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# AIDS: A COMPREHENSIVE UPDATE FOR EMBALMERS

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**Part 2**

EMBALMING DANGERS: Obviously, AIDS being a fatal disease, appropriate precaution must be used to avoid infection. HIV, in fact, is a relatively fragile virus and is inactivated by numerous disinfecting agents. It usually cannot live on external surfaces or deceased tissue unless engulfed in blood or other tissue fluids and not subjected to extremes of temperature and atmosphere. However, it has been found in human corpses, even after refrigeration, up to at least 23 1/2 hours and has been isolated in partially dried blood samples after several days. In fully dried small blood spatters the virus usually only survives a matter of hours. The potential for infection from accidental needle sticks, scalpel scrapes and aspiration of blood spray and other accidental contact with body fluids calls for due concern.

In addition, the typical AIDS victim presents a very real danger from numerous other potentially serious diseases. AIDS cases are invariably infected with other organisms in addition to HIV due to their extreme immuno-compromised condition. Typically, it is not unusual for the cause of death to be some other virulent infectious agent such as Pneumocystis carinii (pneumonia), Mycobacterium tuberculosis (tuberculosis) and other infections such as toxoplasmosis, histoplasmosis, herpes, HBV (hepatitis B virus) and other blood and pulmonary infectious diseases. Hepatitis B virus is a relatively resilient organism to several disinfectant agents and can live for extended periods of time in dried blood samples and presents a clear danger to embalmers. HBV (serum Hepatitis) is, in fact, one of the most commonly contracted infections during embalming operations and other procedures utilized in morgues, autopsy theaters and histology labs.

Recent research indicates that there is even considerable risk involved during embalming of asymptomatic HIV-infected individuals that exhibit no signs of AIDS and are not diagnosed as such. Asymptomatic HIV infected individuals that have little or no evidence of HIV in their blood have been found to have extremely high titers of HIV infectious particles present in lymph fluid and lymph tissues. These bodies would appear to be normal adult cases with no disease diagnosis and an un-related cause of death (e.g. accident or heart attack), but would, in fact, present a serious infectious hazard during embalming.

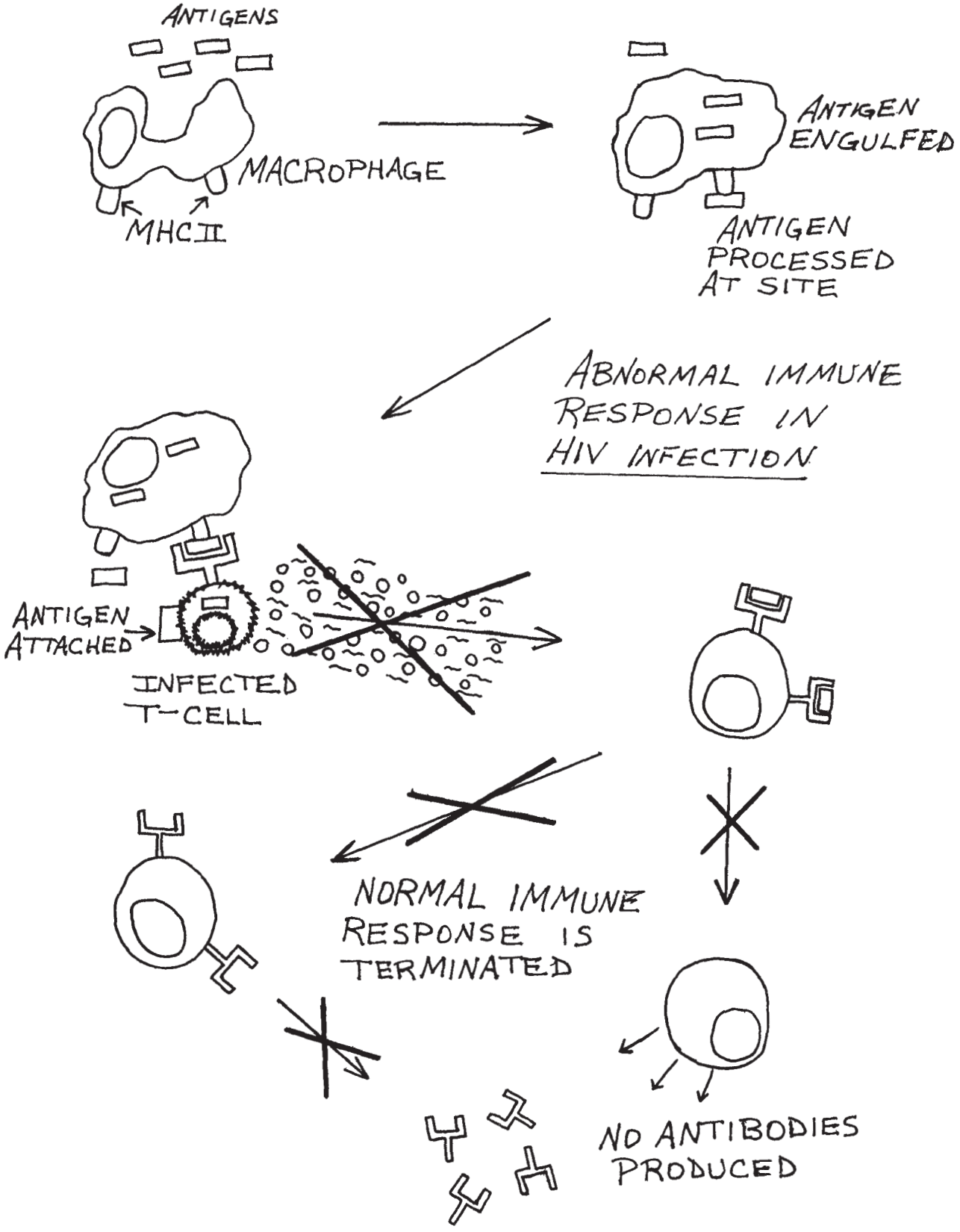
ANTIGENS
MACROPHAGE
MHC II
ANTIGEN ENGULFED
ANTIGEN PROCESSED AT SITE
ABNORMAL IMMUNE RESPONSE IN HIV INFECTION
ANTIGEN ATTACHED
INFECTED T-CELL
NORMAL IMMUNE RESPONSE IS TERMINATED
NO ANTIBODIES PRODUCED

