CD4 Counts in Patients Diagnosed With HIV Through Routine HIV Screening in Two Urban Emergency Departments

To the Editors:

The feasibility and success of Emergency Department (ED) HIV screening programs has begun to be reported,[1–5] but there has been little analysis of the characteristics of patients who are confirmed to be infected with HIV. We therefore analyzed the characteristics of patients, including initial CD4 counts, who are confirmed to be HIV positive after the implementation of routine HIV screening in 2 urban EDs; The George Washington University Medical Center (GWUMC) in Washington, DC, and the Alameda County Medical Center (ACMC) in Oakland, CA. At both centers, HIV screening is performed point-of-care using the OraQuick ADVANCE Rapid HIV-1/2 antibody test. Each of these screening programs has been described in detail elsewhere.[5,6]

We studied only those patients who had been identified as HIV positive through a routine emergency department HIV screening program. Confirmation of HIV infection was by Western Blot. Data were abstracted from the electronic medical record at each site (ACMC 1/1/05–2/28/09, GWUMC 9/1/06–2/28/09). The Institutional Review Boards at each site approved the data collection and statistical review.

The study sample was 169 patients with confirmed HIV infection. The mean age at diagnosis was 36.5 years (SD 11.3), and more than half of the sample (59.2%) was between 25 and 45 years of age. Seventy six percent were men, 71% were African American, 12.4% were non-Hispanic white, and 7.7% were Hispanic. Comparisons of the baseline characteristics showed a nonsignificant trend toward a greater proportion of African American patients at the GWUMC (80.0% vs 66.7%, $P = 0.073$), whereas a higher proportion of patients at the ACMC were Hispanic (10.5% vs 1.8%, $P < 0.05$).

As shown in Table 1, 161 of the 169 HIV-positive patients had CD4 counts obtained at the time of their diagnosis. The median CD4 count was 284 cell per microliter (IQR: 65–499). More than half of the patients (58.4%) had a CD4 count <350 cells per microliter, and 40.4% had a CD4 count <200 cells per microliter. The median CD4 count was lower in patients at the GWUMC than at the ACMC [median 162 (IQR: 26–400) vs. 320 (IQR: 123–527), $P < 0.01$]. The median viral load for the overall sample was 17,250 RNA copies per milliliter (IQR: 798–67,850); the median viral load of patients in District of Columbia lower than those in California [median 509 (IQR: 71–45,000) vs. 23,000 (7080–77,400) $P < 0.01$]. Patients in District of Columbia were less likely to have viral loads ≥10,000 copies per milliliter (36.0% vs. 67.3%, $P < 0.001$). We examined the reason for discrepant findings regarding aggregate CD4 counts and viral loads (ie, significantly lower CD4 and lower viral loads in District of Columbia). There was no significant difference between the proportion of patients missing CD4, viral load, or both between GWU and ACMC (10.9% with at least 1 missing value vs. 7.0%, $P = 0.39$). There were more GWUMC patients missing viral load data than ACMC (9.1% vs. 3.5%, $P = 0.13$) and more ACMC patients missing CD4 data than GWUMC (5.3% vs. 3.6%, $P = 0.641$). Given the smaller sample size, missing data, and the variability of viral load, together these had the effect of making the aggregate values seem discordant. In view of this, we found that the data regarding CD4 count were more reliable than those regarding viral loads.

A CD4 <350 cells per microliter was less likely in African American patients [OR: 0.35 (95% CI: 0.14 to 0.87)]. Comparing only those who self identified as white, African American, and Hispanic, there was a significant difference in mean CD4 counts [white 219.5 cells/μL (SD: 222.7), African American 350.2 cells/μL (SD: 285.1), Hispanic 224.5 cells/μL (SD: 160.6), $P < 0.03$)]. CD4 test results may be used to determine the level of immunosupression

TABLE 1. Description of Patients Newly Identified as HIV Positive at the George Washington University Medial Center and the Alameda County Medial Center Emergency Departments (N = 169).

