

Review Article

HUMAN CADAVERS- REVIEW OF INFECTIOUS DISEASES

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ABSTRACT

Cadaver handling personnels are always at risk to pose infection hazards. Infections and various agents causing infection in the cadavers that present particular risks include tuberculosis, Gp. A streptococcal infection, Gastrointestinal organisms, the agents causing Creutzfeldt- Jakob disease, Hepatitis B and C, Human immunodeficiency virus, meningitis and septicaemia (especially meningococcal). Use of appropriate protective clothing and various precautions should be taken by all who handle cadavers.

Key Words: *Cadavers, Tuberculosis, Streptococcal, Creutz Feldt, Hepatitis*

INTRODUCTION

The cadaver handling workers are exposed to a number of infectious agents (Healing et al., 1995). Most likely infections are those produced by blood born viruses, enteric pathogens and mycobacterium tuberculosis (Rischetelli *et al*, 2001). A strong aversion to dead may represent a natural instinct to protect ourself against the disease (Curti and Biran, 2001). Microorganisms involved in the decay process are not always pathogenic (De .ville, 1980). The belief that the dead bodies are infectious can be considered as natural reactions by the persons to protect themselves from diseases (Morgan, 2004).

DISCUSSION

Hepatitis

Risk of infection depends on infectious status of victim, likelihood and mode of exposure and vaccination status of the exposed individual in case of hepatitis B. In many developing countries, prevalence of chronic hepatitis B is around 8% to 10% (De Ville, 2000) and was high for pathologists, surgeons and other exposed to blood. Hepatitis C virus is estimated to infect 3% of world's population. 13% of embalmers were found positive for anti HBV. Exposure occur due to direct contact with non intact skin, percutaneous injury from needles and mucous membrane exposure from blood or body fluid to eyes, nose and mouth (Gershan et al, 1998). From needle prick, risk of infection for hepatitis B is 6-30% having no prior vaccination, hepatitis C 1.8% and HIV is 0.5% (Ball et al, 1991).

HIV

Infectious HIV can survive in cadaver for a considerable time (16 days after death if stored at 2⁰C) and viable virus is isolated from various viscera six days post mortum (Demiryurek et al, 2002). Hepatitis and HIV are transmitted by similar routes and precautions required to prevent transmission of hepatitis B should be adequate to prevent transmission of HIV. HIV is probably about hundred times less infectious than hepatitis B and so risk of those handling the infected cadavers is proportionately less. Most important is exposure to blood (91%) (Melter, 1993). Cadavers, not all, who died positive for HIV antibodies are known to be infected at the time of death. The virus survives for many years after death in tissue preserved under laboratory conditions (Nyberg et al, 1990). Care should be taken while handling unfixed material from HIV infected cadavers or when undertaking necropsies on cadavers infected with HIV (Williams B et al, 2001). Embalming of bodies infected with HIV is not recommended and effectiveness of embalming fluids against HIV in cadavers is unknown (Decraemer, 1994). Cadavers infected with HIV are after infected with other organisms such as mycobacterium which may be more infectious than HIV infection itself.

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Anthrax

Anthrax is also known as Ragpicker's disease/ Wool Sorter's disease. It is an infectious disease due to a type of bacteria called *Bacillus anthracis* (Bhat et al, 1985 and Barnes, 1947). Infection most often involves the skin, gastro-intestinal tract and lungs (Reissman et al, 1998 and Beatty, 2003). Differential diagnosis of anthrax includes boil, ulcer, plague, syphilitic chancre, rat bite fever and leishmaniasis (Bell et al, 2002). Meningitis (haemorrhagic leptomeningitis) is a serious clinical development which may follow any of three forms of anthrax (Lanska, 2002 and Koshi, 1981). Anthrax has world wide distribution occurring both in the tropical as well as polar regions. The organism can survive for long period in the areas of extreme heat and prolonged flooding (Moynihant, 1963). It presents a hazard because it has highly resistant spores which are affected by moisture, temperature and pH but can last for long period in dry conditions. Humans are moderately resistant to anthrax and are less likely to be involved even if in contact with an infected cadaver (Turnbull, 1976) Although highly infectious disease, the causative agent is unlikely to survive in the human body for a long time after death (Healing et al, 1995).

Tuberculosis

About 1% of world population is infected by tuberculosis every year. Rates are higher in developing countries. Increase in HIV has lead to increase in prevalence of tuberculosis (Sterling et al, 2000). Incidence of morbidity as well as mortality is higher in United States (McKeena et al, 1996). Exposure can occur from gurgling at the nose and mouth of the cadaver due to fluid build up in the chest cavity and putrefaction of tissue and organs (Gershan et al, 1998). Also the residual air in the deceased's lung may be exhaled when the body is moved (Juner et al, 1989). So many cadavers stored together in a temporary mortuary may present an increased risk of infection, once aerosolized, the tubercle bacilli may remain viable for extended period of time. It can be reduced by placing cloth over the deceased's mouth when moving the body and by proper ventilation.

Meningitis And Septicaemia

Meningitis can be caused by many organisms but the only ones that present a hazard to those handling the dead are *M. tuberculosis* and *N. meningitidis*. Septicaemia is commonly a terminal condition and can be caused by many different organisms. Antibodies has decreased the fatal infection with haemolytic streptococci in general population (Williams et al, 2001) but the cases still occur in patients as well as from cadaver handling staff and can result from trivial injuries (Granich et al, 2009).

Gastrointestinal infection

Because a corpse will commonly leak faeces, persons handling dead bodies are likely to be exposed to gastrointestinal organism than to blood born viruses. The workers may be exposed through direct contact with the victim body and solid clothes. Transmission occurs via faeco-oral route. Contamination of other equipment such as stretchers and vehicles used for transportation and storage is also possible. However common gastro intestinal organism do not survive long in environment and present little risk of infection (Healing et al, 1995).

Pancephalopathic type of Creutzfeldt Jacob disease is found to be associated with the cadaver duramater graft. (Yamada et al, 1997)

Reducing The Risk Of Infection

A number of simple measure can be taken to reduce the risk of infection associated with cadavers. All the workers should have basic instructions about the risks and precautions. Universal precautions for blood and body fluids and enteric precautions should be followed (Herbst et al, 2009). Other personal protective equipment like eye wear, gowns and masks are only required when large splashes of blood are anticipated. Hands should be washed after handling the cadaver and before eating and all equipment washed with disinfectant (Curti and Biran, 2001).

Body bags can also reduce the infection and are useful for transportation of cadavers who are badly damaged. But the body bags reduces the rate of cooling and increase rate of decomposition especially in hot climate (Rischetelli et al, 2001) and (De ville, 1980). Hepatitis B vaccination prevents infection and

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is 70-80% effective within a week of exposure. Therefore while dealing with cadavers, covering of cuts or lesions with water proof dressings, careful cleansing of any injuries sustained during embalming, particularly use of appropriate protective clothing will greatly reduce the risk of acquired infection.

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