HIV Prevalence and Strain Diversity in Gabon. The end of a paradox

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The HIV epidemic in central Africa is peculiar, with a predominance of heterosexual transmission, large differences in prevalence between rural and urban areas, and the importance of other sexually transmitted diseases as facilitating factors for HIV transmission [1]. A paradoxical discrepancy between high genetic diversity and low prevalence has been reported in both Cameroon and Gabon. HIV diversity is maximal in Gabon, where HIV-1 group M subtypes A to H, the four HIV-O clades, rare group N, pointing to probable lengthy evolution in this region [2-5].

In 1986 and 1994, epidemiologic studies showed a stable prevalence of HIV-1 infection in the general Gabonese population (2.1% and 2.2%, respectively) [2]. Contrasting with this relatively low prevalence, genotyping showed major strain diversity, with subtypes A, C, D, G, F and group O and HIV-2 all being present [2, 6].

In 1998 the situation changed: the estimated seroprevalence jumped to 4.25% in this country of approximately one million inhabitants [7]. We confirmed this estimate in a serologic survey of 389 Gabonese military personnel, 22 (5.8%) of whom were HIV-positive.

We have now performed a new analysis of HIV diversity in Gabon. Plasma and cells were collected from unselected heterosexual patients in Libreville and Franceville, the two main urban areas. The patients had been confirmed as HIV-seropositive in our Center after 1997. One hundred consecutive samples were studied. Synthetic peptide analysis [8] confirmed that all but one strain belonged to group M. One HIV-2-infected patient was excluded. Molecular
genotyping was based on heteroduplex mobility assay (HMA) and a previously described algorithm [9]. Seven samples could not be amplified with the primers used. The successfully genotyped samples mainly belonged to subtype A (n = 45; 49%), the others belonging to subtypes B-2, C-3, D-9, F-6, G-1 and H-6. Twenty strains were repeatedly HMA-indeterminate: 8 had double-migrating profiles (A/G-4, B/D-3, C/G-1) and 12 failed to migrate.

The paradoxical epidemiologic pattern in Gabon is thus disappearing with the spread of HIV in the general population. Subtype A is now predominant in Gabon, as it is in Benin, Ivory Coast, Cameroon, Ghana and other neighboring countries [3,4,10-12].

The persistently high strain diversity in what is now a minority of Gabonese patients could be explained by human migration, Gabon being one of the most prosperous and politically stable countries in Africa. Cocirculation of HIV-2, HIV-O and the different group M subtypes reflect this strain importation.

The delayed spread of HIV could be explained by a low population density (4/km²) and a limited number of commercial sex workers and sexual networks. Indeed, a higher variety of subtypes is often associated with slower epidemic spread [13]. The recent and increasing urbanization of Gabon, combined with important exchanges with neighboring populations, may account for the observed changes in the dynamics of the epidemic.

Previously forwarded explanations for the Central African paradox included the possibility that transfer from chimps to humans might be responsible for the emergence on HIV-1 in this region [2, 14], via loggers and hunters. This led to stigmatization of these groups [15]. However, the recent description of a limited number of HIV-1 group N and the related virus SIVcpz showed that chimp-human transmission was no more than an exceptional phenomenon [5, 14]. The changing pattern we are now observing in Gabon, with the emerging predominance of subtype A,
clearly demonstrates that the origin of the viruses and their epidemiological spread are separate events governed by different mechanisms.

References


