EMERGENCY DEPARTMENT BASED HIV SCREENING: AN OPPORTUNITY FOR EARLY DIAGNOSIS IN HIGH PREVALENT AREAS

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Abstract

The Emergency Medicine Department (EMD) is an ideal place for public health interventions and provides ready access to the health care system, offering a great opportunity for HIV testing and counselling. Between 2003 and 2005, rapid test was requested for 59.39% of 10,752 cases from EMD, whereas ELISA was requested for 40.61%. Of the 317 HIV reactive cases, available medical records of 249 were reviewed for epidemiological and clinical information. Nearly 42% of total reactive cases detected in our Institute were from EMD. Three percent (317/10,752) were diagnosed as HIV reactive, 1.52% of the total samples were reactive by rapid test and the other 1.43% by ELISA. Two and half percent (163/6386) of those who had rapid testing and 3.53% (154/4366) who had ELISA testing, were identified as HIV reactive. All these cases were diagnosed within a mean EMD stay of 2.5 days. Eighty-five percent of HIV reactive individuals were unaware of their reactive status. Additional 53 cases of asymptomatic spouses were diagnosed as HIV reactive, thus making it possible to seek early treatment for HIV infection. The study emphasizes the importance of offering HIV testing to all patients who present to emergency department.

Key words: Diagnosis, human immunodeficiency virus, emergency department, Rapid test, enzyme-linked immunosorbent assay

Globally, the percentage of human immunodeficiency virus (HIV) infected individuals has risen dramatically over the past 26 years, when the AIDS epidemic was first detected. With a population of over one billion, the Indian epidemic is spreading at a prolific rate primarily due to large numbers of commercial sex workers, migrant labourers and a high prevalence of STDs. Many a times, doctors and health care providers fail to suspect HIV due to long asymptomatic phase of infection and many of these cases remain undiagnosed in the absence of any clinical manifestations. Early diagnosis of HIV infection allows infected individuals to take full advantage of antiretroviral treatments and preventive medicines for opportunistic infections.

The Emergency Medicine Department (EMD) is an ideal place for public health interventions and provides ready access to the health care system offering a great opportunity for HIV testing and counselling. Adopting a policy of HIV testing as a screening test in EMD would ensure early diagnosis, early management and proper interventions.

Centres for Disease Control and Prevention (CDC) in 1993 had recommended that any hospital with a HIV seroprevalence rate of at least 1% or an AIDS diagnostic rate ≥1/1000 discharges should strongly consider adopting a policy of offering counselling and testing routinely to patients aged 15-45 years.[1] Further on April 17, 2003, CDC had announced a new initiative, “Advancing HIV Prevention (AHP): New strategies for a changing epidemic” and made HIV testing a routine part of medical care.[2] As ours is a tertiary care hospital with a >1% prevalence rate of HIV, testing for HIV infection is offered to all the patients attending to the EMD to potentially identify HIV infected persons and better link them to care and prevention services.

We took up a retrospective study of all the cases with a request for HIV testing from the EMD of our Institute with the objectives to assess the appropriateness of offering routine HIV screening to all patients in the EMD, to describe the outcomes of rapid and ELISA HIV screening methods and also to study the spectrum of clinical illness induced by HIV infection among these patients.

Materials and Methods

Our institute is a tertiary care hospital and University with all super-speciality units. Its EMD receives patients from the local area as well as from different parts of the state of Andhra Pradesh. A retrospective study was conducted on a total of 10,752 blood specimens sent for HIV screening from EMD between 2003 and 2005. After obtaining consent for blood collection and testing, specimens were sent to our laboratory for HIV screening, 6,386 (59.39%) with a request for rapid and 4,366 (40.61%) for standard ELISA testing. Rapid test was mostly requested for patients who needed emergency surgery or other invasive procedures. Rapid testing was performed by HIV Tri dot (J. Mitra and Co, New Delhi, India). All the specimens on which rapid test was performed, were also tested by 4th generation ELISA along with other 4,366 cases that were requested for ELISA, by Vironostika HIV ag/ab Combi (bioMérieux, France). Each reactive specimen was re-evaluated by the second
immuno assay and discordant results were confirmed by more sensitive second type of 4th generation assay (VIDAS HIV Ultra Duo, bioMérieux, France) and by Western Blot assay (J. Mitra and Co, New Delhi, India) as per the HIV testing algorithm (Fig.1). Patients with reactive results were referred to the General Medicine Department for further management.

