

HIV-2 infections: a lesson in diagnostic test selection in Egypt

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العدوى بالنمط الثاني من فيروس العوز المناعي البشري : درس في انتقاء الاختبارات التشخيصية في

مصر

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خلاصة هذا تقرير عن أول حالة عدوى بالنمط الثاني من فيروس العوز المناعي البشري سجلت في مواطن مصري . ولم يفكر في العدوى بالنمط الثاني من الفيروس إلا بعد أن أسفر اختبار نوعي للنمط الأول عن نتيجة سلبية في شخص كان قد ثبت أنه إيجابي مصلياً في مقابلة مشتركة للنمطين الأول والثاني معاً . إن ذلك يؤكد أهمية استعمال مقاييس قادرة على اكتشاف النمطين الأول والثاني معاً في اختبارات نقل الدم ولتشخيص حالات العدوى بفيروس العوز المناعي البشري ، في المناطق التي تكون فيها معدلات انتشار العدوى بالنمط الثاني للفيروس منخفضة جداً .

ABSTRACT The first HIV-2 infection in an Egyptian national is documented in this report. Infection with HIV-2 was recognized only after a HIV-1 specific assay yielded negative results in an individual previously identified as being HIV-seropositive by a HIV-1/HIV-2 assay. This emphasizes the importance of using assays capable of detecting both HIV-1 and HIV-2 for testing blood supplies and diagnosis of HIV Infections in regions where the prevalence of HIV-2 infections is extremely low.

Infections par le VIH-2: enseignement au sujet du choix des tests de diagnostic en Egypte

RESUME Le premier cas d'infection par le VIH-2 chez un Egyptien est documenté dans ce rapport. L'infection par le VIH-2 n'a été décelée qu'après avoir obtenu des résultats négatifs avec un test spécifique de dépistage du VIH-1 chez un individu qui s'était révélé auparavant séropositif lors d'un test de dépistage du VIH-1/VIH-2. D'où l'importance ici soulignée qu'il y a à utiliser des tests capables de déceler à la fois le VIH-1 et le VIH-2 pour le contrôle des approvisionnements en sang et le diagnostic des infections à VIH là où la prévalence des infections par le VIH-2 est extrêmement faible.

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Introduction

A high prevalence of HIV-1 infection and acquired immunodeficiency syndrome (AIDS) has been reported among high-risk groups and also in the general populations of several countries of Africa [1]. In contrast, the prevalence has remained low in the countries of the Eastern Mediterranean Region. The distribution of HIV-2 infections is more restricted; the highest prevalence is reported from west African nations. Recently, HIV-2 infections have been reported in natives of countries outside west Africa—in Mozambique [2] and in Egypt, where four foreigners residing there were found to be infected [3]. In this report, we describe the first documented HIV-2 infection in an Egyptian and point out the need to include appropriate HIV-2 diagnostic tests in regions where HIV infections occur infrequently.

Methods and results

HIV testing in Egypt was initiated in 1986 at the US Naval Medical Research Unit No. 3 (NAMRU-3) in Cairo. During the period from 1986 to 1991, specimens were tested in parallel by NAMRU-3 and the central laboratories at the Egyptian Ministry of Health. In 1991 the central laboratories assumed sole responsibility for HIV testing. Screening of blood donors in Egypt for HIV infection, which began in 1986, was decentralized in 1987 and is performed in regional blood banks. NAMRU-3 is a WHO collaborating centre for AIDS and now performs confirmatory testing when requested by the Ministry of Health.

The HIV testing scheme of both NAMRU-3 and the central laboratories has used enzyme immunoassay (EIA) kits manufactured by Abbott Diagnostics (Chicago, Illi-

nois, USA) with confirmation of repeatedly (twice) reactive samples by Western blot. Since EIA testing was initiated, a series of Abbott assays has been used: first generation HIV-1 assays (1986 to 1987), first generation HIV-1/HIV-2 recombinant EIA (1987 to 1989), second generation tests (1989 to 1993) and third generation tests (1993 to the present). Early in 1993, the Ministry of Health discontinued the general use of the Abbott test in the regional blood banks and began screening blood donors using the UBI HIV-1 EIA that uses HIV-1 synthetic peptide antigens (UBI, United Biomedical, Inc., Hauppauge New York, USA). The use of this test was discontinued in April 1993 and the use of Abbott kits was re-established.

For confirmation of HIV-1, Western blot testing was performed at NAMRU-3 using HIV-1 Western blot immunoglobulin G (IgG) assays from Du Pont Company, Wilmington, Delaware, USA (1986–1990) and Diagnostic Biotechnology Ltd, Singapore (1990 until present). Beginning in 1988, Western blot testing was performed in the central laboratories, first using kits manufactured by Bio-Rad Laboratories (USA) and later Diagnostic Biotechnology Ltd. At the collaborating centre at NAMRU-3, samples showing indeterminate results on HIV-1 Western blot, but suggestive of HIV-2 infection due to the presence of antibodies to gene products *gag* (p17, p24, p39, p55) or *pol* (p31, p51, p66), were tested by HIV-2 Western blot (Diagnostic Biotechnology Ltd, Singapore). The central laboratories refer Western blot indeterminate samples to NAMRU-3 where they are tested for antibodies to HIV-2.

