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Infectious Disease Risk from Dead Bodies of Natural Disasters

KEYWORDS: Agent, Epidemiology, Cadavers, Putrefaction, Exposure, Discreted, Precautions, infectious disease.

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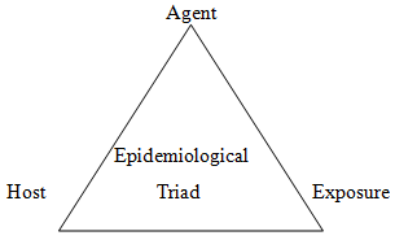
ABSTRACT *The assumed infectious disease risk that a dead body [cadavers] poses has been discrete by science through numerous observations, epidemiological investigations and scientific evidence, which while scare, is documented. The fundamental epidemiological fact is overlooked that these diseases are not transmitted by most infections agent as they don't survive beyond 48 hrs in a cadaver. The research reviews existing literature to assess the risk of infectious disease transmission from cadavers following natural disasters to the handlers and the precautions that should be taken. The present study compared the natural disaster which can give all possible infectious diseases risk will be help full for the people of new generation to minimize the possible effects of diseases.*

Methodology

Research articles, epidemiological studies, books, journals, and 'google.com' search engine is used to extract the data pertaining to the risk of infectious disease transmission to relief workers, cadavers handlers, family members, funeral workers, personnel's at mortuary, autopsy room, pathology department and from administration.

Disease transmission requires the presence of an infectious agent, exposure to that agent and a susceptible host. These elements are considered to characterize the risk of infectious disease transmission from cadavers following natural disasters. The concept is aptly shown by epidemiological triad,



The human body is host to many microorganisms, only a few of which are pathogenic. When the body dies, the environment in which pathogen live can no longer sustain them. However, this doesn't happen immediately and transmission of infectious agent from cadaver to a living person may occur (Karl, 2004). Even the most resistant bacteria and viruses die quickly in the body that has died recently, for example, salmonella [typhoid] or vibrio cholera [Fica, et.al; 1996].

Introduction

Intestinal [Enteric] pathogens are adapted to living at body temperature and their population density decreases rapidly after death. They are quickly out competed by putrefaction microorganism mostly anaerobic flora. Tuberculosis should be mentioned as it is highly contagious, can pose a hazard during handling of the cadaver when air is exalted from the respiratory tract [CDC, 1994].

It has been verified that the Human Immunodeficiency Virus [HIV] can survive as many as for 16 days in cadaver at temperature as low as 20C [Karl, 2004]. Ebola virus is fragile. It can be easily killed with the use of water and soap otherwise the virus remains much longer than the HIV [Medicine, 2001].

The organism in putrefaction is not usually considered pathogenic without a large inoculums and exposure occurrence. Although the burialsite produce dioxin the pollution of ground water by buried cadaver is rare and cadaver disposal by burning produces furan emissions which are highly hazardous to humans.

Morgan [2004] found little evidence of microbial contamination of ground water from burial sites. The microorganisms responsible for the decomposition [putrefaction] are not capable of causing disease. The recovery of cadavers from confined and unventilated spaces should be approached with caution as several days of decomposition can build up potentially hazardous toxic.

Table No.1

General categories and specific examples of infectious agents associated with cadavers [Morgan, 2004].

Sr. No.	General Category	Specific Examples
1	Blood Borne	Hepatitis 'B', and 'C', Human immunodeficiency Virus [HIV].
2	Gastrointestinal	Rota virus, campylobacter, enteritis, salmonella typhi, E-coli, Hepatitis 'A' virus, Shigellosis and Cholera.
3	Respiratory	Mycobacterium Tuberculosis

Although there is no published literature about the risk of infection for various group, the risk is probably similar to that of public safety workers [Emergency medical Personnel's, fire fighters, police personnel's, funeral workers; etc] who are occupationally exposed to infectious agent during the intimate management of cadavers [Healing, et.al; 2004].

