Clinical and Epidemiological Aspects of HIV Infection at a Rural Hospital in Northern India

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ABSTRACT

Village Hospital is a 120-bed rural mission hospital located in the foothills of the Himalayas in northern India. During a two-month senior international health elective, I studied clinical and epidemiological aspects of the human immunodeficiency virus epidemic experienced at Village Hospital. During the first 7.5 months of 2001, there were 73 antibody-based rapid assays conducted at Village Hospital to test for HIV, and 7 of the patients tested HIV-seropositive. No blood donors had positive test results for HIV suggesting relatively low disease prevalence in this area. Eight clinical vignettes are presented which describe the clinical presentation and care of patients with HIV. Indications for testing included extensive tuberculosis, candidiasis, emaciation, chronic fever, and high-risk behavior. Most of the patients who tested seropositive were young men with some form of high-risk behavior. The hospital’s treatment of HIV was entirely palliative. Care was variable reflecting the stigma faced by patients with HIV. However, the community health department’s commitment to educating surrounding villages about HIV was very strong and served as a model of preventive medicine in a developing country.

INTRODUCTION

Although the ravages of the human immunodeficiency virus (HIV) epidemic in sub-Saharan Africa are frequently mentioned in the news, HIV and the acquired immune deficiency syndrome (AIDS) are spreading at an alarming rate across India. The first case of HIV infection in India was documented in 1986 (Simoes et al., 1987; Simoes et al., 1993). By January 1999, Lancet published an article entitled, “India has the largest number of people infected with HIV” (Kumar, 1999). Presently, the estimate for the number of people infected with HIV is 3.5 million people out of a population of almost 1 billion (The Joint United Nations Program on HIV/AIDS, 2000) — a population greater than the entire continent of Africa. The prevalence of adults living in India with HIV is estimated to be between 0.5% and 1%, which is the same prevalence estimated for the United States. Although the prevalence is still low, the absolute number is large, giving India one of the highest HIV burdens in the world.

There are several epicenters from which HIV is spreading in India. The first cases of HIV were reported among commercial sex workers (CSW) in Mumbai and Chennai (Madras), two major ports of trade (Bollinger et al., 1995). Current estimates by The Joint United Nations Program on HIV/AIDS (UNAIDS) put the prevalence of HIV in CSW working in major urban centers of India at 5.3%. In Mumbai, 50% of CSW are now HIV infected (National AIDS Control Organization, 2000). A second major portal of entry is through intravenous drug users in the northeast states of Manipur and Nagaland. These states border Myanmar, Laos, and Thailand, which constitute a golden triangle of drug production and trade (Cock and Weiss, 2000). Studies in Manipur have found that 75% of intravenous drug users, the majority of whom are male, are HIV seropositive. Forty-five percent of their non-injecting wives are also infected (Eicher et al., 2000; Panda et al., 2000). From these epicenters, the virus spreads inland by means of long distance truckers who stop to visit CSW at dhabas (hotels) along their routes (Rao et al., 1999). In 1992, the seroprevalence of trucker drivers was found to be 1%, which was 20 times higher than the estimated national prevalence rate at the time (Singh et al., 1992).

Although HIV seroprevalence in India, as in the United States, is highest in large metropolitan areas, there is mounting evidence that HIV is spreading to small cities and rural areas as well. Near Varanasi in the northern state of Uttar Pradesh, the prevalence of seropositivity is 2.8% based on screening of blood donors (Mandal et al., 2000). In Chandigarh (a city not far the hospital where I worked), 5.7% of patients attending a sexually transmitted disease (STD) clinic in 1998 were found to be seropositive, compared to 0.56% in 1993 (Kumar and Gupta, 2000). In the south, screening of male patients presenting at a rural hospital in the Sindhudurga district of Maharashtra with AIDS-associated illnesses (such as tuberculosis, fever of unknown origin, or cachexia) or with high-risk behavior, demonstrated that 17.5% of those tested were infected with the virus. Moreover, 57% of the wives of these HIV-infected patients were also seropositive (Redkar and Redkar, 1999). In rural areas of the Pune district of Maharashtra, 1.2% of pregnant women were found to be HIV-infected, with seroprevalence being higher in villages situated closer to highways (Kunte et al., 1999).

