Correlation between Monocyte to Lymphocyte ratio (ML ratio) and tuberculin skin test (TST) among adults living with HIV

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Background and objectives:
The Tuberculin skin test (TST) can identify individuals at increased risk for TB but TST poses major logistical challenges. The peripheral blood Monocyte to Lymphocyte ratio (ML ratio) could be an alternative as extremes in ML ratios have been associated with an increased TB risk in HIV-positive adults. No other study has examined the relationship between TST and ML ratio in HIV-positive adults.

Methods:
Adults presenting for a pre-HAART visit at a primary care clinic in Northern Johannesburg, who were free of TB symptoms and had a TST done as part of routine HIV care were enrolled. A differential white blood cell count (including monocytes and lymphocytes) was performed in addition to the routine baseline blood tests.

Results:
Of the 259 HIV-positive adults enrolled, the TST was positive in 51 (30%) of the 171 participants returning for TST reading. Median monocyte count was 0.26 cells/mm³ (IQR 0.21-0.35), median lymphocyte count was 1.52 cells/mm³ (IQR 1.08-1.92), and median ML ratio was 0.18 (IQR 0.13-0.28). TST positivity decreased linearly with increasing ML ratio (Pearson -0.927, p <0.01). In those with ML ratio ≤ 0.36, TST positivity was 33% (47/141) compared to 13% (4/30) in those with ML ratio > 0.36 (p=0.03). In regression analysis, a positive TST was associated with a lower ML ratio (OR 0.78 for every 0.1 increase in ML ratio, 95%CI 0.59-0.97), higher lymphocytes (OR 1.98 for lymphocyte count > 1.70 cells/mm³, 95% CI 1.02-3.91), and higher CD4 (OR 3.82 for CD4 > 250, 95%CI 1.89-8.14). In multivariate analysis, CD4 > 250 was the only variable associated with a positive TST (OR 3.10, 95%CI 1.37-7.35).

Conclusion:
While TST positivity decreased significantly with increasing ML ratio, this negative correlation likely reflects differences in CD4 immunity levels. Therefore, ML ratio cannot replace TST in people living with HIV.