

How does HIV affect cardiac function in children admitted for management of severe acute malnutrition in rural Kenya?

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Background. Approximately 3.4 million children are infected with HIV worldwide, 90% in Sub-Saharan Africa. They suffer from severe acute malnutrition (SAM) and mortality amongst this group remains high. We wish to determine the cardiac risk factors for such children in order to target the treatment at those most likely to succumb.

Methods. As part of the CArdiac Physiology in MALnutrition (CAPMAL) Study we recruited children with SAM (marasmus or kwashiorkor) who presented to a rural Kenyan hospital. We used a Vivid I portable echocardiograph to assess cardiac function at day 0, day 7 and day 28 from admission. Bedside observations, co-morbidities and blood tests including HIV status were also recorded.

Results. 52 marasmic and 36 kwashiorkor cases were recruited. 20 (22.7%) were HIV positive (HIV+), more with marasmus (32.7% vs 8.3%; $p=0.007$). Between HIV+ and HIV-, age (23.5 vs 18.5 months), gender (60 vs 53% male), mid upper arm circumference (10.5 vs 11.0 cm) and co-morbidities were similar but a higher proportion presented with chest infections (30 vs 7.4%, odds ratio (OR) 5.4; range 1.4-20.2) in the HIV+ group. HIV+ children had higher heart rates at day 28 (143 vs 131/min, $p<0.05$). HIV+ and HIV- children showed normal average fractional shortening, mitral annular plane systolic excursion (MAPSE), E/A ratio and E'/E ratio. Right ventricular systolic long axis function was reduced (TAPSE 12.8 vs.14.9 mm; $p=0.0123$) and Tei Index was higher in HIV+ at day 7 (0.4 vs 0.29, $p<0.001$). We found no difference in indexed LV mass (g) at any time point (Day 0: 64.8 vs 63.5g day 7: 78.8 vs 69.8g day 7, day 28: 80 vs 77g, all $p>0.05$). In all groups, the cardiac index increased proportionately with the increase in left ventricular dimension in diastole. However, children were more likely to die if they were HIV+ (OR 3.2; CI 0.96-10.76).

Conclusions. Admission with SAM appears to be linked to the presence of HIV, especially in those with marasmus. Despite an improvement in cardiac index and no difference in myocardial performance or structure, malnourished children are more likely to die if HIV positive.