The role of HIV viral load and CD4+ cell count in the prolongation of the QT interval in patients from an HIV outpatient clinic

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Background: QTc Interval prolongation is associated with life-threatening arrhythmias and it has been reported to occur more frequently in the HIV-infected population.

Methods: The data was collected from the charts of a cohort of 135 consecutive HIV-infected patients from our HIV outpatient clinic. QTc interval was corrected to the heart rate using Bazzets formula .The cohort was divided into two groups(prolonged QTc and normal QTc interval). QTc interval was considered prolonged if it was >440 ms in males and >460 ms in females. Multiple variables and potential risk factors were collected including the CD4+ cell count and Viral Load (VL) measurements which were done at the same day or within few days from the time the ECG was done.

Results: 23 patients were found to have prolonged QTc (17%).No significant difference between the groups was observed for any baseline characterestics;however stastistically significant differences were observed with regard to the CD4+ cell count and VL. The ROC curves for both CD4 count and VL were obtained to establish cut-off points .The cutoff points for CD4 count and VL were 144 and 17.9 x 103 respectively. Sixteen of 23 subjects (70%) with prolonged QTc had CD4+ cell counts < 144 cells/mm3 as opposed to only 27 of 112 (24%) of subjects with normal QTc interval (OR: 7.20; 95% CI: 2.88 to 19.33; $p < 0.0001$). For VL, 18 of 23 subjects (78%) with prolonged QTc had levels $\geq 17.9 \times 103$ copies/ml, whereas 43 of 105 (41%) of patients with normal QTc had VL greater than the cut-off value (OR: 5.19; 95% CI: 1.79 to 15.05; $p = 0.002$). The simultaneous presence of both risk factors increased the OR to 14.74 (95% CI: 3.84 to 56.55; $p < 0.0001$).

Conclusion: Our study confirmed that the risk of QTc prolongation increases with the progression of the HIV infection. Low CD4 cell count and high Viral load could be considered as independent potential risk factors for QT prolongation in HIV patients in the outpatientclinic settings.

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Modelling the between-host evolution of set-point viral load in HIV infection

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Background: The Human Immunodeficiency Virus (HIV) is capable of evolving rapidly and responding to diverse selection pressures. Previous research has generally focused on the responses of HIV to selection within-host, comparatively little has been done on the response between-host selection. Previous work has proposed that the set-point viral load also evidence for heritability of SPVL from one infection to the next.

Methods: We developed three models to examine the evolution of the SPVL distribution. One modelled change in strain prevalence in discrete generations of infection. Another incorporated continuous time into this framework. The third was extended to include explicit modelling of host dynamics and variable population size. Comparison of the simulated distribution with observed data allowed estimation of parameter values.

Results: All three models demonstrated that SPVL distribution would converge on the optimum relatively rapidly regardless of the initial distribution of genotypes. The discrete generation model provided a robust measure of the amount of variation attributable to nonviral effects and mutation from one individual to the next. The dynamic population model showed the response of the SPVL distribution to host dynamics.

Conclusion: The models described can be used to simulate the response of SPVL to widespread interventions such as circumcision or treatment, or the response to changing demography.

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Large scale HIV survey in Cameroon by mass HIV testing mobile units: Evidence of HIV epidemic hot spot areas and high HIV vulnerability of women over time

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Background: In Africa where the majority of HIV-infected adults do not know their HIV status, the use of HIV testing mobile units offers relevant public health prospects. In order to increase the HIV testing capabilities of voluntary counselling and testing centres, we developed a decentralized, large scale strategy based on bringing the needed services closer to the people, through the use of mobile units.

Methods: The National Public Health Laboratory ''Hygiene Mobile'' acquired a van (in order to propose voluntary HIV screening) comprising separate compartments for the driver, the medical team, and laboratory facilities. The screening of HIV-specific antibodies in serum samples was carried out using SD Bioline HIV, (Standard Diagnostics) & Determine (Inverness Medical Innovation). Indeterminate or positive samples were immediately retested by the ImmunoComb®II HIV 1 & 2 Bispot /Hexagon HIV. People