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A View of HIV-I Infection in Karachi

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Abstract

A prospective study on the prevalence of HIV-l infection in Karachi, Pakistan was conducted over a period of six years (1986-1992). Over 15,000 individual samples and more than 32,000 donor units of individuals residing in Karachi at the time of sample collection were tested for HIV-I infection by our screening test EIA which revealed a positivity rate of 0.23% and 0.003% in individual and donor units respectively by Western Blot. We divided patients into four groups A,B,C and D based on the most plausible cause of transmission. The largest number of positive patients belonged to group B, who were of either foreign origin or expatriates or Pakistanis sett led abroad. They comprised approximately 67% of the total positive cases and were subjected to testing on strong clinical grounds. In individuals of other groups like group A and D, there was history of travel abroad from time to time. The only positive donor unit (group C) belonged to a person who had been living in Middle East for the last 10-12 years. The last group D comprised of samples that were directly sent to us without complete history, except for the fact that they had been travelling back and forth. The large majority of patients fell in 20-50 years age group. Despite the limitations of this study, we conclude that the prevalence of HIV is steadily Increasing in our population and so far, we have not been able to find an indigenous case of AIDS in our series (JPMA 44: 8, 1994).

Introduction

The first case of Acquired Immunodeficiency Syndrome (AIDS) in Pakistan was reported in 1987. A condition initially reported among homosexual men in Los Angeles, USA with subsequent isolation of Human Immunodeficiency Virus (HIV-I) in 1983[1]. As of July 1, 1992, a cumulative total of 501,272 cases of Acquired Immunodeficiency Syndrome have been reported to WHO from 168 countries. WHO estimates that at least 10-12 million adults to date have been infected with HW, out of these, 1.5 million have full blown spectrum of AIDS. Since the beginning of the epidemic, 1 million children worldwide have been infected with the HIV-I. Out of these 12 million, approximately 1 million persons were infected during the first six months of 1992, about one half residing in sub-Saharan Africa and a quarter in Asia[2]. The present number of AIDS cases reflect the HIV infection acquired almost a decade ago. Taking into account under-reporting and delay in reporting WHO estimates that the actual number of adult cases may be closer to 1.7 million. With every passing day, 5,000 more people worldwide become infected with the virus[3]. The projection for the future is that by year 2,000, 30-40 million people will be infected with HIV 90% of those infections will occur in developing countries. AIDS could undermine decades of progress in health and economics in the third world countries. Many of these countries lack funds necessary for AIDS surveillance and this may lead to under-diagnosis and under- estimation[4]. There is paucity of AIDS data and studies in Pakistan, apart from few published studies[5,6].

Materials and Methods

A prospective analysis of serum samples and donors screened for HW-I infection by enzyme immuno-assay serum samples (EIA) was carried out during the period June, 1986 to June, 1992. A total of

15,639 individuals and 32,127 donors (Table)

Table. Number of HIV positive patients.

		Total pts. ref. for testing	+ve by ELISA	+ve by WB
Group A	Screened for immigration purpose	14,097	6	1
Group B		145		
Sub-group 1	Foreigners/Pakistanis settled abroad		17	15
Sub-group 2	Frequent travel abroad		3	3
Sub-group 3	Recipients of multiple transfusions		4	3
Sub-group 4	Family members/close personal contact		2	2
Sub-group 5	Vertical transmission		1	1
Group C	Donor population	32,127	3	1
Group D	Direct referrals	1,240	15	10
	Total		51	36

were screened. The former group included 14,097 individuals who were screened for immigration purposes only. Another sub-set of 145 patients were referred as suspected cases of RW positive Dy/AIDS for laboratory testing. 1,240 samples belonged to individuals on whom complete clinical information was not available.

All positive test samples were sent for confirmation to National Institute of Health, Islamabad, after retesting for positive reactivity, in duplication at our institution. The confirmation was done by Western Blot (WB) (Bio-Rad), the results were interpreted using criteria as set by WHO. The testing for blood donors was introduced in 1987 at our Medical Centre and we are one of the few centers in the country where regular testing for HW-I is carried out on blood products. Abbott Recombinant HIV-I EJA is an in-vitro enzyme immunoassay for the detection of antibody to HP/-I in human serum or plasma. This test detects antibodies directed against 2 major groups of HIV-I proteins envelope and core. The WB is used to confirm the presence of HP/-I infection as it permits the identification of antibodies to individual component polypeptide of 1-1W-I[7]. Although the specificity of most ELISA for antibodies to HIV exceeds 99.8%, they are often used to test population with a very low prevalence of H1V infection. In these circumstances, the positive predictive value of the test may be 10% or even less. It is critically important to employ supplementary test procedures to validate the HTV infection status of individuals with reactive screening test results. It must be realized that false positive screening test results will generally occur with the same frequency in any population tested. Therefore, even population with a high prevalence of HW infection, some screening test results will show false positive results[8]. Repeating the initially reactive EIA increases the apparent specificity of the test. False positive ETA result may be caused by specimen immunoglobulin non-specifically adsorbed to the solid phase reaction vessel. Also, they may occur as a result of cross- reactive antibodies directed to antigen determinants found in non-pathogenic retroviruses, or to antibodies to lymphocyte antigens derived from the human cells in which the ELISA antigen is propagated[8,9]. There are variety of methods for confirmation of 11W screening assays. Currently, however, WB test and indirect immune fluorescence

are most frequently used for this purpose.