All the HIV reactive cases with their clinical history were categorised into the four World Health Organization (WHO) stages. As many patients were discharged within two days of admission and also due to financial constraint, CD4 count enumerations were requested for only 162 cases only these were categorised as per the CDC criteria. CD4 testing was performed using FACS Count system (Becton and Dickinson, USA), courtesy NACO, Government of India.

Data analysis

The demographic and clinical data of all the HIV reactive individuals was analysed by reviewing the case records and was entered into the Epi-info version 5 - 2002, downloaded from the CDC website, www.cdc.gov/epiinfo. Statistical analysis of data was done by Chi-square test and a <0.05 P-value was considered statistically significant.

Results

Out of 10,752 specimens screened for HIV, 317 (2.95%) were diagnosed as HIV reactive, 1.52% by the rapid and the

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**Figure 1:** Testing algorithm for HIV detection

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other 1.43% by the ELISA testing. Two and half percent of rapid tests and 3.53% of ELISA test were HIV reactive. All the reactive cases by rapid test were also reactive by ELISA test. But two of the samples reactive by ELISA were non-reactive by rapid test and after applying further tests as per the testing algorithm; they were detected to be positive for HIV p24 antigen and were not having any HIV antibodies.

The study was done on 8,498 males and 2,254 females with a mean age of 49 years (range 3-89 years). Prevalence of HIV was observed to be more in males with male to female ratio of 3:1 and a mean age of 34 years.

As a policy of our department, all the results of rapid HIV tests are made available to the clinician within 30 minutes of receiving the sample. ELISA test is done in batches and thus takes minimum 2-18 hours for knowing the HIV result. Thus 100% of cases with a request for rapid assay were informed of their HIV result within 30 minutes whereas 96.29% cases with a request for ELISA received their results before the discharge. Thus only 1.51% (162) patients were discharged from the EMD before knowing their HIV status.

Of the 317 HIV reactive cases from EMD, medical records of 249 were available for review. The average length of EMD stay per patient diagnosed as HIV reactive was about 2.5 days (range 1-8 days), whereas the average hospital stay for the patients who were shifted from EMD to other wards, from the day of admission till the discharge was 5 days (range 1-28 days). Only 15.26% (38/249) patients were aware of their HIV seropositive status prior to admission to the EMD. The rest of the 84.74% patients (211/249) were diagnosed as HIV seropositive only after being admitted in the EMD. Two out of 249 cases (0.8%) were previously reported outside our Institute as non-reactive but were found to be reactive in our laboratory.

After the knowledge of the HIV status, 25.30% (63/249) patients were discharged against medical advice in spite of repeated counselling, but 18 of them were later readmitted in the EMD due to various HIV related complications. HIV screening of the spouses of 29.32% (73/249) of the HIV reactive cases was performed and 72.60% (53/73) of them were diagnosed as HIV reactive and referred to the General Medicine Department for further management.

Patients were admitted in the EMD with various reasons like road traffic accidents, fever, diarrhoea, AIDS defining illnesses or some other reasons (Fig. 2). Many patients had presented with multiple complications and various opportunistic infections. Mortality rate was 18.70% among these patients and the commonest identifiable cause resulting in death was an acute illness with multiorgan failure.

Seventy-six out of 249 reactive cases, after the categorisation into four WHO categories, were in

![Figure 2: Reasons for admission to EMD, clinical symptoms and opportunistic infections in HIV reactive individuals included in the study](www.ijmm.org)
asymptomatic phase whereas 141 were in late stage of infection. Nineteen cases with CD4 cell counts of >500 cells/μL were without any symptoms of infection whereas 119 cases had CD4 counts of <200 cells/μL and most of these were with many AIDS related illnesses. CD4 cell enumeration could not be performed in 87 of the reactive cases either due to financial constraint or because the patient left the hospital against medical advice.