FIGURE 2

THERAPIES AND VACCINES: AIDS is a fatal disease and there is no cure available at this time. The only treatments are strictly ameliorative in nature-designed to slow down the progress of the disease (but not stop it) and to afford comfort during the progression of the disease. Typical drug therapies usually include AZT (azidothymidine or zidovudine) as the most common AIDS treatment. AZT is a chain terminator chemical that mimics thymidine and inhibits HIV replication. AZT unfortunately has serious side effects including toxicity to bone marrow cells and AZT therapy can only be used for a certain length of time. Also available is Soluble CD4 which is essentially a genetically engineered CD4 binding site that inhibits binding of HIV to T-cells. Soluble CD4 is helpful in cases where extreme depletion of CD4 cells has not already occurred. Dideoxycytidine and Dideoxyinosine (DDI) can be used in place of AZT as a chain terminator with a lower toxicity than AZT. Alpha-interferon has been found to reduce budding of HIV from infected cells and is also a potent anti-tumor agent for Kaposi's sarcoma (a typical cancer associated with AIDS).

Recent research has utilized a combination of three anti-AIDS drugs (AZT, DDI and Pyridinone or Nevirapine) to stop or significantly slow reproduction of the HIV virus in vitro. Some researchers are cautiously optimistic that a better form of treatment for AIDS victims may come from this investigation. As of this article, all success has been limited to the laboratory under strictly controlled conditions. Other researchers stress that two of these drugs are not new and the chances of a breakthrough using them are slim at best. Numerous difficulties must be overcome for effectiveness to be significant in the human body such as toxicities and the complexity of the virus in vivo. Human testing trials are scheduled to be conducted sometime in 1993. In the final analysis, all of the above are stopgap measures that attempt to slow or control but not cure the disease.

There are available experimental AIDS vaccines that are currently undergoing clinical trials. These vaccines are therapeutic in nature and not preventive - i.e. they are useful only for someone who is already infected with HIV. There are no preventive vaccines for humans and some researchers think the possibility of a preventive vaccine is not good. Most of the vaccines are recombinant sub-unit vaccines from Vaccinia and Adenoviruses. There are currently gp120 and gp160 vaccines undergoing controversial trials. Because of the mutating ability of HIV it is not known how long the efficacy of these vaccines would last. There has been some promising research on chimpanzee vaccines but these employ actual attenuated viruses and the potential for acquiring the disease through vaccine is high. These types of vaccines will probably never be acceptable for human use.