Results

A total of 51 samples (41 males, 10 females) were positive by ETA; of these, 30 males and 6 females were confirmed to be antibody positive by WB. The ages ranged from 18 days to 67 years. A total of 9 patients -6 males and 3 females, revealed no bands on WB. The WB of one patient was indeterminate. The results of three patients are awaited and one patient sample was lost during shipment and another was of insufficient quantity for analysis.

The patients and donor confirmed to have 11W infection as demonstrated by WB were divided into the following groups. These individuals had strong clinical suspicion and were tested because of this reason. This group comprised the largest number of positive cases.

Group A

Screened for immigration purposes: A total of 14,097 individuals were tested. Six individuals were positive on the screening test, but only one was confirmed positive. This particular individual had been travelling back and forth from Pakistan to North America.

Group B

The individuals in this group were further categorized based on the most plausible cause of acquiring HW infection.

Sub-group 1- Foreigners/Pakistanis settled abroad

This group comprised of all those patients who were either expatriates or foreigners, 8 patients were from Africa (Uganda, Tanzania), 6 had been working in the Middle East (UAE, Saudi Arabia) and one was of Indian origin, living in Paris. One Nepalese male and one American were also present in this group. Interestingly, the only confirmed donor was also an expatriate as discussed later.

Sub-group 2 - Frequent travel abroad

Included in this category were 3 individuals whose job involved very frequent visits to various parts of the world.

Sub-group 3-Recipients of multiple transfusions

The individuals of this group included a haemophiliac and a patient with thalassemia major. The third individual apparently had undergone cardiac bypass surgery in London in 1982, when screening of blood products for 11W infection was non-existent. Similarly, the above patient of thalassemia had been receiving transfusions in the Middle East, where most of the blood till 1985 was imported from abroad. The screening of blood products came into full play in 1985, in USA.

Sub-group 4- Family members/close contacts

At the moment, two cases of HW transmission to spouses are present in our record, heterosexual transmission being the most probable cause.

Sub-group 5- Vertical transmission

There is so far only one possible case of this pattern in our observation, where the mother had possibly acquired the infection in a Middle East country after receiving multiple transfusions during a previous surgical procedure. An 18 days old infant tested positive for 11W antibodies. However, these could have been maternal antibodies and for confirmation polymerase chain reaction for 11W DNA sequence or culture is required at this stage. The other choice would be to recheck for the presence of antibodies in the infant at the age of 15-18 months. If the antibodies persist at this time then the presence of infection is confirmed.

Group C-Donors

Three donors were initially reactive on screening by ELISA, but only one was confirmed by WB. This particular individual had been living in UAE for the last 10-12 years.

Group D - Direct referrals

Individuals in this group had no definite history available, apart from the fact that they had been outside Pakistan at sometime or the other. They were referred either from outside laboratories or other cities. At the time of this writing, five more individuals have been tested positive by ETA. Confirmatory results are awaited. Three (2 males, 1 female) belong to sub-group 1 and 2 persons (1 male, 1 female) belong to sub-group 3. Since June, 1292 to October 31, 1992 more than 1,150 patient samples, 2,500 donor samples have been screened for 11W-I infection. The cases in which indeterminate results were obtained on WB those patients were requested to submit samples again at three and six month interval. Unfortunately these few individuals in our case were lost to follow-up.

