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Anemia and iron homeostasis in a cohort of HIV-infected patients in Indonesia

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Abstract

Background: Anemia is a common clinical finding in HIV-infected patients and iron deficiency or redistribution may contribute to the development of low hemoglobin levels. Iron overload is associated with a poor prognosis in HIV and Hepatitis C virus infections. Iron redistribution may be caused by inflammation but possibly also by hepatitis C co-infection. We examined the prevalence of anemia and its relation to mortality in a cohort of HIV patients in a setting where injecting drug use (IDU) is a main mode of HIV transmission, and measured serum ferritin and sTfR, in relation to anemia, inflammation, stage of HIV disease, ART and HCV infection.

Methods: Patient characteristics, ART history and iron parameters were recorded from adult HIV patients presenting between September 2007 and August 2009 in the referral hospital for West Java, Indonesia. Kaplan-Meier estimates and Cox's regression were used to assess factors affecting survival. Logistic regression was used to identity parameters associated with high ferritin concentrations.

Results: Anemia was found in 49.6% of 611 ART-naïve patients, with mild (Hb 10.5 - 12.99 g/dL for men; and 10.5 - 11.99 g/dL for women) anemia in 62.0%, and moderate to severe anemia (Hb < 10.5 g/dL) in 38.0%. Anemia remained an independent factor associated with death, also after adjustment for CD4 count and ART ($p = 0.008$). Seroprevalence of HCV did not differ in patients with (56.9%) or without anemia (59.6%). Serum ferritin concentrations were elevated, especially in patients with anemia ($p = 0.07$) and/or low CD4 counts ($p < 0.001$), and were not related to hsCRP or HCV infection. Soluble TfR concentrations were low and not related to Hb, CD4, hsCRP or ART.

Conclusion: HIV-associated anemia is common among HIV-infected patients in Indonesia and strongly related to mortality. High ferritin with low sTfR levels suggest that iron redistribution and low erythropoietic activity, rather than iron deficiency, contribute to anemia. Serum ferritin and sTfR should be used cautiously to assess iron status in patients with advanced HIV infection.

Keywords: anemia, iron, HIV

Background

Anemia is a common clinical finding in HIV-infected patients and is associated with advanced disease, lower quality of life and higher mortality [1-4]. Many factors may contribute to the development of anemia in HIV-infected patients including nutritional deficiencies, opportunistic infections, AIDS-related malignancies, drug treatment and a direct effect of HIV on the bone marrow [4]. Iron deficiency and inflammation-induced iron maldistribution may also contribute to HIV-associated anemia [5,6]. Due to the effects of inflammation, iron is diverted from the circulation into the reticulo-endothelial system and other storage sites. Apart from inflammation, also HCV may possibly contribute to redistribution of iron [7]. Hepcidin plays an important role in these processes [8,9], by limiting the availability of iron for hematopoiesis [10]. Iron maldistribution may have another unwanted effect; it may increase susceptibility to opportunistic infections, and accelerate disease progression [7,11-14]. Indeed, iron overload is associated

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