UNAIDS estimates the HIV prevalence in women attending antenatal care clinics outside major urban centers in India was 0.3% in 2000 (UNAIDS, 2000). This figure is used as an indicator for prevalence of HIV seropositivity in the low-risk or general population. The
major risk factor for HIV infection among pregnant women or housewives was to have sex with their husband (Sircar et al., 1998; Solomon et al., 1998; Kunte et al., 1999; Mandal et al., 2000; Maniar, 2000), signifying that the epidemic has spread to all areas and populations of India.

Village Hospital (VH) is located in a small village 150 miles northeast of New Delhi, nestled in the foothills of the Himalayas. VH was opened in 1936 by an English ophthalmologist. The Eye Clinic has remained an outstanding feature of the hospital. Since opening, the services provided by the hospital have expanded to include a tuberculosis hospice, surgery, obstetrics, dentistry, pediatrics, and a 24-hour emergency room. The hospital also supports community clinics in 29 villages surrounding the hospital. Tuberculosis is endemic in the area and tuberculosis patients form one of the largest components of the patient population at VH. Tuberculosis is also one of the most common presenting illnesses of HIV infection in northern India (Mandal et al., 2000).

The hospital attracts patients from villages in the plains as well as from villages in the surrounding mountains. Patients sometimes travel for hours to be seen at VH. According to a survey recently completed by the Community Health Department at VH, 66% of the families in the hospital’s catchment area fall below the poverty line. The women’s literacy rate is below 50%. Most of the villagers are farmers. Only 12% of those surveyed have left the villages for their livelihood, being employed as drivers, army personnel, or in government service. At the hospital, patient’s families are responsible for feeding, clothing, changing the bedpans, and doing other routine tasks the patients require.

The hospital is a 120-bed fee-for-service hospital. In the early 1970s, the hospital joined a Consortium of community hospitals with almost two-dozen hospitals across northern India dedicated to bringing health care and economic change to poor rural populations. The hospital is staffed with seven senior doctors with specialization, and three junior doctors, recently graduated from medical school. The hospital is associated with a medical college whose surgery registrars (residents) spend two months at VH. All of the physicians are Indian and were trained in India.

I spent two months, July and August 2001, at VH during a senior international medicine elective. All of the doctors spoke English as well as Hindi and all of the medical documentation including medical records and prescriptions were written in English. I spent one month on the obstetrics service, where I had the opportunity to deliver more than a dozen and a half babies as well as assist in Cesarean sections and gynecological surgeries. I also spent a week each in ophthalmology, general surgery, orthopedics, medicine, and pediatrics. After morning rounds, which were conducted mostly in

FIGURE 1 | The HIV Tri-Dot Test.

English, I would attend the outpatient department with the doctors, who would summarize the patient’s history, and then allow me to examine the patients. Elective surgeries were scheduled for Wednesdays and Fridays. I was allowed to scrub and assist with these surgeries. I also went on several community health visits to surrounding villages.

In addition to the clinical experience, I spent a portion of my time looking at epidemiological and clinical issues concerning HIV infection at VH. As the village is isolated from major cities and highways, my initial hypothesis was that the hospital had not seen many cases of HIV infection. Through interviews with patients and hospital staff, as well as medical chart review, I set out to collect information regarding the prevalence of HIV infection, the protocols for HIV testing and diagnosis, and the general attitudes and understanding of the HIV epidemic among the staff and in the community. Much of the data is presented in the form of clinical vignettes, depicting the type of experience I had during my elective. In short, I hoped to document the onset of the HIV epidemic in this remote Indian village as seen through the work of a small mission hospital.

