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NOTES

Beta-2 Microglobulin Values among Human Immunodeficiency Virus (HIV)-Negative, HIV-Positive Asymptomatic, and HIV-Positive Symptomatic Ugandans

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Mean serum beta-2 microglobulin levels among healthy human immunodeficiency virus-seronegative and asymptomatic and symptomatic human immunodeficiency virus-seropositive Ugandans were found to be 2.35, 3.75, and 5.06 mg/liter, respectively ($P < 0.001$). The upper limit of the normal range (3.5 mg/liter) is higher in this African population than that reported elsewhere.

The serum beta-2 microglobulin level is elevated in human immunodeficiency virus (HIV)-infected people and has been shown to be a better predictor of HIV infection status than CD4 counts and a better predictor of survival (1). Several studies in the United States have shown that elevated beta-2 microglobulin levels are associated with disease progression to AIDS among HIV-seropositive subjects in the United States (3–7). The present study was designed to determine the normal range of serum beta-2 microglobulin levels among asymptomatic HIV-seronegative Ugandan subjects and to determine if the beta-2 microglobulin level is correlated with the stage of HIV infection in Ugandans.

Subjects. HIV-seronegative subjects were recruited from the AIDS Information Centre, Kampala, Uganda, where they had sought counselling and confidential HIV antibody testing. Subjects were asked a series of questions concerning their reasons for seeking HIV antibody testing. Anyone who listed sickness, fever, a sexually transmitted disease, death of a spouse or sexual partner, or suspicions about a sexual partner was excluded from the study. HIV-seropositive subjects were recruited from the Makerere University-University of California—San Francisco clinics for Kaposi's sarcoma and sexually transmitted diseases at Old Mulago Hospital, Kampala, Uganda. These patients underwent a clinical assessment for symptoms, including questions about fever, weight loss, sweats, diarrhea, rash, and cough. Patients were included in the asymptomatic group if they denied having any symptoms except for exposure to a sexually transmitted disease.

Methods. HIV antibody tests were performed in duplicate by using the Wellcozyme HIV type 1 (HIV-1) and -2 enzyme-linked immunosorbent assay (ELISA) kit (Wellcome Foundation) and the Recombigen HIV-1 ELISA kit (Cambridge Biotech Corporation) according to the manufacturers' directions. Beta-2 microglobulin levels were measured at the Joint Clinical Research Centre in Kampala, Uganda, by using a competitive enzyme immunoassay (Pharmacia) by personnel who were blinded to the source and HIV antibody status of the serum samples. Serum creatinine levels were measured by using an autodry chemistry analyzer, Spotchem sp-4410 (Kyoto Daiichi Kagaku Co., Ltd).

Results. Sixty-six subjects ranging from 24 to 73 years of age were included in the study. Thirty-eight (57.6%) were HIV seronegative and reported no symptoms, 12 (18%) were HIV antibody seropositive but asymptomatic, and 16 (24.2%) were HIV seropositive and symptomatic.

The mean beta-2 microglobulin levels were 2.35 mg/liter (standard deviation [SD] = 0.61) among the HIV-seronegative individuals, 3.75 mg/liter (SD = 0.66) among the asymptomatic HIV-seropositive subjects, and 5.06 (SD = 1.74) among the HIV-seropositive symptomatic subjects. The mean beta-2 microglobulin levels were significantly different ($P < 0.001$) by analysis of variance. Ninety-five percent of the HIV-seronegative subjects had beta-2 microglobulin levels of ≤3.5 mg/liter.

All of the HIV-seronegative subjects had normal creatinine levels. Seven (22%) HIV-seropositive symptomatic individuals had elevated creatinine levels, whose values were between 1.5 and 2.2 mg/dl. There was no significant correlation between elevated serum creatinine levels and high beta-2 microglobulin levels.

Discussion. The manufacturer's suggested upper limit of the normal range (95th percentile) for the beta-2 microglobulin assay that we used is 2.0 mg/liter, which has been the accepted normal value. The results of this study show that the upper limit of normal (95th percentile) for the Ugandan population is ≤3.5 mg/liter. This value is higher than the values cited in the literature (2, 3). The Ugandan subjects we studied may have slightly elevated beta-2 microglobulin levels due to infections other than HIV. Malaria, schistosomiasis, and tuberculosis are all endemic in this population, although the effects of these diseases on beta-2 microglobulin levels were not studied.

The higher levels of beta-2 microglobulin in the HIV-seronegative subjects did not impair the specificity of the test as a marker for HIV infection and stage of HIV disease. On the contrary, we found that only 5% of patients uninfected with HIV had beta-2 microglobulin levels of >3.5 mg/liter while

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50% of HIV-seropositive asymptomatic subjects and 75% of HIV-seropositive symptomatic subjects had abnormal beta-2 microglobulin levels. We propose that the upper limit of normal beta-2 microglobulin levels reported here is more appropriate for use by clinicians and investigators in African countries.

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