The World Health Organization [WHO, 1993] has reported that there is a minimal risk for infection from the cadavers. In a document published by World Health, Organization [WHO] in 2002, established that dead or decaying human bodies don't generally create a serious health hazard, unless they are polluting drinking water source with faucal matter of infected with phus or plague.

Exposure to blood borne viruses can occur due to direct contact with non intact-skin, Percutaneous injury from bone fragments, needles, and mucous membrane, exposure from splashed blood or body fluids to the eyes, nose and mouth [Gershon, et.al; 1995]. As cadaver will commonly leak faeces hence persons handling are more likely to be exposed to gastro-intestinal than blood borne microorganism. Workers may be exposed through direct contact with the cadavers, soiled cloths and transmission can occur via faeco-oral route. Transmission of infection by the handling of contaminated equipments such as stretchers, vehicles and storage facility is also possible.

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Exposure may occur from gurgling at the nose and mouth of cadaver due to fluid build up in the chest cavity and putrefaction of tissue and organ. Also, residual air in the deceased's lung may be exalted when the cadaver is moved. Storage of many cadavers in temporary mortuary may present an increased risk of infection once aerosolized. HIV infection has led to an increase in the prevalence of Tuberculosis infection thereby increased risk of the infection transmission.

Infectious disease risk for individual who routinely [mortuary and autopsy room] handle cadavers include Tuberalosis, Group 'A' streptococcal infection, Gastro-enteritis, Transmissible spongy form encephalopathy [Cruetzfeldt-Jacob disease], Hepatitis 'B' and 'C', HIV infection, possibly meningitis and meningococcal septicemia.

These risks are unlikely to be different for persons who handle cadavers. However, a natural disaster that results into large number of fatalies thereby cadavers requires a large temporary workforce for the collection, transportation, storage and disposal of the dead; thereby exposing the susceptible hosts [Morgan, 2004].

Where cadaver are traditionally bathed by the family prior to last ritual burial are exposed and may actually assist the spread of the infectious disease. Emergency and disaster relief workers who directly handle cadavers are most at risk.

Funeral workers who have repeated occupational exposure to cadaver experience greater risk than with one time exposure experienced by those handling the cadavers following natural disaster [Goyet and Zeballos, 1996].

A number of simple measures can be taken to reduce the risk of infectious disease transmission while handling cadavers. Universal Precaution for blood, body fluids, and enteric contents should be followed. Personal protective equipments such as eye wear, gowns and mask are only required where large quantities or splashes of blood are anticipated and are probably not necessary when handling cadvers following a natural disasters. In order to avoid cross-contamination personal items should not be handled. Body bags will further reduce the risk of infections and are useful for transpiration of cadavers that have been badly damaged. Hepatitis 'B' vaccination will help to prevent infection and will be 70-80% effective within one week of exposure [U.S.; 2004].

Basic hygiene practices protect body handlers from exposure to infectious diseases spread by blood and certain body fluids. These include use of hand gloves, wash hands with soap before eating equipments disinfection, cloths and vehicles. Face masks are unnecessary, but should be provided if requested to a void anxiety.

Suitable precautions for military personnel's, rescue workers, volunteers and others include training, use of body bags, disposable gloves, good hygiene practices and vaccination for hepatitis 'B' and tuberculosis are adequate to eliminate the risk of infectious disease transmission.

Most of the deaths in natural disasters are due to trauma, drowning or fire and there is no opportunity for any amplification of the pathogens that the victim may have been harboring. According to the Plan American Health organization [PAHO, 2004] "Concern that cadavers are infectious can be considered 'natural' reaction by person waiting to protect themselves from disease", although the risk that cadaver poses for the public is extremely small.

Evidence has never been presented to link the presence of cadavers to the increased rates of infection. On the contrary the lack of drinking water, poor hygiene and overcrowding are responsible for increased incidence of communicable disease following natural disasters [Cockburn, et.al; 1999]. If there is no sanitary infrastructure, no safe water supply, no sewage system, personal hygiene is poor; a natural disaster can hardly aggravate the existing situation. There exists little evidence suggesting that cadavers constitute a risk in areas that are not endemic for tertian diseases [PAHO and WHO, 2004].