METHODS

The results of HIV serologic tests performed at VH between January 1, 2001, and August 10, 2001, were obtained from laboratory records. HIV testing was performed using the Tri-dot test (J. Mitra and Co., New Delhi, India; Figure 1), an antibody-based rapid assay, with sensitivity and specificity approaching 100% (UNAIDS, 1997). Next, medical records were reviewed to obtain sociodemographic and clinical data, including signs and symptoms, treatment provided, and medical follow-up. Where possible, the patient’s physician was interviewed to obtain further sociodemographic data as well as the reason an HIV test was ordered. Because of the nature of medicine in a poor, rural, mission hospital setting, much information about the disease was based
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on physical exam findings and the clinical intuition of the physician. Results are given in the form of clinical vignettes from inpatient, outpatient, and maternity wards in order to give the reader a sense of life at a rural Indian hospital.

RESULTS

HIV testing

VH had a large sign in front of the outpatient department, which read in both English and Hindi, "Infectious disease clinic on all Fridays, with facilities for sexually transmitted diseases (STDs), HIV/AIDS, and voluntary confidential HIV testing" (Figure 2). Although the major Friday clinic was currently an antenatal clinic, HIV testing was done on an inpatient and outpatient basis as needed.

According to the laboratory director at VH, the correct protocol for HIV testing was the following: a patient is presumed to be HIV-infected if three rapid antibody assays, preferably from different manufacturers, are positive. Confirmatory Western blot testing is then performed for all patients with positive tests at the Indian Council of Medical Research in the state capital, although it is not compulsory to report HIV cases to local or national governing bodies. All cases of HIV at Consortium-associated hospitals, however, are reported to the Consortium headquarters in New Delhi. In actuality, there were no records of the results of Western blot testing in any of the charts that I studied. In many cases only one, and sometimes two, Tri-dot tests were performed.

During the first 7.5 months of 2001, there were 73 Tri-dot HIV tests performed on different patients, with 7 (9.6%) positive results. Forty-eight tests were performed on an outpatient basis with 4 positive results (8.3%), and 25 tests were performed on an inpatient basis with 3 positive results (12%). The difference in these proportions is not statistically significant using Chi-square analysis. As required by law, Tri-dot tests were also performed on blood from blood donors at the hospital. In the first 6 months of 2001, there were 390 blood donors, none with positive test results.

The indications for HIV testing, reported by the internist Dr. T., are listed in Table 1. For the most part, these indications were concordant with the World Health Organization (WHO) Southeast Asia Regional Office’s publication Clinical Management of HIV and AIDS (WHO, 1998). However, it was also common practice among junior doctors to perform HIV tests on patients with or suspected to have hepatitis. In general, pretest counseling was not performed, and informed consent was not obtained or required for testing. Post-test counseling, however, which included a discussion of the nature of the test and treatment options, was routinely offered. A psychologist had recently joined the staff of the hospital. Although she had no prior experience with HIV counseling, she was in the process of adding HIV counseling as one of her duties at the hospital.

The following clinical vignettes illustrate the presentation and treatment of patients having or suspected of being infected with HIV at VH. They give a flavor of the type of medicine practiced in rural India as well as a picture of a cross-section of the patients I saw while on the rotation.

TABLE 1 | Indications for HIV Testing at VH

| 1. Extensive pulmonary tuberculosis |
| 2. Emaciation: greater than 10% weight loss |
| 3. Oral Candidiasis |
| 4. Chronic fever (greater than one month) with weight loss |
| 5. Chronic diarrhea with weight loss |
| 6. Extensive extrapulmonary tuberculosis |
| 7. The patient work as a truck driver or is away from home often |
| 8. The patient has a history of “high-risk” behavior |

FIGURE 2 | The sign in front of the outpatient department at VH.
**Inpatient Medicine - Case 1**