In 1990, a 38 year-old male Egyptian blood donor was found to be HIV-seropositive by second generation HIV-1/HIV-2 recombinant EIA (Abbott Diagnostics). The patient's serum was tested by HIV-1 West-

ern blot (Diagnostic Biotechnology Ltd) and was reported as positive for HIV-1. The Preventive Medicine Section, Ministry of Health of Egypt, administers a programme to follow all HIV-infected individuals and visits asymptomatic subjects approximately every three months and individuals with AIDS once monthly. The purpose of this programme is to provide counselling to the infected individual and his family, to assist with any social needs, and to monitor and provide treatment for medical conditions. Additional samples were collected from this man during follow-up visits in August 1992 and April 1993. The 1992 sample was tested by Abbott HIV-1/HIV-2 recombinant EIA and found to be reactive, and indeterminate by HIV-1 Western blot. The 1993 sample was tested by the UBI HIV-1 EIA that uses HIV-1 synthetic peptide antigens and was nonreactive. The 1993 sample was then tested by Abbott second and third generation HIV-1/HIV-2 recombinant EIAs and was positive in both. HIV-1 Western blot results for the 1992 and 1993 samples were indeterminate (positive p24, p51, p55 and non-diffuse gp41). HIV-2 Western blot tests of these samples were reactive (positive p16, p26, gp36, gp41, p56, p68, gp80, gp125). A sufficient quantity of serum collected in 1990 was unavailable to confirm the initial positive HIV-1 Western blot result or to perform HIV-2 testing.

This HIV-2 infected man resided in Iraq from 1985 until 1989 and admitted having sexual contacts with prostitutes during his stay in Iraq. He presently resides in Egypt and was employed as a mechanic on a cruise boat on the River Nile from 1989 until 1991. The cruise boat served foreign tourists travelling between Luxor and Aswan in southern Egypt. He reported that he had had sex with foreign tourists. He is presently asymptomatic and free of any HIV-associated diseases. His wife and his children have

been tested for HIV infection on multiple occasions, most recently in January 1996, and have been repeatedly HIV-1 and HIV-2 seronegative by third generation Abbott HIV-1/HIV-2 recombinant EIA. He and his wife report that he always uses a condom during sexual intercourse.

A careful review of all HIV-1 Western blot results of HIV-1/HIV-2 EIA-positive subjects tested at NAMRU-3 during the period of 1986 to 1991 was conducted. HIV-2 testing of samples with HIV-1 indeterminate results with reactivity to p17, p24, p31, p39, p51, p55, or p66 identified two additional HIV-2 infected persons who were residing in Egypt, one from Malawi and the other from Côte d'Ivoire. Samples were collected from these individuals in 1988.

Discussion and conclusions

This report represents the first documentation of HIV-2 infection in an Egyptian. HIV-2 infections were reported previously among four foreigners residing in Egypt, one from Senegal, two from Côte d'Ivoire and one from the Persian Gulf region [3]. Since the 1990 sample from the Egyptian subject was unavailable for retesting, we cannot verify the initial positive HIV-1 Western blot result. The significance of the indeterminate results in 1992 and 1993, i.e., cross-reacting antibodies present in HIV-2 infection, was not appreciated until the HIV-1 specific synthetic peptide EIA yielded a negative result and HIV-2 Western blot tests were performed. A thorough review of HIV-1 indeterminate Western blot results from other subjects tested by HIV-1/HIV-2 led to the recognition of two additional HIV-2 infections in expatriates from Malawi and Côte d'Ivoire.

From our experience, we derive two conclusions concerning diagnostic testing for

HIV-2 in a region where prevalence is extremely low. First, assays capable of detecting both HIV-1 and HIV-2 must continue to be used by blood banks and hospital laboratories for screening and/or diagnosis of HIV infections. As our results indicate, the use of tests that detect HIV-1 alone will not identify individuals with HIV-2 infections. Sec-

ondly, where Western blot results are indeterminate when tested for HIV-1 and appropriate risk factors are present, Western blots for HIV-2 should be performed. The recent availability of HIV-1 Western blot kits containing a separate band of HIV-2 antigen aids in the selection of samples that require further testing.

References

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Women and aids

WHO estimates that 7-8 million women of childbearing age have been infected with HIV. This figure is expected to double by the end of the century. Worldwide, up to 50% (and in some places more) of all new infections are in women—mainly adolescent and young women. A decade ago less than 10% of people with AIDS were women: as of late 1994, women represent 40% of all new AIDS cases—a dramatic four-fold increase. By the year 2000 WHO estimates 14 million women will

have become infected with HIV and some 4 million of them will have died. As infections in women rise, so do the infections in the infants born to them. To date, these total about 1.5 million, of whom half a million have already developed AIDS. Overall, about one third of babies born to HIV infected mothers become infected themselves. By the end of this century, as many as 5-10 million children may have lost their mothers or both parents to AIDS.

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