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EMBALMED CADAVERS –ARE THEY SAFE TO HANDLE, A STUDY TO SEE THE MICROBIAL FLORA PRESENT IN THE EMBALMED CADAVERS.

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ABSTRACT

Cadavers remain a principal teaching tool for anatomists and medical educators teaching gross anatomy. Infectious Pathogens in cadavers that present particular risks include Mycobacterium tuberculosis, hepatitis B and C, the AIDS Virus, HIV and prions that cause transmissible spongiform encephalopathy such as Creutzfeldt - Jakob disease (CJD) and Gerstmann-Straussler-Scheinker syndrome (GSS). It is often claimed that fixatives are effective in inactivation of these agents. Unfortunately cadavers, even though they are fixed, may still pose infection hazards to those who handle them. The purpose of this study is to draw attention to the infective agents that can be detected in fixed human cadavers and to suggest safety guidelines for the protection of all who handle cadavers. In this study we collected the samples from the different sites of embalmed cadavers and from the limb which was kept outside the body tank for about fifteen days to see any microbial flora present in the embalmed cadaver. The results were alarming, all the samples from the 17 cadavers were negative in culture and there is no bacterial, viral and fungal growth. But the sample from the dissected limb of the embalmed cadaver which was outside the body tank is positive for fungal and bacterial growth that might pose health hazards to the handler. So the precautions are necessary during handling and dissection of embalmed cadaver.

KEY WORDS: Cadaver dissection, embalmed cadavers, microbial flora, cadaveric dissection infection.

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INTRODUCTION

Embalming is the technique to preserve the dead bodies with its normal anatomy and life like appearance for a long period. Embalming is the inescapable necessity of the modern society. Since ancient times, embalming has been in practice. The specimens preserved more than thousand years back are still lying in a perfect form in British museum of London. A statement in 1875 by the New York State Supreme Court is still relevant, concise, and conceptually completes: 'The descent burial of the dead is a matter in which public has concern. It is against the public health if it does not take place at all and against a proper public sentiment should it not take place with decency'[1]. The purpose of embalming is to preserve the body in life like appearance, prevent the putrefaction of the dead body and make it free from infectious germicides. Like all other occupations, being a member of an anatomy department has its own risks. The potential infection hazard of human cadavers is one of them. Cadavers are the main studying materials of anatomists but may pose infection risks to people who handle them during embalming procedures or dissections. Infectious pathogens in the cadavers that present particular risks include Mycobacterium tuberculosis, hepatitis B and C viruses, HIV, and prions that cause transmissible spongiform encephalopathy [2.] The embalming fluid used in anatomy departments contains fixatives, disinfectants, glycerol, salts, and water. There are inadequate data in the literature about the disinfectant efficiencies of fluids used for embalming. The purpose of this study is to draw attention to the infective agents that can be detected in fixed human cadavers and to suggest safety guidelines for the protection of all who handle cadavers.

MATERIAL AND METHODS

This study was carried out on 17 embalmed cadavers and on one upper limb which is dissected out from embalmed cadaver and was kept out from the body tank for about fifteen days. Samples for culture from different sites e.g. peritoneal cavity, pleural cavity, perineum, subcutaneous tissue and muscle compartments have been taken under complete aseptic precautions. From each cadaver one sample from each site i.e. from peritoneal cavity, pleural cavity, skin over the perineum, subcutaneous tissue and muscle compartment have been collected. Three samples also collected from the dissected limb which was kept out from the body tank i.e. one from skin, one from subcutaneous tissue and one from muscle compartment and sent in the dept. of microbiology for culture of bacterial flora, HIV, Hepatitis B and C and fungal infection. For bacterial culture blood agar media was used and for culture of fungus Sabroud's Dextrose Agar (SDA) was used.

RESULTS

All the samples were cultured in department of microbiology using blood agar media to see the bacterial growth and sabraud's dextrose agar (SDA) media for fungal growth. The results were alarming, all the samples from the 17 cadavers were negative in culture and there is no bacterial, viral and fungal growth. But the sample from the dissected limb of the embalmed cadaver which was outside the body tank is positive for fungal and bacterial growth. The sample which was taken from skin is positive for staphylococcus aureus and Aspergillus fungus.

