Finding tuberculosis in children with severe acute malnutrition: a multi-country observational study

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Background

Diagnosing tuberculosis (TB) in children is challenging, especially in children with severe acute malnutrition (SAM), as differentiating TB from other comorbidities is particularly complex. Laboratory results are usually negative and sputum samples difficult to obtain. Urine-based point-of-care Determine TB-LAM is WHO-recommended in children living with HIV, which along with the new Fuji-LAM, may be useful in children with SAM (also immunocompromised). WHO has recommended new treatment decision algorithms (TDAs) for TB in children, with and without Xray, emphasizing clinical diagnosis. We assessed the diagnostic accuracy of these TDAs and of TB-LAM tests in children with SAM.

Methods

The prospective diagnostic TB ALGO PED study included children under 10 years with signs or symptoms of TB in five sub-Saharan Africa countries. The TDA in SAM nested study included children with SAM from Niger, Nigeria and South Sudan. The TB-LAM in SAM included HIV-negative children with SAM from these three countries and Uganda. Each child was classified as confirmed/unconfirmed TB or unlikely TB using a composite reference standard.

Results

Among 1068 children included in the TDAs in SAM study, median age was 1.3 years (IQR: 0.8-2.0), 98.5% were hospitalized, and 245 (22.9%) initiated TB treatment (72% based on clinical symptoms). The TDAs had a sensitivity of 84.5% (95%CI: 79.0–88.8) and specificity of 85.7% (95%CI: 83.2-87.9). Among the 990 HIV-negative children enrolled in the TB-LAM in SAM study, Determine TB-LAM had a sensitivity of 38.8% (95%CI: 32.3-45.7) and specificity of 63.8% (95%CI: 60.3–67) and FujiLAM had a sensitivity of 11.0% (95%CI: 5.9-22.5) and specificity of 96.5% (95%CI: 94.1-98.0).

Conclusion

The new WHO algorithms for TB showed high sensitivity and acceptable specificity in children with SAM. In HIV-negative children with SAM, Determine TB-LAM test had low specificity that do not support its use. FujiLAM showed high specificity and may have potential as a rule-in test.

WHO treatment decision algorithms are an accurate tool to diagnose TB in children with SAM. Determine TB-LAM in HIV-negative children with SAM is not recommended.