

**ABSTRACT**

All children with acute gastroenteritis should be carefully examined to rule out non gastrointestinal infections such as acute appendicitis and urinary tract infection. Rotavirus is one of the commonest causes of acute gastroenteritis in children. The main complication is dehydration with electrolyte imbalance. The clinical course is self-limiting and most children would have recovered in 5 to 10 days. Prevention is by maintaining personal hygiene and vaccination is available nowadays.

**PRESENTATION**

Rotavirus gastroenteritis is the clinical syndrome of acute diarrhea and/or vomiting caused by rotavirus infection. Often fever is present in the initial phase of the disease. In children with acute diarrhea, it is useful to divide the clinical pattern into acute watery diarrhea or dysenteric diarrhea. Acute watery diarrhea is the presentation for rotavirus gastroenteritis although some bacterial diarrhea can also present in the same manner. Dysenteric type of diarrhea is more commonly seen in Shigella or Salmonella infection.

**POINTERS IN ASSESSMENT**

When a child with acute vomiting and diarrhea is first seen, the initial assessment is to determine, on clinical ground, whether the child has acute gastroenteritis or whether there is evidence that the child has some other disease states that may present in a similar manner. Some of the disorders such as upper respiratory tract infections are relatively mild. However some conditions are far more serious and failure to make the correct diagnosis may have dire consequences for the child. Acute abdomen is the greatest risk. A detailed history carefully taken, coupled with a simple and yet thorough clinical examination can usually exclude most of the serious conditions.

Danger signs include abdominal distension, abdominal tenderness and a degree of toxicity out of proportion to the child's state of hydration. Abdominal distension and tenderness usually suggest the possibility of an acute abdomen and a plain X ray is always indicated. Sometimes acute diarrhea can cause abdominal distension with dilated loops of gut. Such patients should be closely observed, even when there is no evidence of obstruction.

The second step in the clinical assessment is to assess the state of hydration. The clinical signs and a rough clinical assessment of the extent of the dehydration are listed in the table. It is a good clinical practice to assume that a child with acute gastroenteritis is dehydrated until proven otherwise. Capillary refill time, abnormal skin turgor, and abnormal respiratory patterns are most useful signs for detecting dehydration. Combinations of signs perform better than individual signs. History taking and laboratory tests are also useful in detecting dehydration. When a child is dehydrated, it is wise to hospitalize the child for hydration under supervision, either orally or intravenously. There are other possible reasons for hospital admission. These include:

- κ Failure of outpatient treatment
- κ Uncertainty about the state of hydration, e.g. obese child
- κ Uncertainty about the diagnosis, especially if acute abdomen is suspected
- κ Children with history to suggest severe disease although not yet dehydrated
- κ Poor social circumstances
- κ No responsible adult at home to care for the child.

**COMPLICATIONS**

Complications that can occur with rotavirus gastroenteritis are:

- κ dehydration and shock
- κ electrolyte imbalance
- κ acid base disturbance
- κ acute renal failure
- κ secondary disaccharide intolerance
- κ protein intolerance
- κ malnutrition
- κ intracranial haemorrhage
- κ death.

**DIFFERENTIAL DIAGNOSIS**

Differential diagnosis of rotavirus gastroenteritis are:

- κ bacterial diarrhea
- κ food poisoning
- κ parenteral diarrhea
- κ intussusceptions
- κ acute abdomen such as acute appendicitis
- κ food intolerance.

**DEHYDRATION**

The degree of dehydration is a term used to describe the severity of dehydration. In mild dehydration, it is estimated that the

## Assessment of dehydration and fluid deficit (WHO)

Signs and symptoms	Mild dehydration	Moderate dehydration	Severe dehydration
<b>General appearance and condition</b>			
infants and young children	Thirsty; alert; restless	Thirsty; restless; or lethargic but irritable when touched	Drowsy; limp; cold; sweaty; cyanotic extremities; may be comatose
Older children and adults	Thirsty; alert; restless	Thirsty; alert; giddiness with postural changes	Usually conscious; apprehensive; cold; sweaty cyanotic extremities; wrinkled skin of fingers and toes; muscle cramps
Radial pulse	Normal rate and volume	Rapid and weak	Rapid; feeble; sometimes impalpable
Respiration	Normal	Deep; may be rapid	Deep and rapid
Anteriro fontanelle	Normal	Sunken	Very sunken
Systolic blood pressure	Normal	Normal-low	< 10.7 kPa(80mmHg); may be unrecordable
Skin elasticity	Pinch retracts immediately	Pinch retracts slowly	Pinch retracts very slowly (>2 secs)
Eyes	Normal	Sunken	Deeply sunken
Tears	Present	Absent	Absent
Mucous membranes	Moist	Dry	Very dry
Urine flow	Normal	Reduced amount and dark	None passed for several hours empty bladder
Body weight loss (%)	4-5	6-9	10% or more
Estimated fluid deficit	40-50 ml kg <sup>-1</sup>	60-90 ml kg <sup>-1</sup>	100-110 ml kg <sup>-1</sup>

