



Expanding Encyclopedia Of Mortuary Practices

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BLEACH IN EMBALMING ROOMS:

OVERRATED AND OVERUSED

PART 2

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CONTINUED: Because of these limitations, bleach can easily fail under certain circumstances of use in disinfection. There are, in fact, numerous documented failures of bleach under varying situations in the medical field. It has been demonstrated that 1:10 dilutions of bleach are ineffective against HIV with blood burden at times of 5 minutes or less. Even 1:1 concentrations of bleach take up to 30 seconds for HIV disinfection with blood burden. Consequently, for certain and rapid disinfection with HIV infectivity it is recommended that undiluted bleach always be used. Other examples for other organisms demonstrate that bleach (particularly diluted) is no magic bullet for disinfection. Constant rewetting of surfaces is required due to the high chlorine concentration loss (typically 80% loss of chlorine in one hour) to insure adequate disinfection. Gross organic debris (which is typical in embalming operations) essentially neutralizes the oxidation potential of bleach solutions. Even 1% and 2% bleach solutions that are activated and buffered require up to 9:1 v/v for organic burden, blood spills or resistant organisms. This means that large blood spills that are common in embalming could require up to a half gallon or more of undiluted bleach for effective certain disinfection. 1:10 bleach dilutions fail tuberculosis suspension tests w/blood (generating considerably less than log₃ reductions in infectivity) consistently as due 1:5 dilutions. Only undiluted bleach or 1:2 dilutions (if concentrations verified) are highly effective against both Poliovirus type3 and M. tuberculosis in suspension tests w/blood. In these situations, chlorine releasing powders (NaDCC) and certain phenolics appear to be more effective when used during blood spills, if used in appropriate quantities. Obviously, care should be used when disinfecting with bleach products as the quantity and concentrations required is surprisingly high.

BLEACH AND CJD: There is much heated discussion regarding the use of bleach as the only effective way to attempt disinfection while embalming CJD (Creutzfeldt-Jakob Disease) cases. Most labs find bleach effective and usable for CJD and the evidence points to bleach as an effective disinfectant for CJD. Just because bleach is effective in lab use does not mean that it is appropriate for embalming or other circumstances of use. No one considers the special situation of embalming with formaldehyde based chemicals and the problems associated with the liberal use of bleach in this situation. In medical disinfection, bleach has serious drawbacks and disadvantages which make the use of alternatives popular and effective.

Bleach, in general, at higher concentrations exhibits good action against the causative agent of CJD. However, extreme variability has been noted in regards to CJD strains and dilutions of use and time frames. NaOCL was generally accepted as effective at 5% at most time frames -- this is now not true. A new report shows it effective at 30 minutes for certain scrapie strains, but not others. At 2.5% NaOCL is only partially effective at 60 minutes, but was effective at 20,000 ppm free CL₂ and 30 minutes but only if constant rewetting was accomplished. A 6.25% NaOCL was effective at 45 minutes, but only one strain was tested. A 12.5 % NaOCL was effective at 30 minutes but only tested on one strain. An 8.25% solution was effective at 30 minutes on 2 BSE strains, but not tested on CJD or scrapie. At least a 2-3% solution of NaOCL is recommended for surfaces with continual rewetting for at least one hour to safely eliminate most contamination. It is very difficult to use concentrated bleach in medical disinfection due to corrosion, fumes, and irritation of the airways during use. 80% of the active chlorine disappears in one hour of application making it difficult to control concentrations necessary for disinfection.

Fortunately, there is a readily available alternative that is as effective as bleach, if not more so. Sodium hydroxide (NaOH) is much less caustic than bleach and is very easy to measure and use and has been proven to be as effective or more effective under situations of medical use against CJD and related prions. 1N to 2N NaOH (sodium hydroxide) has been proven effective against CJD and variants in various circumstances. It is less dangerous to use than bleach and is capable of being made fresh when needed with a definite concentration ratio. There is no dangerous reaction with formaldehyde and there are no reaction gases or other problems associated with ammonia cleaners. It is less corrosive than bleach and can be used on instruments in most situations. It has a documented success rate equal to or greater than bleach in medical disinfection of CJD and related prions. Also, it can be safely disposed of by mixing with acetic acid (vinegar) and poured down the drain. It can safely be used, before, during and after embalming as an agent against CJD and related prions. Irrigation of cuts and scrapes of the skin with 1N or 2N sodium hydroxide is the recommended safety protocol in high-risk CJD labs. For embalming purposes, sodium hydroxide is the much preferred alternative disinfectant than bleach.

ALTERNATIVE DISINFECTANTS: For general disinfection and sanitation in embalming, there are numerous medium and high-level disinfectants that are as effective as bleach and offer none of the disadvantages or dangers of use that bleach does. Phenolic based medium-level disinfectants are very effective overall disinfecting agents with good detergent capability and ability to operate under relatively high organic load conditions. They are especially effective against resistant hard-to-disinfect *M. tuberculosis* species and other typically resistant organisms. Also, the newer medium-level alcohol-potentiated superquats exhibit equal effectiveness on most organisms as that of bleach or any other disinfectant group. For instrument immersion, the standard by which all other disinfectants are judged, is still 2% activated/buffered glutaraldehyde in a slightly heated solution. This chemical delivers as high or higher disinfecting/sterilizing capability of virtually any disinfectant/sterilant on the market if used correctly. All of the alternative disinfectants to bleach are EPA registered, tested and approved with clearly marked usage instructions and effectiveness label claims. These alternative chemicals, such as Metricide 28 (a 2.5% glutaraldehyde), Uniphene SE (medium level phenolic) and Metriguard (alcohol-potentiated superquat) are superior alternatives to the use of bleach in embalming rooms.

CONCLUSION: The extensive use of bleach in embalming rooms has little or no validity. Effective alternatives, that are actually superior in many circumstances of use, are readily available and easy to implement. Use of these alternatives eliminates the problems of bleach interaction with embalming chemicals and cleaners and overall reduces the hazardous exposure problems in embalming rooms. Bleach possibly has uses as an odor controller (in dilute solutions) and bleaching of floors on an occasional basis. As a continual use disinfectant, bleach is a dangerous, variable and unstable chemical that does not need to be used in embalming rooms. Too many superior alternatives exist to argue otherwise.

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