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# Treating cholera in severely malnourished children in the Horn of Africa and Yemen

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Populations in Yemen, South Sudan, Somalia, and Ethiopia are experiencing starvation and concurrent outbreaks of confirmed or suspected cholera (acute watery diarrhoea [AWD]).[1] Drought, conflict, and population displacement in these countries have led to increased food insecurity and a higher incidence of severe acute malnutrition (SAM).[1] Limited access to safe water and poor sanitation have exacerbated cholera and AWD outbreaks and led to the dangerous comorbidity of cholera and SAM in young children. In Yemen, WHO reported that 25% of cholera cases occurred in children less than 5 years old.[2]

While limited guidance exists on fluid management in children with cholera and SAM,[3,4] evidence on best practices and consensus on treatment of the combination of these life-threatening conditions in children less than 5 years old are lacking. Protocols should address specific SAM-related complications including hypoglycaemia, hypothermia, and risk of heart failure in the context of cholera treatment.[5]

In August, 2017, we reviewed guidance documents and treatment protocols on cholera and SAM used by various ministries of health, UN agencies[3,4,6] cluster coordinators,[7,8] and non-governmental organisations in affected countries. The review identified commonalities and differences and raised important concerns. Indications for oral and intravenous rehydration were not always clearly defined, and protocols stipulated differing doses for both oral and intravenous rehydration. For example, oral rehydration with oral rehydration solution varied from 10 to 40 mL/kg for the first 2 h and intravenous rehydration varied from 20 to 60 mL/kg for the first 2 h. Most protocols did not recommend appropriate antibiotic treatment for SAM patients with cholera or AWD. Guidance on how to diagnose SAM in a child with cholera, and on preventing, recognising, and managing specific SAM-related risks such as hypothermia, hypoglycaemia, sepsis, and heart failure was often missing.

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We declare no competing interests.

Based on the review, we recommend the following points for improved guidance at the national and international levels for children suffering from cholera and SAM (panel).

We encourage the international community to make a concerted effort to re-examine protocols currently in use and develop improved and standardised guidelines to support best practice in managing patients with cholera and SAM. For areas where evidence is insufficient, consensus expert opinion should be sought and research should be undertaken to inform evidence-based best practices.

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***Panel:*** **Recommendations for improved guidance at the national and international levels for children with cholera and severe acute malnutrition**

### Diagnosis

- Include specific guidance on SAM detection that includes a combination of visual appearance and anthropometry. In children with cholera, dehydration might cause falsely low weight-for-height Z-scores that could lead to an incorrect diagnosis of SAM, unless additional signs are noted, such as loss of gluteal muscles or visibility of ribs.
- Consider mid-upper arm circumference screening in all patients less than 5 years old in areas with high prevalence of SAM during a cholera and acute watery diarrhoea outbreaks to improve diagnostic accuracy for SAM.
- Emphasise that the cholera rapid diagnostic test should not be used as an individual screening tool, and that negative tests results do not exclude a patient from rehydration treatment according to a SAM and cholera protocol.

### Treatment

- Clearly define indications for intravenous versus oral rehydration treatment.
- Clearly indicate when patients should switch from intravenous to oral rehydration.
- Specify signs to be monitored by health-care providers to assess improvement (eg strength of pulse, general condition or behaviour and urine output).
- List key parameters and vital signs to be monitored, and provide a monitoring template and patient card.
- Define criteria for antibiotic treatment and indicate antibiotic choices, dosages, and regimens (according to antimicrobial susceptibility test results, if available).
- Define indications for a nasogastric tube for rehydration or therapeutic milk feeding.

### Complications

- List and describe complications for which patients with cholera and SAM are at high risk (eg, hypoglycaemia, hypothermia, sepsis and heart failure) and warning signs.
- Define signs of fluid overload and explain its prevention and treatment.

### Nutritional treatment

- Define indications for use of energy sources (eg glucose) and therapeutic milk (eg F-75 or F-100) including feeding regimens (timing and volume).
- Provide recommendations on breastfeeding or use of breastmilk during treatment.

- List indications on transfer to therapeutic feeding centres and stabilisation centres.