Comparison between calculated and direct measurements of CD4 percentage for immunological monitoring of antiretroviral therapy in children


MRC / UVRI Uganda Research Unit on AIDS

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• 2.1 million Children are estimated to be living with HIV/AIDS; majority in sub-Saharan Africa

• CD4 levels are required for ART initiation and immunologic monitoring

• In children CD4% is applied

• Limited facilities to perform direct CD4% measurement

• The alternative approach is to compute the CD4 percentage
OBJECTIVE

• To compare calculated and direct measurements of CD4 percentage in assessing pediatric eligibility for ART and immune monitoring.
METHODS

• CD4% was determined for 99 children enrolled in ARROW trial at MRC by two approaches:

  – Direct CD4% using the single platform assay by BD Facscalibur as a gold standard.

  – CD4% computed from absolute lymphocytes obtained by Beckman Coulter and CD4 count obtained by BD Facscount flowcytometer.

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  \text{CD4\%} = \frac{\text{Absolute CD4 count}}{\text{Absolute lymphocytes}} \times 100
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The BD FACSCalibur™
ANALYSIS

• The two techniques were compared using:
  – Bland -Altman statistical methods
  – Lin’s concordance correlation coefficient (Rc)

• Using the Facscalibur as the gold standard the sensitivity and specificity of the computation method was determined
95% limits of agreement were between -6.28 to 4.4 (width interval = 10.7)

This suggests acceptable agreement between the methods.
RESULTS

Lin’s concordance correlation coefficient (Rc)

There was a strong agreement between computed CD4% and direct CD4% values of 0.97.

Excellent agreement is defined as Rc > 0.90
RESULTS

- The computed method had
  - sensitivity of 100%
  - specificity of 97.3%
CONCLUSIONS

• Computing CD4 percentage could be a reliable alternative method for pediatric immunologic monitoring in centers that can afford low cost CD4 count testing facilities without access to automated analysers.

• The high sensitivity and specificity tests mean that many children who need to be started on ART cannot be missed.
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