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Natural killer cell activity: a promising tool to screen for malignancy in hemodialysis patients

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Objectives : Natural killer (NK) cells are lymphocytes of innate immune system that play a key role in immune response towards viral infections and tumors. NK cell deficit has been suggested in patients undergoing hemodialysis (HD) with conflicting results regarding their activity. Decreased NK cell cytotoxicity has been noted in malignancy and recent data suggest measurement of NK cell activity as a useful tool for assessing changes in immunosurveillance in high risk patients. Aim of this study was to measure NK cell activity using a high-throughput assay in HD patients and their significance as a screening tool for malignancy in HD patients.

Methods : Clinically stable prevalent HD patients (n=218) from three HD clinics as well as healthy control subjects (n=340) were enrolled. Another group of HD patients with untreated newly diagnosed malignancy (n=16) was also enrolled. NK cell activity was assessed using NK Vue™ high-throughput assay (ATGen Co., Seoul, Korea) that uses serum of ex vivo stimulated whole blood to detect interferon (IFN)- γ secreted from NK cells as an indicator of NK cell activity. The patients were classified into three groups by NK cell activity: abnormal group (<100 pg/ml), borderline group (100 ~ 250 pg/ml) and normal group (>250 pg/ml).

Results : Mean age of the healthy control, stable HD patients and malignancy patients were 54 ± 8 years, 61 ± 13 years and 70 ± 8 years, respectively. HD patients demonstrated significantly lower NK cell activity compared to healthy control (569.4 ± 37.2 pg/mL vs. 707.2 ± 37.3 pg/mL, respectively, $P < 0.001$). Moreover, HD patients with untreated malignancy showed further decrease in NK cell activity (127.1 ± 29.0 pg/mL vs. 569.4 ± 37.2 pg/mL, $P < 0.001$). Age was correlated negatively with NK cell activity ($r = -0.142$, $P = 0.001$). NK cell activity showed differences among control, HD patients and patients with malignancy even after adjustment for age ($F = 4.883$, $P = 0.008$). Interestingly,

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most HD patients with untreated malignancy showed abnormal (n=8, 50%) or borderline (n=5, 31.3%) NK cell activity while stable HD patients showed higher NK cell activity while 22.5% (n=49), and 17.4% (n=38) of patients in HD group showed abnormal and borderline, respectively. (Fisher exact test, P =0.002)

Conclusions : Our results showed decreased NK cell activity in HD patients and those HD patients with untreated malignancy showed further decrease NK cell activity. Measurement of NK cell activity could be a useful tool for screening for malignancy in HD patients.

Keywords : NK cell activity, Hemodialysis, Malignancy