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RESEARCH NEWS

Fluid replacement in African malnourished children: too much or too little?

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Article

Myocardial and haemodynamic responses to two fluid regimens in African children with severe malnutrition and hypovolaemic shock (AFRIM study).[1] This article was published online in Critical Care on 3 May 2017.

Why was this research done?

Current WHO guidelines make a distinction in fluid volume and rate of correction of hypovolaemic shock between malnourished children and those who are not malnourished.[2] The rationale for this difference is the presumed risk of biventricular failure due to malnourishment and subsequent risk of fluid overload. However, the evidence for this recommendation is weak and research shows conflicting results.[3-5] For example, the important FEAST trial showed increased mortality in the fluid bolus group; however, this excluded patients with dehydration due to gastroenteritis. Severe dehydrating diarrhoea is a common complication in malnourished children with a high mortality rate.[6]

What was the research question?

To determine the effect of two fluid replacement strategies in hypovolaemic shock due to gastroenteritis in malnourished children on mortality, haemodynamic parameters and cardiac function.

How was this investigated?

In two East African hospitals severely malnourished children between 6 months and 5 years of age and admission because of hypovolaemic shock due to gastroenteritis were included. Group 1 followed the WHO standard protocol with a bolus of 15 ml/kg of Ringer's lactate in one hour, repeated once in case of persistent shock. This was followed by half strength Darrow's/5% glucose at 4 ml/kg/h. Group 2 received 10 ml/kg/h of Ringer's lactate for in total five hours. Both groups were further treated similarly according to the WHO guidelines. All patients underwent clinical assessment with physical examination, blood tests, electrocardiogram, haemodynamic monitoring and transthoracic echocardiography before and after treatment.

Main findings

After screening 174 patients, eleven patients were included in the bolus arm (group 1) and nine patients received the intervention treatment (group 2). Two patients died in group 2 before the intervention could be completed. Mortality after 48 hours was 46% in group 1 and 33% in group 2. The 28-day mortality was 82% versus 56% in group 1 and 2, respectively. However, the study was not powered to yield statistical significance on mortality. Left ventricular fractional shortening, stroke volume index, global radial strain and inferior vena cava collapsibility index could not reliably distinguish survivors from non-survivors. Echocardiographic data were very heterogeneous; however, no evidence of fluid overload could be found and all deaths were deemed largely secondary to underlying comorbidities.

Conclusion and consequences for daily practice

This study does not support a restrictive fluid strategy in malnourished children admitted with hypovolaemic shock due to gastroenteritis in resource-poor settings. Furthermore, this study shows that in resource-poor settings complex pathophysiology studies in critically ill children are possible which will help to improve the care of this vulnerable patient group.

Disclosures

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