

Diagnostic of tuberculosis in children

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Background

Childhood tuberculosis (TB) mortality is high, particularly in young untreated children. Child-friendly treatments are available, but childhood TB is often underdiagnosed. Lack of adapted tools and care concentrated at central facilities contribute to this situation. We present Epicentre's work on paediatric TB diagnosis in Mbarara and discuss future orientations.

Methods

One cross-sectional study and two prospective cohorts addressed the issue of specimen collection in children unable to produce sputum, comparing string-test and induced sputum in children with presumptive TB (Study-1) and non-sputum tests (urine-LAM and XpertMTB/RIF on stool) in children with increased risk of severe or disseminated TB (Study 2). Study-3 assessed the outcomes of children with presumptive TB.

Results

String-test performed as well as induced sputum using mycobacterial culture (9/105, 8.6% in each group) and Xpert (3/64, 4.7% vs 4/64, 6.3%, $p=1.0$) but 16.1% of children could not swallow the capsule. Of 235 children in Study-2 (69.8% < 2 years, 31.9% HIV-infected, 66.8% severely malnourished, 28.1% with severe pneumonia), 5.1% were TB confirmed. Sensitivity and specificity of urine-LAM and Xpert on stool were 50.0% and 73.7%, and 50.0% and 99.1%, respectively.

Of 360 children in study-3, 140 (38.9%) were treated for TB but only 13% of them were bacteriologically confirmed. At 3 months, 6.9% children had died: 10.7% on TB treatment vs 4.5% not treated ($p=0.025$). Severe acute malnourished children were more likely to die (aHR 9.86, 95%CI 3.11-31.23).

Conclusions

Few children with presumptive TB from high burden countries were bacteriologically confirmed. Xpert on stool is a promising method, but strengthening of clinical and radiological diagnosis is required. Early TB identification of children with co-morbidities, particularly severe pneumonia is needed. The ongoing TB-Speed project evaluates the impact in term of case detection and reduction of mortality of a diagnostic approach combining XpertMTB/RIF Ultra on stool and nasopharyngeal aspirate, staff training and mentorship on clinical and radiological diagnosis and digital X-ray at peripheral facility level. TB-Speed also evaluates algorithms for TB screening and diagnosis of children with severe pneumonia, HIV-infection and severe acute malnutrition.

Epicentre's research on diagnosis of childhood tuberculosis in Mbarara highlights the difficulties of bacteriological confirmation and the need for innovative diagnostic approaches using child friendly tools suitable to low-level health care facilities. This is currently evaluated in TB-Speed.