Although this patient was well remembered by the doctors in general, the HIV test for this patient was apparently lost in the lab, and I was unable to recover the patient identification number or find the patient’s chart. All information comes from an interview with the internist Dr. T. This patient was a 25 to 30 year-old male who was admitted from the emergency room one afternoon. Dr. T. recalls that the patient was probably a truck driver, was probably married, but without children, and was accompanied by a male relative. The patient presented with fever, tachycardia, and decreased blood pressure suggesting septicemia. He was found to have oral candidiasis, which prompted HIV testing, and a patchy bronchopneumonia on chest x-ray. A Tri-dot HIV test was performed that evening with a positive result. Later that night, the patient required intubation due to increasing respiratory distress. The patient was noted to bleed excessively from puncture sites and from the mouth upon intubation, leading Dr. T. to suspect disseminated intravascular coagulation (DIC) from overwhelming infection. The patient died with respiratory failure, septicemia, and DIC the next afternoon. Once it was generally known amongst the staff that the patient’s HIV test result was positive, Dr. T. recalls that the staff avoided the patient, "especially during the intubation."

**Inpatient Medicine - Case 2**

S.K. was a 45 year-old male who presented to the internist Dr. T. with 15 to 20 days of fever, cough, weight-loss, and decreased appetite. His erythrocyte sedimentation rate was elevated (115 mm/hr), and his chest radiograph showed infiltrates suggestive of tuberculosis. He was admitted to the hospital for collection of sputum samples to diagnosis tuberculosis and counseling. On further exam, the patient was found to have oral candidiasis, which prompted HIV testing. The Tri-dot HIV test was done twice and found to have a positive result both times. The patient stayed for one day in a tuberculosis room, which a room adjoining the male ward was set aside for active tuberculosis cases. Dr. T. explained to the patient and his relatives the meaning of the Tri-dot tests and the importance of obtaining another test for confirmation. However, the patient urgently requested to be discharged. When asked why, the patient said the staff had informed him that the hospital did not treat HIV. The patient was discharged on the antifungal fluconazole without any sputum samples being collected, or tuberculosis therapy being initiated. He was lost to follow-up.

**Inpatient Medicine - Case 3**

H.K. was a 60 year-old Sikh woman from a nearby village who presented to the emergency room with one month of fever, vomiting without diarrhea, weight loss, and decreased appetite. She had obtained a positive Widal test from an outside source. On exam, she was emaciated and had oral candidiasis. The first lab test requested by the surgical registrar was an HIV test, which returned with a positive result. The registrar stated that he wanted the test because of the patient’s emaciated state and thrust. The patient reported a history of multiple blood transfusions. Further history revealed that the patient’s husband lived with his son in the southern city of Hyderabad, and had died one year ago with one and one-half months of fever. Upon questioning, the son denied that his father had had any extramarital affairs. The patient stayed in the hospital for more than a week being treated for enteric fever. I noticed no adverse treatment from the staff, although the patient’s HIV diagnosis was widely known. It had not, however, been recorded in the chart. Dr. T. sat down with family one afternoon, and told them about the HIV test. They seemed understanding and were willing to have the test confirmed by western blot. The test had not yet been ordered when I left the service.

**Inpatient Medicine - Case 4**

H.S. was a 45 year-old male who was seen in the outpatient department with progressive weakness, and body aches for 6 years. He also complained of decreased appetite, weight loss and a cough. He was found to have cervical lymphadenopathy upon physical exam. The provisional diagnosis and reason for admission stated on the admission slip was "rule-out AIDS." A Tri-dot test had a negative result. The patient was eventually diagnosed with and treated for malaria with good follow-up once discharged.

**Inpatient Medicine - Case 5**

P. was a 45 year-old male who was admitted for secondary closure of a wound in his back. He had been suffering from fulminant necrotizing fasciitis, for which he had been hospitalized for many weeks in the months prior to the current hospitalization. The infection was not clearing readily with antibiotics, and the general surgeon, Dr. C, began to suspect some form of immunosupression. The admitting history in the chart stated that the patient was an alcoholic. The patient was a manual laborer who was probably married, according to Dr. C. The patient was not found to be diabetic, and his HIV test had a negative result. The wound was closed and the patient was eventually discharged on antibiotics in an improved condition.

