HIV-infection during treatment of a chronic hepatitis B virus infection: implications for PrEP?

Storim, J¹; Jochum, C²; Timm, J³; Schadendorf, D¹ and Esser, S¹

¹University Hospital Essen, Department of Dermatology, Essen, Germany. ²University Hospital Essen, Department of Gastroenterology, Essen, Germany. ³University Hospital Essen, Department of Virology, Essen, Germany.

The protective effect of oral tenofovir disoproxil fumarate (TDF) with or without emtricitabine (FTC) as pre-exposure prophylaxis (PrEP) against HIV differed significantly among clinical studies and poor PrEP-adherence was closely associated with PrEP-failure. Despite HIV-infections during PrEP-exposure the development of resistance mutations against PrEP was rarely observed so far. As PrEP is an emerging tool against HIV transmission, it is important to identify risk-factors for PrEP-failure and the induction of PrEP-associated resistance mutations against antiretroviral drugs. We here present the case of a 25-year old MSM who was successfully treated with TDF due to a chronic hepatitis B virus (HBV) infection (HBV-DNA always <357 IU/ml after ten months of treatment). As HIV tests were negative when the treatment was initiated and six months later, no routine HIV tests were performed although the patient repetitively acquired sexually transmitted infections (STI). After 30 months, an HIV infection (subtype B) was diagnosed during a syphilis re-infection. At this point, HIV was TDF-resistant (K65R and A62V mutations within the reverse transcriptase gene). Retrospective analysis of frozen serum samples revealed HIV-seroconversion 12 months prior to diagnosis and low HIV-RNA levels from seroconversion to diagnosis (always <400 copies/ml). The TDF-based therapy of the chronic HBV-infection resembles a TDF-HIV-PrEP. But here poor therapy adherence is an unlikely cause for the ‘PrEP-failure’ as the constantly suppressed HBV-DNA indicates therapeutic TDF-levels over years. Combining TDF with FTC might have augmented the prophylactic effect. However, TDF-levels in the rectal mucosa are high and should therefore protect MSM who practice receptive anal intercourse. On the other hand, the concomitant STI of our patient may have promoted HIV transmission (via compromising the mucosal barrier function and promoting inflammatory reactions) and therefore possibly counteracted TDF-effects. Finally, infection with a TDF-resistant virus strain might explain the lack of protection in this case. But K65R is a rarely transmitted drug resistance mutation and low level viremia for one year suggests considerable TDF effectiveness. In fact, we here rather present a K65R mutation induced by a PrEP-like TDF therapy. The development of the K65R mutation in a PrEP-like situation emphasizes the urgent need of regular HIV-tests during PrEP exposure.