Although, some of these microorganisms are highly contagious but they are unable to survive for long in the human body after death occurs. It is therefore unlikely that epidemics will result from contact with a cadaver [Armstrong and Cohen, 1999].

Conclusion

When the casual agent of an infectious disease is not present in the environment, it is not possible for the disease to get transmitted. The public and administration authorities seem under a misapprehension concerning the part played by cadaver in the transmission of infectious disease. Example abound in which the press and television have evoked the spectra of cholera, typhoid fever or plague epidemic to which the population is supposedly exposed by the presence of cadavers. The fundamental epidemiological fact is overlooked that these diseases are not transmitted by most infections agent as they don't survive beyond 48 hrs in a cadaver. An exception is Human Immunodeficiency Virus [HIV] which has been found to survive for16 days at 200C. It is practically, almost impossible to know the medical status of each and every deceased person. Therefore, it is prudent to consider all the cadavers to be potential carrier of infection and follow the universal precautions while handling them. Active surveillance and rapid restoration of normal public health service, including the provision of safe drinking water and food should be the priority.

REFERENCE Armstrong, D. and J.Cohen (eds) (1999): "Geographic and travel medicine: cholera" Infectious disease, Vol.2l mos by: London, Management of dead bodies in disaster situations. | CDC (1994): Centre for disease control and prevention "Guidelines for preventing the transmission of mycobacterium tuberculosis in health care facilities morb. mortality weekly review (MMWR), | Cockburn, A, St. Clair J. and Silversteink (1999): "The politics of natural disaster: who made Hurricane Mitch so bad? Inst. J. Health ser, 29,439-62. | Goyet, C.de ville de and J.L. Zeballos (1996) P. Communicable disease and epidemiological surveillance after sudden natural disasters. | Dleoniryurek D, Bayromoglu A, Ustacetebi (2002): Infective agents in fixed human cadvers: a brief review and suggested guidelines" Anat Rec. | Fica AE, In Pratt Miranda S, Ternandez-Rieei A, D'ottone K, Cabello FC (1996) : "Epidemic typhoid in Chile: Analysis by molecular and conventional methods of salmonella typhistrain in epidemic [1977-1986] and non epidemic [1990] years" J. Clin. Microbiol 34 (7):1701-7. | Gershon, R.R., D. Vlahov, H. Farzaden, I. Alter (1995): Occupational risk of human immunodeficiency virus, he patties B virus, and hepatitisc virus-infection among funeral service practisioners in Maryland. Infect control sop epidermal. 1995; 16 (4): 194-7. In infectious disease risk from dead bodies following natural disasters by Oliver Morgan. | Healing, T. D., Hofman, P. N. and Youngse (2004): The infectious hazards of human cadavers, commun dis rep CDR Rev. 1995; 5 (5); Kil. 8. In infectious disease risk from dead bodies following natural disasters by Oliver Morgan. 308. | Karl Western (2004): In management of dead bodies in disaster situations disaster manuals and guidelines series No. 5. Washington D.C., P. 71. | PAHO and WHO. Washington D.C., (2004). Management of dead bodies in disaster situations. Disaster Mamals and guidelines series, No.5 Epidemiological Risk in Non-Endemic Areas. | Medecins San Frontiers (2001):http://www.msf.org> (12April2001). In disposal of dead bodies, 137. | Morgan, O. (2004): In factious disease risks from ded bodies following natural disasters. Rev Panam Salud publication/ Pan-am J public health. | U.S. (2004): United States centre for Disease Control and Prevention: Guidelines for prevention of transmission of human immunodeficiency virus and hepatitis B virus to health care and public safety workers. MMWR morb mortal. In. infectious disease risk from dead bodies following natural disasters by Oliver Morgan, 309. | WHO (1993): Guidelines for cholera control, WHO: Geneva. In Disposal of dead bodies chapter 9. retrieved from: http://www. bepress. com/ Jhsem/vol3/iss3/9 137. |