**Outpatient Medicine - Case 6**

Patient M., a 35 year-old male, came to the outpatient department complaining of dysparenuia and urethral discharge. He denied fever. The patient worked in a sugar mill, and although the patient was married, he reported that he had no children and had had inter-
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Although latex gloves were available, gloves were rarely worn by the nurses to start intravenous lines as they were considered expensive and not for routine use. Gloves for sterile procedures were cleaned and resterilized repeatedly, which increases the porosity of the latex. Needles and other sharps were routinely mixed in with sheets, instruments, trays, and tissue waste and left for cleaning personnel. Needles were also cleaned, autoclaved, and reused. Although sharps containers existed in many hospital rooms, for the most part they sat unused in the corner. It was not uncommon to see unshielded needles, as well as glass from drug ampules sitting on desk tops. I noticed that during surgeries in the operating theater, as well as during stitching of episiotomies, fingers were routinely used to guide needles. Footwear during surgeries consisted of open-toed flip-flops.

COMMUNITY AWARENESS

The community health department has addressed the HIV epidemic on several levels. First, the department regularly held Chasini STD clinics at various village sites. The Chasini clinic, whose acronym stands for “comprehensive HIV/AIDS services in north India,” is a Consortium-supported program where a female doctor sees mainly female patients with gynecological complaints and can examine patients and test for STDs. Furthermore, through their extensive network of women’s groups, the community health team was able to educate the members about HIV. Finally, the department held education classes at the hospital for various invited groups. While I was there, they held a class for Dais (community midwives) on HIV, stressing the importance of wearing gloves during deliveries and handling sharps carefully. Approximately two dozen Dais came to the class, and each was given several pairs of latex gloves. The class lasted for most of one Friday morning, and everyone stayed long after the class had ended, talking, and enjoying each other’s company.

A survey conducted by the community health depart-
ment asked a number of questions about the community’s understanding of HIV. The survey covered 29 surrounding villages and a population of 24,000. Two hundred and ten family units were surveyed. Highlights of the survey are the following. Forty-five percent of the families interviewed said that they had heard of HIV/AIDS. Fifty-six percent of those families had heard of the disease from watching television. Another 20% had heard of the disease from the newspaper, and a smaller proportion had learned of the disease from the radio (12%), posters (8%), or a health worker (8%). When asked how HIV is spread, 33% of the families responded that it was spread through an unfaithful sex partner. Unscreened blood transfusion (22%) and use of unsterile syringes and needles (28%) were the next most popular responses. Fifty-nine percent of families said that condoms were easily available. Finally, when asked about “what should be done to an HIV-positive person,” 92% said that they did not know.

DISCUSSION

In the first 7.5 months of 2001, VH tested 73 patients for HIV with 7 positive results divided uniformly between the inpatient and outpatient setting. Patients with positive tests were mostly young men with some form of high-risk behavior. The small number of women who tested positive appeared to have been infected by their husband or blood transfusion. Estimating that approximately 250 outpatients are seen 6 days per week at the hospital, less than 1 in 10,000 outpatients tested positive. However, as patients were tested only if they were symptomatic, establishing the true HIV seroprevalence in VH’s patient population is not possible from the above data. Yet, the fact that none of the 390 blood donors tested positive for HIV during the first 6 months of 2001 suggests that HIV seropositivity in this area is still relatively low.

The indications for performing an HIV test at VH were very similar to those listed in the WHO’s publication outlining guidelines for management of HIV in Southeast Asia. Common reasons for testing, and reasons why patients found to be HIV positive were tested, included candidiasis, extensive tuberculosis, prolonged fever, cachexia, and evidence of a STD. As the hospital saw many patients with tuberculosis, tuberculosis which “looked too bad” was a cue to check for underlying HIV. Thus, patients were tested for HIV once they were already symptomatic with AIDS-defining illnesses. In addition, the junior doctors routinely tested patients suspected to have hepatitis. Although pregnant women were screened for hepatitis and syphilis, there was no antenatal HIV screening.