AIDS TESTING AND THE BLOOD SUPPLY: With the successful implementation of effective and consistent AIDS testing of blood samples the incidence of transfusion AIDS has dropped precipitously. The two types of testing for HIV in blood are the indirect ELISA and the Western Immunoblot. The indirect ELISA (enzyme-linked immunosorbent assay) is most often used for routine screening and first testing. An indirect ELISA essentially detects antibodies to the disease agent in the sample. The human serum is washed into antigen treated microtiter wells. If antibodies are present in the sample they will bind to the antigen in the wells. A rinse is performed next followed by treatment with goat or rabbit anti-human immunoglobulin which binds to the immunoglobulin portion of the antibodies in the wells. This anti-human immunoglobulin is conjugated with an enzyme that forms a colored product when treated with its substrate. When a specified amount of substrate is added to the complex in the microtiter wells-a color reaction occurs which registers a positive test for the HIV antibodies. Indirect ELISA's are simple and quick but they occasionally show false positives and also fail to detect HIV in cases of advanced AIDS due to the depletion or non-existence of antibodies for HIV. There is also a possibility of a negative test on a very recent acquiral of HIV. The Western Immunoblot is the definitive test for HIV that is used when ELISA tests are inconclusive. The Western Immunoblot again tests for HIV

antibodies but by a more refined manner. The sample is treated and subjected to gel electrophoresis to separate the antibodies by their protein constituency. The proteins are then blotted to nitrocellulose paper where they are subjected to an AIDS positive sample. If there are antibodies present in the original sample they will bind with the AIDS positive sample. A detecting antibody (usually anti-human immunoglobulin) is added so as to form a brown precipitate where the antibody proteins are on the blot. This essentially results in a fingerprint of HIV antibodies which can be compared with proven AIDS positive blots for definitive analysis. Due to the specificity of the Western Immunoblot it is virtually 100% reliable in diagnosis.

There still are some problems with the blood supply in that routine testing will miss some cases as it is not 100% reliable. The unfortunate truth is that for every 1000 blood donors there are 2-3 positives recorded for HIV. The safety of the blood supply at the present time is relatively good but there is always the potential for the random case being missed-resulting in potential infection with a fatal disease.

MODES OF TRANSMISSION: AIDS is acquired by intimate contact (almost always of a sexual nature) and by exposure to blood products containing the causative agent. The transmittal of this disease is very similar to several other STD's (sexually transmitted diseases) such as gonorrhea and syphilis. The homosexual/bi-sexual community in the United States was the original focus of this disease due to their unique sexual practices. As previously mentioned, AIDS is now in the United States looking more like a typical STD and the heterosexual transmission factor is increasing. AIDS has always been a predominately heterosexually transmitted disease on a global basis-mostly due to indiscriminate sexual practices and female prostitution. The infection rate in women in the United States is increasing.

Demonstrated methods of transmission have included oral (french kissing) anal, vaginal, breast milk, inoculation with infected needles or other sharp device, blood transfusion, etc. The modes of sexual transmission are similar to gonorrhea (five out of 1000 people in the United States are currently infected with gonorrhea) and syphilis in the 1940's prior to the advent of effective antibiotic therapy (five out of 1000 people in the United States were infected with syphilis in the 40's).

The usage of condoms and additional latex products such as oral dams and gloves have been professed as a solution for the transmittal of AIDS during sexual contact. In the majority of cases safety is no doubt increased dramatically especially if a spermicide such as Nonoxynol-9 is also employed. Laboratory research indicates the efficacy of this chemical against the HIV virus. Several research groups have cautioned the public about the possible defects inherent in this mode of "safe sex". Failure rates are fairly uniform at 2-3/1000 (far below guidelines for aseptic surgery requirements). There is some concern that HIV, being a small retrovirus of only .08-.12 microns, might not be completely filtered by a condom with a proven filtration ability of only 5 microns. With these caveats in mind, some researchers have suggested a practice similar to double gloving during surgical procedures - the usage of at least two condoms for an acceptable safety factor. Obviously, all due diligence should be exercised when intimate contact is a possibility with a person of uncertain risk factors.