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**Title:** Improved and immediate diagnostics in mediastinal sarcoid lymphadenopathy via endobronchial ultrasound and quadruple testing

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**Body:** Background: Mediastinal lymphadenopathy carries a wide differential diagnosis, including sarcoidosis, Tuberculosis (TB) and malignancy. Endobronchial Ultrasound-guided Transbronchial Nodal Aspiration (EBUS-TBNA) allows safe access to these nodes. Methods: 119 patients with mediastinal lymphadenopathy were referred to our tertiary centre for EBUS-TBNA between January 2010 and August 2011. Final diagnoses were used to explore the utility of the 4 tests performed through EBUS-TBNA: immunology (IGRA and/or Tuberculin Skin Test); cytology; microscopy/culture; and the GeneXpert MTB/RIF integrated TB PCR assay. Results: 27 patients (23% of cohort) were diagnosed with sarcoidosis based upon consistent clinical features and supportive TBNA. Cytology was predominantly non-caseating granulomata (24/27 (89%); 3/27 reactive). Immunology was negative in 22/25 (88%), positive in 3/25, not tested in two patients. Sensitivity and specificity for sarcoidosis with immunology alone was 87% and 69%, respectively, with specificity improved by cytology to 91%. GeneXpert was negative in all six further cases otherwise inconclusive by combined immunology/cytology testing (reactive appearances (3), immunology positive (3) or not done (2)). Three patients failed empirical TB treatment and were later re-diagnosed as sarcoidosis; all were PCR-negative. Conclusions: Combined immunology/TBNA-cytology data provide good specificity for sarcoidosis in patients with mediastinal lymphadenopathy. The inclusion of negative GeneXpert MTB/RIF in our cohort provided support in diagnosis for an additional 29% of cases. Quad-testing provides a fast-track and accurate diagnosis of sarcoidosis over TB.