	Overall (N = 169)		GWUMC (n = 55)		ACMC (n = 114)	
	N	%	n	%	n	%
Gender						
Male	128	75.7	39	70.9	89	79.1
Female	41	24.3	16	29	1 25	21.9
Age (yrs)						
<20	5	3.0	4	3.5	1	1.82
20–30	58	34.3	38	33.3	20	36.4
31–40	38	22.5	26	22.8	12	21.8
>40	68	40.2	46	40.4	22	40.0
Race						
Black/African American	120	71.0	44	80.0	76	66.7
White	21	12.4	8	14.6	13	11.4
Hispanic	13	7.7	1	1.8	12	10.5
Other	15	8.9	2	3.6	13	11.4
CD4 (μL)*						
>500	39	24.2	8	15.1	31	28.7
>350 to <500	28	17.4	7	13.2	21	19.4
>200 to <350	29	18.0	9	17.0	20	18.5
<200	65	40.4	29	54.7	36	33.3
Viral load (RNA copies/mL)						
<400	34	21.3	24	48.0	10	9.1
400–9999	34	21.3	8	16.0	26	23.6
>10,000	92	57.5	18	36.0	74	67.3

*n = 6, missing ACMC; n = 2, missing GWUMC. Difference between sites with respect to CD4: $P = 0.055$.

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and the stage of the disease after the diagnosis of HIV is made.[7] In general, the longer the time from initial infection to diagnosis, the greater the immunosuppression and the lower the CD4 count. The baseline CD4 cell count also remains the dominant prognostic factor for patients starting highly active antiretroviral therapy.[8,9] Using the generally accepted AIDS-defining CD4 count (<200 cells/μL), we found that 40% of screened ED patients had AIDS at the time of diagnosis. Further, more than 50% of the ED patients had CD4 counts <350 cells per microliter and the median CD4 count was relatively low at 284 cells per microliter.

The mean CD4 count found in our ED cohort is considerably lower than the national mean CD4 count reported by Crum-Cianflone et al.[10] The CD4 counts in our cohort were also lower than those reported in a study of over 2000 HIV-positive patients at 4 urban community clinics.[11] In that study, 56% of patients had a CD4 count of less than 350 cells per microliter (compared with our ED cohort with 58% having a CD4 count of less than 350 cells/mm/μL) and 36% had a CD4 count of less than 200 cells per microliter (compared with our ED cohort in which 40% had a CD4 count of less than 200 cells/μL).

Our results may also be compared with the most recent data for CD4 results collected across 33 States in the United States.[8] This data, collected by the CDC, reveals that the initial CD4 count was below 200 cells per cubic millimeter in 32% of the patients, and 40% had a CD4 count below 350 cells per cubic millimeter. Compared with HIV-positive patients reported nationally, our sample of HIV-positive patients identified through ED screening were "more" likely to have advanced illness at the time of diagnosis, and most are likely candidates to start antiretroviral therapy.

Despite implementing routine HIV screening protocols in 2 urban EDs, there were differences in the stage of illness between HIV-positive patients identified at the study sites. Reasons for these differences are not known, but may be attributed to regional factors, such as differences between the ED populations in terms of HIV risk, socioeconomic makeup, demographic characteristics, education level, access to primary care, prior HIV testing, and inclusion of nonscreened patients. There is evidence that a baseline viral load of 100,000 copies per milliliter or greater is associated with a slightly higher probability of progression to AIDS[12]; and in this study, the mean viral load was more than 100,000 copies/mL. Based on this measure alone, more than half of the patients diagnosed with HIV had a higher than average risk of disease progression.

This study demonstrates that most individuals found to have HIV infection in a routine ED HIV screening program have CD4 cell counts that are consistent with advanced disease, and that nearly half receive a diagnosis of serologic AIDS at the time of HIV diagnosis. Our results suggest that ED patients are more likely to have advanced illness at the time of diagnosis compared with patients diagnosed with HIV through other sites.

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How Long Is the Right Interval for Assessing Antiretroviral Pharmacy Refill Adherence?

To the Editors:

Near-perfect adherence to highly active antiretroviral therapy (HAART)

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