Brief Reports

Kwashiorkor and HIV: new questions

by J. P. Beau* and L. Imboua-Coulibaly**

*ORSTOM, 04 BP 293, Abidjan 04, Côte d'Ivoire
**Paediatrics Department, Treichville Teaching Hospital, Abidjan, Côte d'Ivoire

The acute prevalence of human immunodeficiency virus (HIV) in Africa, as well as the high mother to child transmission rate explain the widespread acquired immune deficiency syndrome (AIDS) cases among children in the continent.1,2 According to WHO, weight loss is one of the clinical signs of AIDS in children, and several studies have shown a high sero-prevalence among malnourished children and their mothers.3-5 These studies further showed that seroprevalence was even higher among children suffering from marasmus, as opposed to children suffering from kwashiorkor or oedematous malnutrition. No explanation has as yet been given to understand why seroprevalence differs according to the type of malnutrition.

The missionary-run relief centre in Koumassi, Abidjan, was set up at the end of 1993. In addition to giving care to sero-positive adults, the centre also has a creche which takes care of the locality's malnourished children. Blood tests are carried out on patients, with the family's consent (by ELISA method and confirmed by Western blot).

In 1994, blood tests were carried out on 122 malnourished children. Fifty-four of these were HIV1 positive (44 per cent), and 2 were both HIV1 and HIV2 positive (2 per cent). No major disparities were observed in the results with regard to age or sex (sero-positive: 15.1 ± 9.4 months and 55 per cent of boys; sero-negative: 18.0 ± 9.5 months and 59 per cent of boys). An analysis of the sero-prevalence according to age and type of malnutrition (Table 1) corroborates previous results. In children over 15 months old, seroprevalence was twice as low among those suffering from kwashiorkor (defined by the presence of oedema) and there is a significant difference with regard to the total number of children \( P<0.05 \).

The assumption of a high mortality rate among HIV-infected kwashiorkor children could explain this disparity in seroprevalence. Our studies show that mortality among sero-positive children aged over 15 months was lower in the kwashiorkor group with no significant difference (marasmus: eight deaths out of 21; kwashiorkor: one death out of four).

Other assumptions can be made to explain the disparity in seroprevalence noted between marasmus and kwashiorkor. In the event of early infection (in utero or during childbirth), the disease is most likely to develop into marasmus the symptoms of which are close to the weight-loss syndrome observed among infected adults.6 It is important to stress here that very few descriptions of malnutrition with oedema exists in sero-positive adults.

Several assumptions can be made on the fact that in cases of delayed infection, as through breastfeeding, the child's nutritional state at the time of transmission could have a positive or negative impact on the response to viral aggression. The acute deterioration of the immune system among malnourished children could be partly due to zinc deficiency, often observed in kwashiorkor.7-8 These disruptions could cause a slower antigenic response in kwashiorkor, thus showing false negative results expressed by a low seroprevalence. On the other hand, the assumption that malnutrition could have an antagonistic effect on HIV, as in the case of malaria, may be envisaged; furthermore, there is now the possibility that the virus could be eliminated after

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<td>Seroprevalence according to age and type of malnutrition</td>
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<tr>
<td>Marasmus sero-positive</td>
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<tr>
<td>Age &lt;15 months</td>
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<tr>
<td>31/55</td>
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<tr>
<td>&gt;15 months</td>
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NS: not significant.
vertical transmission.\(^9\) Viral replication is partly related to cytokines production and oxidant aggression.\(^10\) Pro-inflammatory cytokines are produced under the influence of leukotriene B4 synthesized from arachidonic acid. Unlike marasmus, a reduction of essential fatty acids, leukotriene B4 and interleukin 1 are observed in kwashiorkor,\(^11\)\(^-\)\(^13\) Despite the decrease in anti-oxidant defence observed in kwashiorkor,\(^8\) these changes could thus have a negative impact on viral replication. Essential fatty acids found in breastmilk may also play a role in mother to child transmission and explain the seroprevalence differences in malnourished children.\(^1\)

The various assumptions made above are not exhaustive and other anomalies observed in kwashiorkor may also produce an antagonistic effect. The existence of chromosome anomalies\(^16\) and a shrinkage of the lymph tissue\(^7\) could particularly have a role in viral integration or replication.\(^17\)\(^,\)\(^18\)

Kwashiorkor remains a major cause of infant mortality in poor countries. Since the disease was first described by C. D. Williams in 1933, numerous assumptions have been put forward to explain the physiopathology of this syndrome, but with no consensus to date.\(^19\) It is therefore imperative to continue research in this area, which may possibly lead to a better understanding of the HIV infection.

**References**