ORIGINAL RESEARCH

63. Myeloid-Derived Suppressor Cells in HIV: A Marker Beyond CD4 Count?

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Background: HIV infection causes profound immune dysregulation, primarily through $CD4^+$ T lymphocyte depletion and persistent immune activation. Myeloid-derived suppressor cells (MDSCs) have recently been recognized as key immunoregulatory cells. They represent a heterogeneous population of immature myeloid cells with strong capacity to suppress T cell proliferation and cytokine production, often mediated via PD-L1 expression and arginase activity. While their role has been described in cancer and other chronic infections, their contribution to HIV pathogenesis, clinical manifestations, and therapy response remains insufficiently defined.

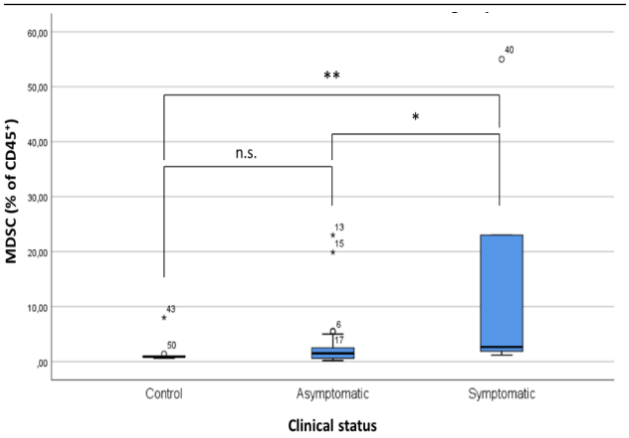
Aim: The aim of this study was to investigate the role of MDSCs and PD-L1 expression in HIV-positive patients, in relation to clinical symptoms, $CD4^+$ T cell count, and type of antiretroviral therapy (ART).

Methods: Peripheral blood samples from 41 HIV-positive patients and 10 healthy controls were collected. Flow cytometry was performed to quantify MDSCs (absolute counts and percentage of $CD45^+$ cells), PD-L1 expression on MDSCs, and $CD4^+$ T cell counts. Patients were stratified by clinical status (symptomatic vs. asymptomatic), $CD4^+$ stage (<200/µl, 200–500/µl, >500/µl), and ART regimen (PI+NRTI, PI+NNRTI, NRTI+NNRTI, or no therapy). Statistical analysis was carried out using IBM SPSS v26. Normality of data was evaluated with the Shapiro–Wilk test. Depending on distribution, comparisons were made using t-test, ANOVA, Mann–Whitney U, or Kruskal–Wallis test. Correlations between continuous variables were assessed using Spearman's rho.

Results: MDSC percentages were significantly higher in HIV patients compared to healthy controls ($p = 0.007$). Within the HIV group, symptomatic patients showed elevated MDSC levels ($p = 0.045$) and lower $CD4^+$ counts ($p = 0.032$) than asymptomatic individuals. Stratification by $CD4^+$ stage revealed a trend toward increasing MDSC percentages with advancing disease, though this did not reach significance ($p = 0.077$). No differences were observed between ART regimens in relation to MDSCs, $CD4^+$ counts, or PD-L1 expression (all $p > 0.5$). Moreover, PD-L1 expression on MDSCs did not correlate with $CD4^+$ counts or MDSC percentages ($p > 0.1$).

Conclusion: Elevated MDSC levels distinguished HIV patients from healthy controls and were further increased in symptomatic cases, suggesting a contribution to clinical manifestations of immune imbalance. Although PD-L1 expression did not correlate with disease stage or therapy type, MDSCs provide insights beyond $CD4^+$ counts in assessing immune status. These findings highlight the potential of MDSCs as early immunosuppressive markers in HIV. Larger studies incorporating functional assays are warranted to validate their diagnostic and therapeutic relevance and to explore whether therapeutic modulation of MDSCs could open new avenues in the management of chronic HIV infection.

Figure 1. MDSC% in Controls and HIV Patient Subgroups



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ISSN 2076-6327

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