**Discussion**

An estimated 39.5 million people around the world were having the HIV infection by the end of 2006 and 95% of them are in the developing nations. Nearly 4.3 million people were newly infected with the virus in 2006. Many studies have shown that EMD can play a major role in the diagnosis of HIV infection. In 2001, CDC had issued revised guidelines giving explicit emphasis to the role of emergency physicians, owing to the realisation that the emergency department represents the only source of medical care for many patients and often serves as the primary site for routine health care to communities at risk for HIV. Our study stresses the importance of offering HIV testing in EMD and its direct and indirect impact on emergency services similar to the earlier study by Teja et al. Because a high number (211/249) of HIV-infected individuals were unaware of their infection, it is evident that EMD can play a critical role in offering HIV testing and help in the national strategy of early HIV detection and further prevention programmes. Furthermore, 76 of these patients were without any symptoms of HIV infection and would otherwise have been missed out from HIV detection. These patients had come to the EMD as they had either sustained a road traffic accident or trauma or had encountered another emergency event.

During the study period, our department had detected a total of 757 HIV reactive cases from all the patients admitted in our Institute under various units. Three hundred and seventeen (41.88%) of total reactive cases detected were from EMD proving again that offering HIV testing in EMD detected a significant number of new infections. Most importantly all these cases were diagnosed within a mean EMD stay of 2.5 days, making it possible for the clinicians and health care workers to implement proper prevention and transmission guidelines. Majority (84.74%) of HIV reactive individuals were unaware of their reactive status prior to admission into EMD. An added advantage was detection of HIV reactive status of their asymptomatic spouses thus making it possible for them to seek early treatment.

There have been several documented studies that present the outcome of rapid and ELISA tests for HIV. With rapid HIV antibody testing and the availability of the result within 20-30 minutes, the chances of patients getting discharged without the knowledge of their HIV status is minimised. The result is comparable in clinical significance to a sensitive EIA result and all these rapid tests in our institute are further confirmed by 4th generation ELISA test to avoid missing out any reactive case in the window period. This time saving can be critical in clinical situations that require prompt initiation of antiretroviral therapy and prevention strategies.

Two out of 249 cases were admitted with previous HIV non-reactive reports. Both of these tests were done just one or two days ago at other diagnostic centres. Both these samples were negative for HIV antibodies but were repeatedly positive when a second type of 4th generation assay (HIV Duo Ultra, bioMérieux, France) was performed on a fresh sample. Western blot assay was negative for both these samples. These could not be confirmed by HIV 1 polymerase chain reaction (PCR) test as plasma sample could not be collected from both these patients. As most of the hospitals and diagnostic centers are continuing the use of 3rd generation kits for HIV testing, this study once again emphasizes the use of 4th generation kits that can detect both HIV p24 antigen and antibodies.

Sixty-three out of 249 (25.30%) patients leaving against medical advice is of concern assuming that these patients are leaving too soon and that adverse consequences will follow. Although the most commonly cited reasons for leaving the hospital were personal matters, financial constraint, dissatisfaction with treatment received and several other reasons, we found that 85.71% of these patients had ended their hospital stay prematurely after knowing their HIV status. This emphasises the importance of physician-patient communication skills and the need for round the clock availability of a professional counsellor in the EMD to prevent patients from leaving against medical advice. Similar to a Canadian study that found that HIV-positive patients leaving against Medical Advice were more likely to be readmitted with a related diagnosis within 30 days than those formally discharged, our study also showed 28.57% readmissions to our hospital. It is possible that rest of the patients sought medical care at other hospitals or did not survive.

We believe that, in an effort to help fight the HIV epidemic, HIV screening should be strongly recommended in patients presenting to EMD. It is evident from our study that HIV testing in EMD has provided access to a significant number of new HIV infections earlier than might have otherwise been. The use of rapid HIV test has minimised the chances of patients getting discharged without the knowledge of their HIV status. Thus the study emphasizes the importance of offering rapid HIV testing to all the patients who present to emergency department with or without any symptoms so that early diagnosis and treatment can significantly reduce morbidity and mortality. For all these rapid test results, a reconfirmation by 4th generation HIV ELISA is recommended to rule out any early HIV infection.

**References**

1. Centers for Disease Control and Prevention (CDC). Recommendations for HIV testing services for inpatients and

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