Discussion

In Pakistan, according to the official statistics, more than 250,000 individuals have been screened for HIV-I infection and a total of 129 cases of sero-positivity have been detected so far. Nineteen individuals developed AIDS, out of them 17 have died and two are still alive[10]. A conservative estimate by WHO indicates over 1 million infections in South and South-East Asia, the vast majority of them in India and Thailand. Abdul Mujeeb et al reported that during 1986-87, 1,363 subjects were screened for HIV infection in Karachi, 2 were confirmed positive by WB[5]. These two were married females who had received multiple transfusions and denied other risk factors. Khanani et al reported another 3 confirmed cases of HJV infection in a group of 413 screened individuals from Karachi in 1990[6]. Two were foreign nationals of Tanzania and Uganda and third individual was a Pakistani national residing in Saudi Arabia who had received multiple transfusions following a car accident in 1981. As stated earlier, till June 1992, we have screened a total of 47,766 serum samples. These samples represent a variable and significant segment of our population. The noteworthy point in this context is that none of the above confirmed HIV positive patients represent indigenous case of AIDS in Pakistan. The largest group of positive patients is represented by foreigners/expatriates, individuals with frequent travel history and recipients of multiple transfusions. The common denominator in all these cases is the fact that HW infection was acquired outside Pakistan by different modes during their long or short stay abroad. Some of the confirmed cases further transmitted it to their spouses. One of the donor sample confirmed for HW infection belonged to an individual living outside Pakistan in UAE for the last 10-12 years. All our positive cases depict the classical modes of transmission of HIV-I virus[11]. The data also shows an increase in the number of HIV-I positivity. In the first year June 1986-June 1987, 5 individuals were positive for HIV-I infection whereas in the last year, July 1991-June 1992, 12 cases of HIV-I positivity were demonstrated. Most of the positive individuals fell into the 20-50 years age group. Asia was labelled as having no specific mode of transmission of HIV-I virus in a study conducted in 1988 by WHO, whereas patterns I and II were assigned to USA, western Europe and sub-Saharan Africa respectively[12]. Heterosexual transmission was declared as the dominant mode of spread in Africa and homosexual and intravenous drug abusers were involved in spread of disease in the Western countries including USA. The epidemiological picture has now changed. On March F, 1989, 141,894 AIDS cases were reported to WHO Global Programme on AIDS from 145 countries. 70% of the world total cases were from America, 85% of these from USA[13], but presently, the sub-Saharan Africa has the largest number of HIV infected individuals and itis projected that by year 2000, Asia will account for 42% of HIV infections[2]. 90% of those with AIDS in developing countries and industrial countries are between the ages of 20-49[4]. The present regional distribution of cumulative adult HP/infections, based on WHO statistics indicates that sub-Saharan Africa has over 7 million infections; North America and Latin America, including the Caribbean, have over 2 million; South and South East Asia have over 1 million, followed by Europe, North Africa, Middle East, Australia, East Asia and Pacific. AIDS has no doubt reached epidemic proportions in the third world and 1.5 million new cases

predicted for this decade will be coming from the third world[2]. Most of the under- reported cases are in the third world where cultural taboos, government attitudes and shortage of money often hamper the reporting process[14]. The third world government lack the equipment and funds necessary for AIDS surveillance. Diverting funds for AIDS education is not priority in third world where leading causes of death continue to be diarrhoea, malaria, etc. It is stated that the presence of a pre-existing sexually transmitted disease increases the risk of HIV transmission by sexual intercourse. The most common means of HIV transmission is now heterosexual contact and if left unchecked will continue to be the main means of spread in Asia. India and Thailand with their rapidly increasing number of AIDS patients have well supported these facts. The adult population in South and South East Asia is 500 million as compared with 225 million in sub Saharan Africa, therefore, the pandemic may grow at a much faster rate in our part of the world. In developing countries of Africa, Asia and Latin America, the ratio of infection in men and women is almost equal or rapidly becoming so, indicating the predominance of heterosexual transmission. WHO estimates that nearly one half of new adult infections have occurred among women. Recent estimates have indicated that 2.1-6.7 million Thais will be infected by year 2000. It is presently estimated that India has 2.7 million HIV positive cases. In a study conducted in India to determine the incidence of HIV infection in hemophiliac patients and those receiving multiple transfusions, 16 out of 124 individuals were positive for HW infection[15]. In another study from India, 182 vials of commercially available blood products revealed 32 products to be positive for HP/antibodies. These products are prepared from blood collected from professional donors[16]. It is of utmost importance to prevent transmission through blood products in our country. In Pakistan, the practice of screening of blood products for HIV infection is practically absent. Only a few large medical centres in the country are screening blood products. It is essential to screen all blood products. The risks in the Western countries have been minimized by screening all donated blood and heat treatment of blood factors VIII and IX. In the United States where every blood unit is screened, the statistical incidence of transfusion associated AIDS is estimated to be 1 in 1,25,000 blood donations[17]. The risk of acquiring HW infection through transfusion is approximately 1 in 153,000 per component[18]. Thus mandatory testing of blood products should be strictly enforced by governmental agencies in Pakistan to limit the progress of this disease. Similarly, use of blood from professional donors needs to be eliminated. Our data depicts the number of HW-I positive individuals in a cross-section of our population. As the samples were collected from individuals residing temporarily or permanently in Karachi at the time of sample collection one may speculate that the results are of reflection of pattern not only in Karachi but of the country as well. Further studies to determine the prevalence in high risk groups is essential. A recent study[19] elicited that more than 33,000 samples were tested out of which fifteen were confirmed to carry HW-I infection by \\VB. These cases represented external source, i.e., outside Pakistan as a cause. It is also stated that a definite increase in the number of positive cases is seen after 1990. The official number of known cases of sero positivity in Pakistan is presently only 129 as of June 1992. Nevertheless, proper health education has to be delivered to the public. It is strongly recommended that the news media, radio, television, social workers, health care workers and politicians should create public awareness. Methods of preventing the spread should be publicized. Sero-surveillance of selected segments of population to assess the current AIDS situation and to monitor progression of 11W should be carried out. Despite the limitations and shortcomings of our study, we strongly feel that there is an increase in HW-I infection in Pakistan and there is no proven indigenous case of AIDS in our series. High risk behaviour groups should be screened to assess the true prevalence of this infection.

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