Pre-test counseling and informed patient consent were not requirements for testing. For the most part, physicians ordered HIV testing if they felt it was needed without consulting the patient. Post-test counseling from the physicians, the pastor, and/or clinical psychologist was routinely offered to patients with a positive test. However, the counseling and follow-up seemed to be performed with variable efficacy. Whereas some patients received full family counseling with multiple hospital staff members, other patients left the hospital very upset after being told of a positive test result.

Similarly, patient confidentiality surrounding the test was not consistent. Whereas for some patients, the fact that an HIV test was done was never recorded in the chart—probably more related to a lack of protocol for recording test results than a concern for patient’s privacy—for other patients, the HIV status was written across the chart in bold red letters. The charts are handed to the patients upon registration so that they may hand them to the doctor at their appointment. Therefore holding a chart readily marked HIV positive is tantamount advertising the patient’s HIV status, even though very few of the patients would have been able to read it.

Treatment for patients with HIV was entirely palliative, as is common in Asia. The hospital did not stock antiretroviral drugs in the pharmacy, and most of the doctors did not have experience in using them. Prophylaxis with Bactrim for opportunistic infections was also not given. Moreover, follow-up with the patients was variable and may have been related to the stigma HIV-infected patients faced.

Many of the doctors expressed concern that the hospital was unprepared to treat patients with HIV. The level of education regarding HIV was somewhat variable between physicians with the junior doctors being more familiar with the disease than some of the senior doctors. Furthermore, there was concern that the staff was unprepared, both in terms of practice and attitude. Based on the staff reaction to recent HIV patients, there appeared to be some reluctance to take care of patients with HIV/AIDS. On a practical level, universal precautions were not routinely practiced; blood was drawn without wearing gloves and needles were not disposed of properly, suggesting that part of the reason staff were reluctant to treat patients with HIV was that they were ignorant of how to protect themselves. With this in mind, it is not surprising that a chart would be marked stating the HIV status of a patient in the interest of staff safety.

Although nursing care of the majority of inpatients with positive HIV tests was substandard, the patient (Case 3) whose care I witnessed was treated well, and received the same attention as the rest of the patients in the female ward. It is unclear why H.K.’s care differed so remarkably from previous patients – whether it was because she was a woman, because she was cared for by the staff in the female ward, because of the relatively
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mild symptoms she expressed, or because the quality of her care reflects an increased level of experience and acceptance over time on the part of the hospital staff in dealing with HIV patients.

One of the hospital’s strengths was its community health program. Working on several levels, the department had assessed community awareness, was educating the community both through outreach groups as well as invited classes at the hospital, and was able to test for HIV and other STDs at the Chasini Clinic. Results of their survey suggest that the community does have an awareness of HIV. However, how to care for a person with HIV is still an uncertainty. Providing education about HIV before the disease takes hold in this area of India, the community outreach has the potential to curb the impact of the epidemic. Education concerning care of HIV patients both in the hospital and the community appears to be a particularly important area on which to focus.

Although the hospital as a whole appeared to need preparation in order to ready itself for HIV patients, its connection with the hospital Consortium put it in a favorable position for continued improvement. The Consortium operates an HIV hospice in the eastern state of Mizoram. Working within an organization that has experience with HIV is advantageous in several ways. First, the hospital has a readily available source of information and support upon which to draw. Several years ago, the consortium drew up its own infection control guidelines. While I was at VH, some of the data I collected was used in a five-year plenary meeting with members of the administrative body from New Delhi. One of the key areas discussed was HIV, and plans to fully prepare the hospital for the epidemic were set in motion, including compliance with the infection control guidelines. Another advantage is the Consortium’s ability to attract outside experts to consult at its hospital. I had the opportunity to meet an English pediatrician who had spent the last 10 years working with HIV infected children in South Africa. She had recently become a consultant to the consortium in order to help physicians in India such as those at VH who were just beginning to face the HIV epidemic first hand. With the commitment from the physicians at VH and help from the Consortium and other consultants, the hope and plan is for VH to become a model for HIV care in rural northern India.

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