shortness of breath or tachypnoea, drowsiness or irritability and abdominal distension with significant tenderness and/or rebound.

It is only possible to distinguish the absence of any clinical signs of dehydration from signs that dehydration is present and signs of clinical shock. Some children are likely to be more at risk of dehydration than others. Factors associated with greater vulnerability include: younger age (especially under one year); low birthweight; frequent vomiting; frequent diarrhoeal stools; inability to tolerate oral fluids; and prior malnutrition or illness.

Most children with diarrhoea and vomiting caused by suspected gastroenteritis do not require any investigation but stool culture should be considered by GPs in the following situations: the child may have acquired the infection abroad; diarrhoea has not improved by day 7 of the illness; there is uncertainty about the diagnosis of gastroenteritis; or there is blood or mucus in the stool.

The most important principle in the management of diarrhoea and vomiting is to prevent dehydration or to correct fluid losses as early as possible. Breastfeeding and usual fluids should be continued where possible and oral rehydration salt (ORS) solutions used to compensate for excessive loss. Where a child has some early signs of dehydration, an additional 50ml/kg ORS solution should be given over a period of four hours for rehydration.

There is insufficient evidence of safety and cost-effectiveness to advocate the use of symptomatic measures. Antibiotic treatment is only rarely indicated for the treatment of diarrhoea and vomiting.

CRITERIA FOR HOSPITAL ADMISSION

While clinical indicators are paramount, the psychosocial context of the illness needs to be taken into account when considering whether or not to admit a child for hospital assessment and management. Significant factors may include the experience of the child's parents and their ability to deal with the illness, and the level of anxiety which it may be causing. Clinical indicators for admission include:

- Symptoms and signs of significant dehydration or shock
- Inability to tolerate oral fluids
- Uncertainty about diagnosis
- Persistent and frequent vomiting or diarrhoea
- Deteriorating clinical condition despite appropriate management
- Children with underlying vulnerability, including very young or low birthweight babies, or children who are immunocompromised.

REFERENCES

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Useful information

Copies of Clinical guideline 84. Diarrhoea and vomiting caused by gastroenteritis: diagnosis, assessment and management in children younger than 5 years can be downloaded free from the NICE website:**www.nice.org.uk**

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