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III PATHOGENESIS OF THE TYPICAL SYMPTOMS AND SIGNS OF CHOLERA AND SECONDARY FEATURES

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Nearly all symptoms and signs can be attributed directly to the losses of water and electrolytes in the cholera stools. With rapid correction of these losses, these symptoms and signs (other than continued diarrhoea) disappear. No other specific systemic toxicity is known or need be invoked. There is no clinical difference between cholera caused by classical Inaba-Ogawa organisms or that caused by El Tor Inaba or El Tor Ogawa.

1. Shock - due entirely to fluid losses.
2. Signs of dehydration (sunken eyes, wrinkled fingers, hoarse voice etc.) due entirely to fluid losses.
3. Cyanosis - can be explained by haemoconcentration and increase in dissociated haemoglobin due to anoxia.
4. Rapid, deep respirations - bicarbonate ion is a major buffer of acids produced in normal metabolism (and increased in time of stress and anoxia). With massive loss of bicarbonate in stool, blood pH falls and rapid, deep breathing is a normal compensatory response of the body to this kind of acute acidosis.
5. Vomiting - seen only during the acidotic state and corrected when acidosis is corrected.
6. Pulmonary congestion and signs of heart failure - evidence from cardiovascular studies in cholera patients , showed that acidosis causes marked increase in pooling of blood in the pulmonary venous bed and possibly also left heart failure. In acidosis an infusion of saline without alkali (i.e. fluid load without correction of pH) aggravates this condition, while an infusion of alkaline-saline (i.e. fluid load with correction of pH) improves it.

7. Cramps - possibly related to yet unexplained cellular ion shifts;rapidly vanish with replacement of water and electrolyte losses.
8. Abdominal distention - common in children and in adults who do not receive adequate potassium replacement.
9. Fever - almost always iatrogenic.
10. Renal failure - most often due simply to inadequate hydration and inadequate correction of acidosis (therefore not true"failure" but simply oliguria which may pass on to true tubular necrosis if hydration and electrolyte balance is uncorrected).

Treatment: the only specific therapy for cholera - that will ensure survival and well-being of the patient - is adequate intravenous water and electrolyte replacement of stool losses.

1. Rational basis for composition of single solution intravenous fluid.
2. Use of antibiotics to shorten course and amount of diarrhoea.
3. Treatment programme at the Cholera Research Laboratory.
4. Latest results: in four years over 2 400 cholera patients with twenty-one deaths, less than 1% mortality.

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