patient has lost less than 5% of body weight as water. In severe dehydration, the amount of water loss is more than 10% of body weight. As for moderate dehydration, the loss is between 5% to <10%.

The type of dehydration refers to the sodium content of the serum. In the vast majority of cases, the dehydration is isotonic (isotonic) where the serum sodium is within normal range (135 to 145 mEq/L). In clinical practice, hyponatremic (hypotonic) dehydration occurs when the serum sodium is <130 mEq/L and hypernatremic (hypertonic) dehydration is present when serum sodium is above 150mEq/L. As the patient gets dehydrated, the volume and electrolyte concentration of the intake usually become the primary determinants of the final state of the body's fluid tonicity.

Hypernatremic dehydration has a higher mortality and morbidity. Clinically significant damage to the central nervous system occurs more commonly and there are more hazards involved in the management. Risks predisposing to hypernatremic dehydration include age, hyperventilation and high solute load in feeding. Young infants are particularly at risk because of the relative small body mass compared to surface area and the insensible water loss is higher. The other reason is the relative immaturity of the renal function.

### ORAL REHYDRATION THERAPY

Oral rehydration is widely accepted means of treatment for children with dehydration due to gastroenteritis. It is effective and relative cheap compared to intravenous therapy. However, it is not used in children with severe dehydration and when vomiting is severe and oral feeding is not possible. Obviously, intravenous route of rehydration is the preferred method for severe dehydration. A wide range of oral replacement fluids has been recommended for children with acute gastroenteritis. The WHO ORS solution contains the following ingredients in each litre: 3.5g sodium chloride, 2.5g sodium bicarbonate, 1.5g potassium chloride and 20g glucose. This corresponds to 90mmol, 20mmol, 80mmol, 30mmol and 110mmol of sodium, potassium, chloride, bicarbonate and glucose per litre of water respectively. Other commercial solutions containing 45 to 60 mmol/L have been advocated in non cholera areas.

For mild to moderate dehydration, oral rehydration therapy using ORS 50 – 75 ml/kg over 4 to 6 hours is recommended. For replacing continuing loss, ORS can also be used. A volume of 50 to 100 ml of ORS is recommended for each stool in infants and 200 ml is recommended for each stool for older children.

### MEDICATION

There is no role for antibiotics in rotavirus gastroenteritis. Antidiarrheal agents are also not recommended for young children. In fact, the side effects of antimotility agents may be harmful to the patients. Absorbents can improve the nature of the stools but do not affect the amount of water and electrolyte loss in the stools.

### DIETARY MANAGEMENT

Once dehydration is corrected, oral refeeding should be restarted as soon as possible. In young infants, breast feeding should be continued. For those who are well nourished and with short

duration of diarrhea, normal diet can be reintroduced. Early re-establishment of full feeding is associated with faster recovery and better weight gain.

### PREVENTION

Preventive measures are:

- κ breast feeding reduces the risk of an infant developing gastroenteritis.
- κ personal hygiene, particularly when preparing milk feeds or other foods for the infants and children.
- κ improve the nutritional status of the children
- κ vaccination.

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### LEARNING POINTS

- o Rotavirus gastroenteritis is the clinical syndrome of acute diarrhea and/or vomiting caused by rotavirus infection.
  - o All children with acute gastroenteritis should be carefully examined to rule out non gastrointestinal infections such as acute appendicitis and urinary tract infection.
  - o The main complication is dehydration with electrolyte imbalance.
  - o The clinical course is self-limiting and most children would have recovered in 5 to 10 days.
  - o Prevention is by maintaining personal hygiene and vaccination is available nowadays.
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