**Background**: Thymic production of T-cells is important for maintenance of good immunological function in HIV infected individuals, however methods of measurement of recent thymus emigrant (RTE) T-cells are not easily adapted to use in HIV clinics. CD31 expression on CD4 cells is a marker of RTE CD4 cells and can be easily incorporated into common clinical monitoring procedures. We hypothesized that quantification of RTE measured as CD4+CD31+ predicts subsequent clinical course of HIV infection.

**Methods**: We performed a 2 year longitudinal prospective study of 69 perinatally HIV infected individuals from a single HIV clinic. CD31 expression was measured using a modified FACs procedure incorporating a FITC-conjugated anti CD45 (BD7.82) into a standard CD4+ measurement routine. Other data are from medical records. For analyses, patients’ HIV clinical status was categorized as good (CD4 ≥ 25% and HIV RNA ≤ 10 eq/ml), intermediate (25% < CD4 < 50% or poor (< 25%), Spearman’s rho, Kruskal-Wallis, Kaplan-Meier, Log Rank tests and Cox proportional hazards models were used.

**Results**: CD4+CD31+ cells correlated positively with CD4+ numbers but were independent of plasma HIV RNA levels. Using an experiment determined discriminator of 56% CD4+CD31+ we used Kaplan-Meier analysis to test whether baseline CD4+CD31+ value predicts subsequent clinical status. Patients in good or intermediate clinical status who had CD4+CD31+ value < 56% at enrollment had significant (p=0.0064) deterioration in the clinically poor classification over the subsequent 2 years as compared to those with CD4+CD31+ ≥56%. Reciprocally, patients in poor or intermediate clinical status who had CD4+CD31+ ≥56% at enrollment had notable improvement to clinically good status (p=0.0254) over 2 years as compared to those with CD4+CD31+<56%. CD4+CD31+ measurements provided a predictive capacity that did not overlap with T-cell activation measured as CD8+CD38+ ≥17%.

**Conclusions**: For perinatally HIV infected patients in good immunological status, the finding of < 56% of CD4 cells expressing CD31 is a predictor of subsequent clinical deterioration. The population identified by this CD31-based criterion did not overlap with that classified as having poor prognosis using the CD8+CD38+ marker of T-cell activation. CD31 on CD4+ cells is a practical additional to established routine methods for immunological assessment of HIV patients and is applicable even with rudimentary FACs hardware.

**Introduction**

- In an era of wide spread cART, conventional measures of HIV disease status, CD4% and VL, fail to identify some patients whose disease will progress.

- CD31 (platelet endothelial cell adhesion molecule-1 [PECAM-1]) is a 130-kDa glycoprotein expressed on the surface of platelets, endothelial cells, monocytes, neutrophils, and subsets of lymphocytes. It is easily measured by flow cytometry and has been used as a marker of recent thymic emigrants (RTE).

**CD31 Expression on CD4 Cells Predicts Clinical Course of HIV in a Perinatally HIV Infected Cohort**

Rania Zakhour, Gilllen Rodriguez, Cynthia S. Bell, Guenet Degaffe, Laura J. Benaminois, Gabriela Del Bianco, Elizabeth Donnachie, Dat Q. Tran, James R. Murphy, Gloria F. Heresi

**Abstract**

- We hypothesized that RTEs, as measured by CD31 expression on CD4+ cells, will predict disease progression over time in perinatally infected HIV positive children.

**Introduction**

- The study involved 69 HIV positive patients, perinatally infected, receiving care through the Pediatric HIV Clinic of UTHouston.

- Blood samples were collected at each routinely scheduled clinic visit between January 2010 and September 2012. Clinical and laboratory data were extracted from medical records.

**Methods**

- Patients were classified into clinical status groups based on CD4% and HIV RNA copesial findings from the enrollment blood sample. (Table 1)

**Table 1 – Clinical status grouping**

<table>
<thead>
<tr>
<th>Clinical Status</th>
<th>CD4%</th>
<th>VL (copies/ml)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cgood</td>
<td>≥25</td>
<td>&lt;50</td>
</tr>
<tr>
<td>Cpoor</td>
<td>&lt;25</td>
<td>≥50</td>
</tr>
</tbody>
</table>

- * One patient had CD4 <25% and <50 HIV RNA copesial and was excluded from the study. Clnt = Clinical Status intermediate.

- * Numbers shown are medians and interquartile ranges.

**Results**

- We demonstrate that having poor (<50%) levels of CD4+CD31+ cells at day 0 strongly and highly significantly associates with clinical deterioration over the following 2 years (Figure 2a).

- A good level of CD4+CD31+ cells at day 0 shows a less strong but nearing significant association with clinical improvement over the following 2 years.

**Conclusion**

- CD4+CD31+ cells by flow cytometry is a technically simple procedure that can be easily integrated to established routine methodology and performed even in facilities with limited resources.

- For a population of perinatally HIV infected children with relatively good immunological and virological status at the time of study enrollment, CD4+CD31+ percentage less than 50% predicts progression of disease independently from VL or immune activation as measured as CD8+CD38+ cells.

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