DISCUSSION

There are very few studies of this type to see any microbial flora present in the embalmed cadavers. Some studies were carried out but in those the samples were collected from the embalmed cadavers who were regularly placed

into the body tank which has formalin, but in this study we also collected samples from the parts of embalmed cadavers which were kept outside the body tank. It was thought that once the dead body has been passed through the embalming it becomes free from the entire infectious and non-infectious microbial flora and they are very safe to handle and dissection. But in this study the results were alarming and shown that if some part of embalmed cadaver if kept outside the formalin filled body tank then there might be some bacterial and fungal growth with time and they might pose health hazards to the handler. There are so many infections which can catch the embalmer and dissector e.g. Tuberculosis is a slowly progressive, chronic infection usually of the lungs, but many other organs can become affected. Tuberculosis was one of the biggest killers among the infectious diseases in the past. The annual number of tuberculosis cases continues to increase due to its emergence in HIV infections. The risk of acquiring tuberculosis varies according to occupation, and anatomy department workers are at particularly risk of contracting tuberculosis carried by cadavers. Infected particles and splashes containing tuberculous material can be acquired during respiration[3]. The increased risk of tuberculosis among employees who handle cadavers was demonstrated through tuberculin skin testing[4]. It is generally thought that the risk of transmission is decreased by fixation, and some authors agree with a commonly held belief that formalin is tuberculocidal[5]. Although it was previously reported that tubercle bacilli from cadavers were not infectious[6]. Trials for culturing M. tuberculosis from 10% buffered formalin-fixed pulmonary autopsy tissues have been unsuccessful, it has been shown that bacilli remain viable and, therefore, infectious for at least 24 to 48 h after an infected cadaver has been embalmed[7]. There is also a case report describing the transmission of M. tuberculosis from a cadaver to an embalmer during the embalming process, with the subsequent development of active tuberculosis. Based on the contradictory published data, the disinfection properties of fixatives for tuberculosis infected tissue remain unclear. Viral Hepatitis can be seen in many viral diseases such as yellow fever, cytomegalovirus and Epstein-Barr infection and congenital rubella. Specific serologic markers of hepatitis B and C viruses can be detected in cadaveric tissue banks (hepatitis B surface Ag 18.1% and hepatitis C Ab 14.3%) and in postmortem blood tests for body donation programs [8]. The prevalence of HIV and hepatitis C markers has been studied among a cadaver population, and the cases represented a high prevalence of serologic markers for HIV and hepatitis C virus infection. It has been reported that organ transplantation from cadavers can transmit hepatitis[9]. Workers in morbid anatomy also face risk of contamination, which raises serious questions about the infective hazards of cadavers and the effectiveness of fixatives against hepatitis viruses. HIV is one of the most intensively investigated viruses. Can an individual who died of AIDS still be infectious at the time of arrival in the anatomy department as a cadaver? Unfortunately, the answer is YES. Infectious HIV has been reported in pleural fluid, pericardial fluid, and blood of such deceased patients after storage at 2°C for up to 16.5 days after death[10]. Viable HIV was also isolated from bone fragments, spleen, brain, bone marrow, and lymph nodes from a patient with AIDS at autopsy 6 days postmortem [11]. Although in suspension tests, 25% ethanol and 0.5% formaldehyde were shown to be effective against HIV, it is not clear whether these concentrations are also effective in cadavers.

CONCLUSION

After seeing the culture reports it has been proved that there is no microbial flora is present in the embalmed cadavers who was placed in the formalin filled body tank so they are safe to handling and dissection, but the part of embalmed cadaver which is outside the body tank for a long time might be infectious to the handlers. So the precautions are necessary during handling and dissection. The potential

infection hazard from human cadavers is one of the risks of being a member of an anatomy department. Special care must be taken to reduce risks to a minimum. Safe working conditions for handling cadavers can be provided through proper education, use of protective clothing, vaccination and practice of hygienic measures.

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