



# Pre-testing Screening for HIV before Conducting Post-mortem Examinations

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## Abstract

The concern about contracting an infectious disease during the course of an autopsy is great, a concern heightened when the devastating infections that could be transmitted are considered. The fear and concern, however, appear out of proportion to the actual incidence of such disease transmission. In our autopsy study, out of the total 328 blood samples tested, only 2 (0.6%) samples were found to be HIV sero-reactive, over a period of three years. A comparison with similar studies abroad, reveals varied results, which do not represent the population data. However more such studies will be needed in different regions of countries to find any significant pattern or correlation. Although this is a burning issue but the forensic medicine departments in India seem to be taking it lightly. The association of the department with a microbiologist is essential in saving its staff

## Key Words

Autopsy, HIV, AIDS, Postmortem

## Introduction

Autopsy safety was not much of a consideration until the 1980s when HIV infection appeared. At first, the emphasis was placed on the prevention of infection by establishing "universal precautions". Along with this came procedures and regulations to minimize the possibility of cuts and needle sticks. Other hazards were eventually identified, and appropriate precautions were implemented to varying degrees. Creating an awareness of autopsy safety is highly significant since it has been shown that the vast majority of occupational accidents are due to human error and that safety awareness in the workplace is more effective in preventing accidents than bureaucratic regulations (1).

Forensic specialists, a small subgroup of healthcare workers, could have an even greater occupational risk for these diseases because of the unique characteristics of forensic autopsy practice. In addition to needles and scalpels, forensic experts are exposed to broken glass, bone shards, and fragmented projectiles, as well as a

large amount of blood and open tissues on a daily basis. The prevalence of human immunodeficiency virus (HIV) and hepatitis infection is higher among cadavers examined by forensic experts than among the general public (2). Most people infected with HIV-I will develop AIDS, but the incubation period varies (mean 10 years, range 2-20). HIV testing of the dead sidesteps many of the ethical and social policy issues raised in the testing of the living (3). Mortuaries, dissecting rooms and forensic laboratories are high risk areas for infection and the staff have the risk of occupational exposure to infectious agents, especially during post-mortem examinations. Spread of infection from dead bodies may occur by the air-borne or contact routes, or from a needle or a sharp instrument injury. However limited data is available regarding these risks to forensic medical personnel who are exposed daily to large numbers of severely traumatized bodies in India. Further the mortuary staff including doctors are either not aware or are ignoring the risks inherent to such an

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infectious case where they are playing with the lives of their own, which may also affect their families.

### Material & Methods

This Forensic Medicine department provides a medicolegal autopsy service for Barara and Mullana areas (population >128,000) of Ambala district in Haryana state. Routine confidential and anonymous testing for HIV antibody in all subjects at autopsy was done from July 2009 to June 2012. Most of the cases are hospital deaths and are kept in cold chambers at a temperature of 4 degree Celsius. In all, 328 deceased, were tested over the three year period. Average time since death was about 24 hours with a range of 6 hours to 3 days. Blood samples (at least 5 ml) were collected from peripheral blood vessels (subclavian or femoral). None of the cases had a previous or known HIV status. Samples were tested in the Microbiology department by Tri-Dot rapid test. Serum was separated & tested for HIV antibodies as per National AIDS Control Organization (NACO) guidelines. Positive results were confirmed by ELISA. HIV tests are used after death yet they are not validated for this purpose and may produce false positives (4-7). The purpose of this study was to determine how much autopsies are safe in relation to pre-autopsy testing for HIV; with an attempt to identify the seroprevalence of HIV in forensic autopsy population in a rural population of north India.

### Results

The result of antemortem serologic testing for HIV was unavailable in all persons; they were evaluated by HIV antibody test on post-mortem serum samples using enzyme-linked immunosorbent assay, confirmation of positive results. Out of the total 328 blood samples tested, only 2 (0.6%) samples were found to be HIV sero-

**Table 1. Summary of the Findings of the Study**

Characteristics	Sample group N = 328	Positive N = 2
Seroprevalence	0.6 %	-
Male : Female	3 : 1	2 : 0
Average time since death	12-24 hours	24-36 hours
Unidentified status of bodies	9.15% (n = 30)	100 %
Common cause of Death	Road traffic accident 49.2% Poisoning 14.2% Burns 12.3% Natural diseases 9.8% Drowning 4.5%	Road traffic accident Poisoning

reactive (*Table-1*). Both the cases were male unidentified bodies brought by police from roadside; none of the females tested positive. Adequate precautions on receiving the report, as per guidelines for the autopsy staff and further advice was given to the police officials regarding further disposal of the dead body.

### Discussion

The total number of People Living with HIV/AIDS (PLHA) in India in 2007 is estimated to be 2.31 million (1.8 - 2.9 million). Estimated Adult HIV prevalence in India in 2007 is 0.34% (0.25% - 0.43%). Estimated HIV prevalence among males (0.40%) continues to be higher than among females (0.27%). Estimated Adult HIV prevalence in Haryana state was 0.27% in 2006 and 0.2% in 2007 (8).

