



Improving safety of personnel exposed to disinfectants by introducing an Endoscopy Quality Assurance Program

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Abstract *Background:* Chemical disinfection is the most commonly used method in gastrointestinal endoscopy reprocessing. The main problem with chemical disinfection is that it is potentially harmful to humans. Risk assessment of employees using toxic substances is recommended and the control of exposure to these substances is required. In 2003, an endoscopy quality-assurance program was instituted in a secondary care governmental hospital in Egypt.

Aim: The aim of the study was to assess the risk to health of personnel exposed to disinfectants in the course of their work and determine the effect of instituting an endoscopy quality-assurance program on the safety of personnel exposed to disinfectants.

Materials and methods: Health surveillance was provided for personnel exposed to disinfectants in the endoscopy unit over an 8-year period between January 2004 and January 2012. A quality improvement program was implemented (improving ventilation, providing instructions and education) to control exposure to these substances. The effectiveness of the change was assessed.

Abbreviations: COSHH, control of substances hazardous to health; PPE, personal protective equipment.

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Results: Prior to a quality assurance program being implemented, allergic reactions related to disinfectants were reported in 33% of working days in 2004. Subsequent allergic reactions decreased to 6–8% in 2010 and 2011 and this was contingent on the solution used for reprocessing.

Conclusion: The implementation of a quality assurance and improvement program in endoscopy unit improved the safety of personnel exposed to disinfectants.

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Introduction

Chemical disinfection is the most commonly used method for disinfection in gastrointestinal endoscopy reprocessing. The main problem with chemical disinfection is that it is potentially harmful to humans.¹ Aldehydes including glutaraldehyde are the most frequently used. Glutaraldehyde enables rapid disinfection and is economical however it is classified by the Health and Safety Executive in the United Kingdom as an irritant and regulations relating to the control of substances hazardous to health (COSHH) require employers to assess the risk to employees using toxic substances of which glutaraldehyde is one.¹ The COSHH regulations require the risk of exposure to glutaraldehyde to be controlled. This may include air monitoring to ensure that concentrations of glutaraldehyde remain below the Maximum Exposure Limit of 0.05 ppm, for both short-term (15 min) and long-term (8 h time-weighted average) exposure.² Peak vapor concentrations should not exceed this level. The main disadvantage of glutaraldehyde is that it is irritant and causes sensitization.² The vapor phase may cause irritation of the nose, eye, throat and respiratory system. The liquid phase may cause skin irritation.¹ Peracetic acid is a highly effective disinfectant but currently available commercial preparations are expensive and it too is highly irritant at high concentrations.¹ There has been reports of burns on hands or arms with accidental contact.¹ It is a toxic substance and likely to be hazardous to health even though it is not currently subjected to the same controls as the aldehyde disinfectants.¹

Bolak Eldakror Hospital is a secondary-care governmental hospital in Giza, Egypt. The gastrointestinal endoscopy unit was set up in 1999. A quality-assurance program was instituted in 2003.^{3–9} Accordingly, quality indicators developed by the American Society of Gastrointestinal Endoscopy and the British Society of Gastroenterology were implemented.^{10,11} For easy application, quality indicators were identified for five major groups: patients, procedures, endoscopists, assistant staff and equipment. Process or outcome indicators were used to evaluate and monitor the quality of endoscopic procedures and the performance of staff. Benchmarking was used to assess suboptimal performance. A quality improvement process was implemented; this involved changing some of our practices to improve the quality of our endoscopic care and patient outcomes. Quality improvement was a continuous process based on Deming cycle for continuous quality improvement [Plan-Do-Check-Act].¹² Health surveillance of personnel exposed to disinfectants was established in 2004. The aim of the study was to assess the risk to health of personnel exposed to disinfectants in the course of their work and determine the effect of instituting an endoscopy quality-assurance program on the safety of personnel exposed to disinfectants.

Materials and methods

The study was performed in a secondary-care governmental hospital in Egypt. The endoscopy unit is furnished with four upper gastrointestinal endoscopes (Olympus GIF-E and GIF-Q230) and two colonoscopes (Olympus CF-EL and CF-230L). The average endoscopy volume is 40 procedures per month, 80% of these are esophago-gastro-duodenoscopies and 20% lower gastrointestinal endoscopies (sigmoidoscopy and colonoscopy). Endoscopic procedures are performed twice per week. Emergency cases (bleeding) are performed on the morning of the next day. The endoscopy unit is staffed by four endoscopists and five qualified nurses. Quality in endoscopic procedures is discussed with staff from their first day in the unit and they are provided with a handbook which includes unit policy and practice guidelines. Assessment, monitoring and improving performance are performed. Regular monthly meetings for open discussion and education are held. Staff and assistant staff are encouraged to identify areas that need improvement. Nursing staff receive supervised training for their first month in the unit. After training they are supervised until judged competent. Endoscope reprocessing and disinfection are carried out in a separate room. A written protocol for decontamination and reprocessing of endoscopes and their accessories is available (table 1). A checklist for reprocessing is used to ensure compliance with the protocol. Three manual disinfectors (Olympus TD-20) are used for disinfection. Glutaraldehyde 2% and peracetic acid are the most commonly employed disinfectants. The time of exposure to the glutaraldehyde 2% is 20 min and peracetic acid is 10 min. Symptoms thought to be related to disinfectant exposure are assessed at the end of each working day. Nurses record disinfection procedures.

Health surveillance was provided for personnel exposed to disinfectants over an 8-year period between January 2004 and January 2012. A quality improvement program was implemented (improving ventilation, providing instructions and education) to control exposure to these substances. The effectiveness of the change was assessed.

The study was a prospective one. All nurses responsible for the reprocessing of endoscopes were included in the study. A risk assessment check list was used. Allergic reactions recorded included chest symptoms (cough, asthma), conjunctivitis (red conjunctiva, tears, itching), rhinitis (running nose, sneezing) and skin symptoms (dermatitis, rashes, itching). The working days in which the staff came into contact with disinfectants, during reprocessing, were recorded. The working days in which one staff or more reported allergic reactions to disinfectant, type of disinfectant and the allergic symptoms were also recorded. Microsoft Excel was the database used for storage and analysis of the data. The working days in which staff came

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