HIV SEROPREVALENCE IN THREE POPULATION GROUPS

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SUMMARY

Many strategies exist for HIV antibody testing. Using a combination of an Enzyme immunoassay and Western Blotting, we found anti-HIV seroprevalence of 1.6%, 1.2% and 34.8% in blood donors, pregnant women and patients with clinical symptoms of AIDS, respectively. Due to worldwide interest in the epidemiology of HIV disease, correct identification of infected people is important. The false labelling of people as seropositive only on ELISA screening has psychological implications. The importance of anti-HIV confirmatory testing when the test objective is diagnosis is stressed.

INTRODUCTION

The Acquired Immunodeficiency Syndrome (AIDS) was reported from the US in 1981\(^4\). In 1983, the microbial agent responsible for this condition was identified and eventually named the Human Immunodeficiency virus type 1 (HIV-1). It was not until 1985 that assays to detect the antibody to the virus became commercially available\(^2\). Also in 1985, a related virus was reported from Guinea-Bissau\(^3\) and named HIV-2. This virus is believed to circulate predominantly in West Africa. The modes of transmission of both viruses are believed to be similar\(^4\). Serological testing of blood takes account of both viruses.

HIV antibody testing in the country began in 1985\(^5\). Surveillance of AIDS started in the same year, and the first AIDS case in the country was reported in 1986\(^5\). In the Upper West Region (URW), routine testing of blood for HIV antibodies began in 1991. This was with the support of the German Technical Co-operation Agency (GTZ). The testing strategy at the beginning of the programme screened all blood with an Enzyme Immunoassay (EIA) kit and subsequently confirmed all samples positive on EIA with a Western Blot (WB) assay. In other parts of the country, all sera positive for HIV antibodies on screening with an EIA kit or a membrane based assay, e.g., HIVCHEK, HIVSPOT, etc., are sent to the Public Health Reference Laboratory (PHRL) in Accra for confirmatory testing. Long delays often ensue before results of the confirmatory tests are received by sending institutions. Depending on the use of which the test result is being put, problems can arise with the delay. Confirmatory testing in all serological assays is necessary because of the presence of cross reacting antibodies in serum.
MATERIALS AND METHODS

The study was carried out between August 1991 - September 1992 at the Wa, Jirapa and Nandom hospitals.

Three hundred and seven (307) adult patients with a clinical suspicion of AIDS as defined by the WHO criteria\(^6\), 1077 blood donors, and 1640 pregnant women were surveyed. 5-10 mls of blood obtained by venipuncture from the patients and pregnant women and also from each donated blood was conveyed to the UWR PHL where the sera were separated and screened for HIV antibodies using a recombinant anti- HIV ELISA1 +2 kit (Enzygnost, Behring Germany) in a microtitre format. Confirmatory testing was carried out on all reactive sera by a Western Blot assay (New Lav Blot 1 and 2, Pasteur Institute). Reading and interpretation of the bands was done according to the manufacturer's criteria.

RESULTS

Table 1 summarises the HIV sero status of the subjects studied. In all the groups, there was a reduction in the sero status of the subjects after the enzyme immunoassays had been confirmed with Western Blot assays.

DISCUSSION

Several tests for detecting HIV antibodies in the laboratory exist. The selection of which test to use depends among other things on the objective of the test. There are four main objectives for which HIV antibody testing is done\(^7\): transfusion/donation safety, surveillance, diagnosis of HIV infection and research. In the screening of blood and blood products for transfusion, the need to minimise false negative results is paramount. Thus a testing strategy with the highest possible sensitivity needs to be used. The use of only a single ELISA or rapid membrane assay will suffice. Reactive sera are considered HIV antibody positive and non reactive sera considered negative. The seroprevalence of 1.5% among blood donors in this rural population is lower than the 5.42% and 10% reported by Mingle et al\(^8\) and De Cock et al\(^9\) from Accra and Abidjan respectively. Counselling of seropositive blood donors is being increasingly used as a tool to limit further spread of the virus and also to dissuade such donors from any future blood donation. This reduces the time and resources wasted in screening such blood again. In these situations, it is mandatory that supplementary (confirmatory) testing is done on sera. This is necessary to prevent stigmatising people with a diagnosis of HIV infection. In our series, confirmatory testing reduced the seroprevalence from 7.1% to 1.6% approximately. The infrastructure for counselling all seropositive blood donors in the country is not in place. The opportunity for reducing HIV spread by counselling the donors and also donor exclusion from future donations in being lost. The WHO case-definition was circulated to all doctors in the country in 1986\(^10\), as was the national revision\(^11\). It would be expected that all patients for whom an HIV antibody test was requested had clinical criteria suggestive of AIDS. Only 34.8% of patients in our series for whom tests were requested were positive. Reasons for this may include high false negative test results, suspicion of HIV/AIDS based on criteria other than the case-definition, and tests requested for non clinical situations, e.g., premarrige, pre-surgery and voluntary

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<th>Table I: HIV Sero Status of Study Subjects</th>
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<tr>
<td>No. of Sera Screened</td>
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testing. Colebunders et al, Wabire-Mangen et al, and Widy-Wisky et al among others have demonstrated very good correlation between the WHO case-definition and HIV sero status. Such a high false negative test result is unlikely. It is common knowledge that practitioners in the country request for a patient’s HIV sero status not only on clinical suspicion, but also on a patient’s history of foreign travel, and again when baffled by an unusual clinical case presentation. It is not unusual for our health institutions to run out of HIV test reagents for some periods of time. Judicious requests for HIV antibody testing is therefore essential. Our above results (34.8%) nevertheless compare favourably with the study by Ankrah et al who found only 32% of their suspected AIDS patients to be seropositive.

In situations such as voluntary, pre-marriage, and pre-surgery testing, a strategy which includes a confirmatory assay is necessary. In many parts of the country, only a screening test using an ELISA kit or a membrane based assay is available on site. Results of confirmatory testing from the PHL in Accra are delayed and patient care is based on results of the screening tests. The false labelling of patients as seropositive could have important psychological consequences.

It has been estimated that in Africa, the rate of vertical transmission of HIV from mother to baby is about 30-50%. Termination of pregnancy remains an option for the HIV positive pregnant women. Due to the psychological and psychosocial impact of a positive HIV status and/or a terminated pregnancy, the diagnosis of an HIV sero status has to be made with certainty. Therefore a single ELISA or membrane screening assay is not sufficient. Our study shows a seroprevalence of 4% on the screening assay in pregnant women but only 1.2% on confirmatory testing. Therefore a single ELISA or membrane screening assay again is not sufficient to enable a prudent decision to be taken in cases of pregnant patients.

We have presented the necessity for HIV confirmatory testing especially when the test objective is diagnosis. Concerns about the use of WB as a supplementary test has been raised in many quarters. This is due to its high cost and also the difficulties in interpretation of the bands. Alternative strategies to reduce cost depending on test objective have been addressed by Tamashiro et al and others. These include the use of tests appropriate for the laboratory’s capabilities, pooling of sera, and best possible purchase. In many parts of this country, single assays (mainly membrane based assays) are the only tests available for diagnosis. Confirmatory testing is not routinely done.

We are currently looking at a combination of ELISA and a membrane assay as recommended by Tamashiro et al in place of ELISA and Western Blot as a viable alternative to HIV antibody testing. The former is cheaper and has been reported to be as reliable as the latter.

ACKNOWLEDGEMENT

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