A BLOOD-BASED TUMOR MARKER FOR THE EARLY DETECTION AND MONITORING OF HPV-INDUCED ANAL CANCER IN HIV-PATIENTS

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Background: People living with HIV are at an increased risk of developing HPV16-induced anal cancer. Yet, there are currently no global anal screening programs in place and the most common diagnostic approaches require anal smears. The establishment of a blood-based biomarker for the early detection and post-treatment surveillance of tumor patients would therefore be highly desirable. In this pilot study, we assessed the performance of a novel competitive serological assay for the early detection and post-treatment monitoring of HPV16-induced anal cancer in HIV-positive individuals.

Methods: This retrospective study included 12 HIV-positive patients diagnosed with HPV16-induced anal cancer and recruited though the German Competence Network for HIV/AIDS. Serum samples that had been collected before and after tumor treatment were analyzed for the presence of anti-HPV16 L1 antibodies using a newly developed, highly specific rapid test based on the HPV16-L1-specific monoclonal antibody clone DRH1 (PrevoCheck, Abviris Deutschland GmbH, Germany). DRH1 antibody levels in patient sera were monitored following treatment and correlated with clinical outcomes.

Results: All patients were men with an average age of 45 years [27-63 years] at the time of anal cancer diagnosis. The mean duration of the HIV infection was 10.2 years [5-19 years] and 11 of the patients were MSM (men who have sex with men). For 10 of the 12 patients, we had access to sera collected in the 12 months preceding tumor diagnosis. Of these, 9 tested DRH1 positive with antibody levels of 1000-3000 ng/mL. The earliest detection of HPV16-induced anal carcinoma using this assay was possible 293 days ahead of clinical diagnosis. For the remaining two patients, sera were only available at 516 and 578 days before tumor diagnosis. These sera tested DRH1 antibody negative, suggesting a positive relationship between antibody levels and tumor development. Blood sera collected up to 89 days after tumor treatment showed a decrease in DRH1 antibody levels by 25-60%, mirroring successful tumor removal. Notably, a 30% increase in antibody levels measured after treatment in one of the patients was linked to disease recurrence.

Summary and Conclusions: The rapid, blood-based test for HPV16 L1 DRH1 antibodies assessed here is easy to use and provides a test result within 20 minutes. In this retrospective pilot study, it detected HPV16-induced anal cancer in HIV-positive patients with a sensitivity of 90% and as early as 9.5 months before clinical diagnosis. Notably, test results during post-treatment follow-up were indicative of treatment outcome and disease recurrence. Serological detection of DRH1 antibodies in patient blood is therefore a highly promising novel tool for the early detection and post-treatment surveillance of HPV16-induced anal tumours.