Miller, Diane M. (CDC/NIOSH/EID)

From: Ann Rivers [amriv@msn.com]
Sent: Saturday, September 19, 2009 8:16 AM
To: NIOSH Docket Office (CDC)
Subject: Docket Number NIOSH-186, Glutaraldehyde Study
Attachments: Glutaraldehyde Publication.pdf

To whom it may concern,

In regards to your request for information on occupational studies of glutaraldehyde, Docket Number NIOSH-186,I have attached my research publication:

Title: Evaluation of procedural modifications to reduce glutaraldehyde vapors during the disinfection of endoscopes using three sampling methods..
Authors: Rivers, Ann M., Stephenson, Dale J., Hegmann, Kurt T. Lillquist, Dean R., Derosso, Frank.
Source: Chemical Health & Safety; Jul 2002, Vol. 9 Issue 4, p13, 8p.
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RESEARCH

Evaluation of procedural modifications to reduce glutaraldehyde vapors during the disinfection of endoscopes using three sampling methods

Glutaraldehyde is the preferred disinfectant for fiberoptic endoscopes. A number of studies have reported adverse health effects in workers exposed to glutaraldehyde vapors. High exposures can occur during the pouring and disposal of glutaraldehyde solutions. This study has tested the effectiveness of three procedural modifications designed to reduce exposures during these activities. These procedures were: (1) the use of a splash-resistant safety nozzle during the pouring of glutaraldehyde solutions, (2) the use of neutralizers during the disposal of glutaraldehyde solutions, and (3) the pouring of 14-day versus 28-day glutaraldehyde solutions. This study also evaluated three sampling methods to monitor glutaraldehyde vapors. The three methods evaluated were: (1) the OSHA method 64 using filter cassettes impregnated with 2,4-dinitrophenylhydrazine (DNPH); (2) DNPH-coated passive diffusion badges; and (3) a direct reading glutaraldehyde meter. Results showed that when the safety nozzle was not used during disinfection procedures, geometric means for all sampling methods were above the ACGIH TLV of 0.05 ppm (filter cassettes = 0.105 ppm; passive badges = 0.191 ppm; meter = 0.082 ppm). Using the safety nozzle during the pour resulted in significant reductions in glutaraldehyde vapor concentrations (filter cassettes = 0.014 ppm; passive badges = 0.027 ppm; meter = 0.021 ppm). Disposal of non-neutralized glutaraldehyde solutions resulted in peak vapor concentrations of up to 0.10 ppm. Neutralization prior to disposal reduced glutaraldehyde vapor concentrations to less than 0.01 ppm. Conclusive differences were not found when the pouring of the 14-day glutaraldehyde solution was compared to the pouring of the 28-day glutaraldehyde solution. Both solution pours resulted in vapor concentration means exceeding the TLV. Comparison of sampling methods showed no statistically significant differences between each method pair or when all methods were compared simultaneously. For the detection of glutaraldehyde vapors, the meter was as sensitive and as accurate as the filter cassettes. In conclusion, employees can significantly reduce exposures to glutaraldehyde vapors by using these modified pouring and disposal procedures, and the meter examined in this study provides an optimal method to measure glutaraldehyde vapors.

By Ann M. Rivers, Dale J. Stephenson, Kurt T. Hegmann, Dean R. Lillquist, and Frank Derosso

INTRODUCTION

Glutaraldehyde has successfully been used as a high level disinfectant for hospital devices that are not autoclavable. It is used to sterilize fiberoptic endoscopes at a concentration of approximately 2%, by weight. Numerous glutaraldehyde-based disinfection products are currently available and marketed under various brand names. These sterilants must be activated before use and are effective for up to 28 days. The use of these solutions has increased substantially over the last decade and there have been an increasing number of reports associated with skin, eye, and respiratory tract irritation in workers exposed to glutaraldehyde vapors during the disinfection process.[1–5] Exposure to glutaraldehyde is also implicated in causing asthma and allergic contact dermatitis.[6–9] Occupational exposure limits (OELs) to glutaraldehyde for various nations are listed in Table 1. In the United States, the American Conference of Governmental Industrial Hygienist's (ACGIH) threshold limit value (TLV) ceiling concentration for glutaraldehyde is 0.05 ppm.[4] In the United Kingdom, the 15-minute short-term exposure limit (STEL) was lowered from 0.2 to 0.05 ppm in 1999.[10] Other nations have higher OELs, but none allow for exposures above the most liberal standard, a ceiling value of 0.2 ppm.[11–13]

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