There have been several studies that have looked at how long HIV survives in a dead body. In unrefrigerated bodies, HIV generally survives up to 24-36 hours after death. However in one study on refrigerated bodies, bodies that were stored at 6 degrees Celsius, HIV was

**Table 2. Showing Comparison of Similar Studies from Different Regions**

S.No.	Study	Year	Autopsy HIV %	Population HIV % (13,14)	Ratio
1.	USA, Los Angeles (15)	1983	18	0.0012	15000
2.	France (15)	1987	4.6	0.3	15
3.	Finland (16)	1988	0.09	0.16	0.6
4.	USA, Maryland (17)	1993	5.6	0.067	84
5.	Tanzania (18)	1999	0.0052	4.32	0.001
6.	South Africa (19)	1999	11	11	1.0
7.	Iran (20)	2001	0.004	0.048	0.1
8.	Peru (21)	2004	5.7	0.5	11
9.	Present study	2009-12	0.6	0.2 - 0.3	2 - 3



still viable for up to 6 days. In another study, bodies refrigerated at 2 degrees Celsius were found to have HIV for up to 16.5 days (9-12). In our study, both the cases were having a post mortem interval of 24 to 36 hours. Table 2. shows comparison of similar studies from different regions (13-21)

A serosurvey of a medical examiner autopsy population in the United States showed an infection seroprevalence of 5.6% for HIV. Other studies have reported an autopsy HIV seroprevalence of 11% in South Africa (19) and 0.004% in Iran (20). Experienced pathologists not wearing cut-resistant mesh under-gloves reportedly sustain percutaneous injury exposures at a rate of 1 per 53 autopsies. Most of these injuries are cuts rather than needle punctures. It has been estimated that a forensic pathologist not wearing cut resistant mesh under-gloves has a career risk of 2.4% for acquiring an occupational HIV infection (2,17).

An "exposure" that may place a HCW at risk for HIV infection is defined as a percutaneous injury (e.g., a needle-stick or cut with a sharp object), contact of mucosa or non-intact skin, or contact with intact skin when the duration of contact is prolonged (i.e., several minutes or more) or involves an extensive area, with blood, tissue, or other body fluids. Prospective studies have estimated the average risk of HIV transmission after a percutaneous exposure at 0.3%. In the context of an autopsy it is worth mentioning that, except blood, some other body fluids are potentially infectious (22) like semen, vaginal secretions, cerebrospinal, synovial, pleural, peritoneal, pericardial, amniotic fluid.

It is recommended that all the dead bodies throughout the country coming to the mortuaries for post-mortem examination must be pre-tested for HIV sero-prevalence and the post-mortem should be conducted after receiving the report of the microbiologist. More care should be exercised in cases of unknown dead bodies, because chances of being HIV positive in such cases are more; therefore the pre-testing for HIV will be more useful in such cases. If the case is found to be HIV positive then proper precautions need to be taken in conducting the autopsy and thereafter of handling the body before cremation. The microbiologists can play a vital role in saving many people. This will save the valuable resources and reduce risk to the staff and relatives handling the dead body. Universal precautions as recommended in all

autopsy cases are neither feasible nor practically possible in a developing country like ours, therefore such pre-testing saves many a valuable resources in saving the lives of persons and the financial liabilities for the departments will be within reach. The fear of AIDS amongst doctors who are conducting postmortem will be reduced or minimized. AIDS is a global challenge; it will not be overcome anywhere unless it is dealt with everywhere.

Although the transmission of HIV infection to autopsy personnel is considered very rare, most would consider such an autopsy high risk (23). Constant awareness of hazards, combined with safe practices in standard operating procedures, is the best way to prevent injury and transmission of infectious disease during autopsy.

Serologic studies of forensic specialists, their technicians, and their autopsy cases for blood-borne pathogens, are needed to clarify occupational exposure and risk for infection (2).

There are two views regarding HIV in autopsies. One school of thought maintains that all autopsies should be carried with total precautions against HIV risk; this is almost impracticable. The second thought advocates pre-autopsy testing for HIV by Microbiology department, by taking blood samples from the dead body; and the decision to conduct postmortem rests upon the outcome of the results. If the result is positive then precautions to be observed while conducting autopsies may include proper autopsy preparation, autopsy surgeon wearing a proper "AIDS Suit" consisting of a disposable scrub suit, plastic apron, double rubber gloves, cap, shoe covering, face mask and goggles. Universal blood and body fluid precautions in the autopsy room and the laboratory are required. After the completion of autopsy instruments must be disinfected by dipping in 20% Glutaraldehyde for 30 minutes, washed with soap and autoclaved. The mortuary should be disinfected. AIDS suit should be properly disposed in a labelled double plastic bag. To avoid risk to health care workers and the society at large, it is prudent to cremate at the place of death.

### Conclusion

The morbid anxiety about occupationally acquired HIV infection in the forensic practice has made mortuary workers unduly overcautious. In contrast, a false sense of safety can pose a health hazard and carries public health implications.



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