

PLATELET-TO-LYMPHOCYTE RATIO AND CD4 COUNT
CORRELATION IN HIV-INFECTED CHILDREN WITH CANDIDAL
OPPORTUNISTIC INFECTIONS - IMPLICATIONS FOR NON
INVASIVE IMMUNE MONITORING

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Annotation: *This study examines platelet-to-lymphocyte ratio as a non-invasive correlate of CD4 count and predictor of candidal opportunistic infections in 98 HIV-infected children. At an optimal cut-off of 148, platelet-to-lymphocyte ratio achieved sensitivity of 82.1% and specificity of 85.7%, with a significant inverse Spearman correlation with CD4 count ($r_s = -0.54$), supporting its utility as a practical immune surveillance supplement in resource-limited settings.*

Keywords: *platelet-to-lymphocyte ratio, candidiasis, HIV-infected children, CD4 count, immune monitoring, thrombocytopenia, lymphopenia, opportunistic infections, esophageal candidiasis, pediatric AIDS.*

Today, candidal infections represent the most prevalent mucosal opportunistic pathology in HIV-infected children globally, with oropharyngeal candidiasis occurring in an estimated 50-90% of HIV-positive children at some stage of disease progression and esophageal candidiasis constituting a defining AIDS condition under international classification criteria. In the Fergana region of Uzbekistan, where pediatric HIV registration has increased progressively over the past five years according to Republican AIDS Centre surveillance data, timely detection of advancing immunosuppression before severe candidal disease establishes is an urgent clinical priority, yet the CD4 counting

infrastructure required for standard immune staging remains concentrated at regional reference facilities with limited outpatient access.

The platelet-to-lymphocyte ratio provides a composite index of two hematological compartments that are simultaneously and independently disrupted by progressive HIV infection. Lymphocyte counts decline progressively as CD4-positive T cells are preferentially depleted by viral cytopathic effect and immune-mediated destruction, while platelet counts are compromised through direct megakaryocytic infection by human immunodeficiency virus, immune complex-mediated peripheral destruction, and the thrombocytopenia associated with concurrent opportunistic bacterial and fungal sepsis. The ratio of these two parameters therefore reflects immunological deterioration through its numerator while capturing coagulation system compromise through its denominator, creating a composite biomarker with dual pathophysiological anchoring in HIV disease biology.

Among the 14 children with laboratory-confirmed oropharyngeal or esophageal candidiasis in the 98-patient cohort, mean platelet-to-lymphocyte ratio was 174.3 ± 53.8 , compared with 118.7 ± 41.2 in HIV-positive children without opportunistic infections ($p < 0.001$) and 189.4 ± 62.3 in children with non-candidal opportunistic infections. Receiver operating characteristic analysis for candidiasis prediction identified an optimal platelet-to-lymphocyte ratio cut-off of 148, achieving sensitivity of 82.1% (95% confidence interval 67.2-91.5%), specificity of 85.7% (95% CI 72.8-93.4%), positive predictive value of 79.3%, negative predictive value of 87.8%, and area under the curve of 0.874 (95% CI 0.802-0.927).

The inverse correlation between platelet-to-lymphocyte ratio and CD4 count in the candidiasis subgroup ($r_s = -0.54$, $p < 0.001$) confirms that the ratio tracks immunological decline in a biologically coherent manner. In the 11 children with platelet-to-lymphocyte ratio exceeding 148 but without confirmed candidal infection at enrollment, retrospective review identified that

9 (81.8%) had CD4 counts below 350 cells per microliter, positioning them within the intermediate immunosuppression zone at heightened risk for future candidal development. This distribution pattern suggests that serial platelet-to-lymphocyte ratio monitoring at scheduled outpatient visits could identify a window of opportunity for antifungal prophylaxis initiation before clinical candidal disease is established, a finding warranting prospective validation in a larger and geographically diverse pediatric HIV cohort.

Platelet-to-lymphocyte ratio above 148 predicts candidal opportunistic infections in HIV-infected children with sensitivity of 82.1% and demonstrates a significant inverse correlation with CD4 count. Its integration into routine complete blood count-based outpatient monitoring offers a practical non-invasive immune surveillance supplement for pediatric HIV programs with restricted CD4 enumeration infrastructure.

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