TABLE 193-1 ASSESSING THE DEGREE OF DEHYDRATION IN PATIENTS WITH CHOLERA

Degree of Dehydration	Clinical Findings
None or mild, but diarrhea	Thirst in some cases; <5% loss of total body weight
Moderate	Thirst, postural hypotension, weakness, tachycardia, decreased skin turgor, dry mouth/tongue, no tears; 5–10% loss of total body weight
Severe	Unconsciousness, lethargy, or "floppiness"; weak or absent pulse; inability to drink; sunken eyes (and, in infants, sunken fontanelles); >10% loss of total body weight

TABLE 193-2 TREATMENT OF CHOLERA, BASED ON DEGREE OF DEHYDRATION[a]

Degree of Dehydration, Patient's Age (Weight)	Treatment[b]
None or Mild, But Diarrhea[c]	
<2 years	1/4–1/2 cup (50–100 mL) of ORS, to a maximum of 0.5 L/d
2–9 years	1/2–1 cup (100–200 mL) of ORS, to a maximum of 1 L/d
≥10 years	As much ORS as desired, to a maximum of 2 L/d
Moderate[c,d]	
<4 months (<5 kg)	200–400 mL of ORS
4–11 months (5–<8 kg)	400–600 mL of ORS
12–23 months (8–<11 kg)	600–800 mL of ORS
2–4 years (11–<16 kg)	800–1200 mL of ORS
5–14 years (16–<30 kg)	1200–2200 mL of ORS
≥15 years (≥30 kg)	2200–4000 mL of ORS
Severe[c]	
All ages and weights	Undertake IV fluid replacement with Ringer's lactate (or, if not available, normal saline). Give 100 mL/kg in the first 3-h period (or the first 6-h period for children <12 months old); start rapidly, then slow down. Give a total of 200 mL/kg in the first 24 h. Continue until the patient is awake, can ingest ORS, and no longer has a weak pulse.

[a]Adapted from World Health Organization: First steps for managing an outbreak of acute diarrhoea. Global Task Force on Cholera Control, 2009 (*www.who.int/topics/cholera*). [b]Continue normal feeding during treatment. [c]Reassess regularly; monitor stool and vomit output. [d]Volumes of ORS listed should be given within the first 4 h.

Abbreviation: ORS, oral rehydration solution.

TABLE 193-3 COMPOSITION OF WORLD HEALTH ORGANIZATION REDUCED-OSMOLARITY ORAL REHYDRATION SOLUTION (ORS)[a,b]

Constituent	Concentration, mmol/L
Na^+	75
K^+	20
Cl^-	65
Citrate[c]	10
Glucose	75
Total osmolarity	245

[a]Contains (per package, to be added to 1 L of drinking water): NaCl, 2.6 g; $Na_3C_6H_5O_7 \cdot 2H_2O$, 2.9 g; KCl, 1.5 g; and glucose (anhydrous), 13.5 g. [b]If prepackaged ORS is unavailable, a simple homemade alternative can be prepared by combining 3.5 g (~1/2 teaspoon) of NaCl with either 50 g of precooked rice cereal or 6 teaspoons of table sugar (sucrose) in 1 L of drinking water. In that case, potassium must be supplied separately (e.g., in orange juice or coconut water). [c]10 mmol of citrate per liter, which supplies 30 mmol HCO_3/L.

TABLE 193-4 ELECTROLYTE COMPOSITION OF CHOLERA STOOL AND OF INTRAVENOUS REHYDRATION SOLUTION

	Concentration, mmol/L			
Substance	**Na^+**	**K^+**	**Cl^-**	**Base**
Stool				
Adult	135	15	100	45
Child	100	25	90	30
Ringer's lactate	130	4[a]	109	28

[a]Potassium supplements, preferably administered by mouth, are required to replace the usual potassium losses from stool.

The total fluid deficit in severely dehydrated patients (>10% of body weight) can be replaced safely within the first 3–4 h of therapy, half within the first hour. Transient muscle cramps and tetany are common. Thereafter, oral therapy can usually be initiated, with the goal of maintaining fluid intake equal to fluid output. However, patients with continued large-volume diarrhea may require prolonged IV treatment to match gastrointestinal fluid losses. Severe hypokalemia can develop but will respond to potassium given either IV or orally. In the absence of adequate staff to monitor the patient's progress, the oral route of rehydration and potassium replacement is safer than the IV route.

Although not necessary for cure, the use of an antibiotic to which the organism is susceptible diminishes the duration and volume of fluid loss and hastens clearance of the organism from the stool. Adjunctive antibiotics should therefore be administered to patients with moderate or severe dehydration due to cholera. In many areas, macrolides such as erythromycin (adults, 250 mg orally four times a day for 3 days; children, 12.5 mg/kg per dose four times a day for 3 days) or azithromycin (adults, a single 1-g dose; children, a single 20-mg/kg dose) are the agents of choice. Increasing resistance to tetracyclines is widespread; however, in areas with confirmed susceptibility, tetracycline (nonpregnant adults, 500 mg orally four times a day for 3 days; children >8 years old, 12.5 mg/kg per dose four times a day for 3 days) or doxycycline (nonpregnant adults, a 300-mg single dose; children >8 years old, a single dose of 4–6 mg/kg) may be used. Similarly, increasing resistance to fluoroquinolones is being reported, but in areas with confirmed susceptibility, a fluoroquinolone such as ciprofloxacin may be used (adults, 500 mg twice a day for 3 days; children, 15 mg/kg twice a day for 3 days).

PREVENTION

Provision of safe water and of facilities for sanitary disposal of feces, improved nutrition, and attention to food preparation and storage in the household can significantly reduce the incidence of cholera. In addition, precautions should be taken to prevent the spread of cholera via infected and potentially asymptomatic persons from endemic to nonendemic regions of the world (as was probably the case in the ongoing outbreak in Haiti; see "Microbiology and Epidemiology," above).

Much effort has been devoted to the development of an effective cholera vaccine over the past few decades, with a particular focus on oral vaccine strains. In an attempt to maximize mucosal responses, two types of oral cholera vaccine have been developed: oral killed vaccines and live attenuated vaccines. Currently, two oral killed cholera vaccines have been prequalified by the WHO and are available internationally. WC-rBS (Dukoral®; Crucell, Stockholm, Sweden) contains several biotypes and serotypes of *V. cholerae* O1 supplemented with 1 mg of recombinant cholera toxin B subunit per dose. BivWC (Shanchol™; Shantha Biotechnics–Sanofi Pasteur, Mumbai, India) contains several biotypes and serotypes of *V. cholerae* O1 and *V. cholerae* O139 without supplemental cholera toxin B subunit. The vaccines are administered as a two- or three-dose regimen, with