

The Q-Net™ Monthly

Volume 9, Numbers 11

November 2003

What's News

☞ An article entitled "Potential nosocomial exposure to *Mycobacterium tuberculosis* from a bronchoscope" appears in the November, 2003, issue of *Infection Control and Hospital Epidemiology*. This article discusses the importance of fully immersing the endoscope during cleaning and disinfection. This article also recommends ensuring that all of a healthcare facility's flexible endoscope models can be properly connected to and used with its automated endoscope reprocessor.

Editor-in-Chief

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What is 'Q-Net'?

Q-Net is a technology-assessment network of questions and answers. Its newsletter is *The Q-Net™ Monthly*.

Q-Net's main goal is to encourage the infection control and endoscopy communities to not only ask good questions but to also demand succinct and well referenced responses.

Q-Net addresses the needs of both the health care provider whose goal is to provide the best care possible, and the patient who deserves affordable quality health care.

Q & A

Whipple's disease

Question: "Could you comment on a recent study that suggests *Tropheryma whipplei* can survive high-level disinfection and may be transmitted by GI endoscopes?"

Answer and Background: Earlier this year, a study that concludes high-level disinfection may not prevent transmission of *Tropheryma whipplei* via gastrointestinal (GI) endoscopes was published.¹ *T. whipplei* is a poorly understood intracellular gram-positive bacterium that causes Whipple's disease, a rare and chronic disorder that usually damages the small intestines, although other organs may also be affected. The mode of transmission of *T. whipplei* is unclear.

The conclusion that *T. whipplei* may survive high-level disinfection and be transmitted by GI endoscopes is based primarily on clinical examination by the study's authors of two patients diagnosed with Whipple disease three years after gastroscopy and intestinal biopsy.

Although infrequent, GI endoscopes have been reported to transmit bacteria and other infectious agents. In each case, however, at least one crucial reprocessing step was breached. There are no reports of transmission of any infectious agent by a flexible endoscope that was properly cleaned, high-level disinfected, and dried in accordance with published guidelines. This is the only study that suggests

T. whipplei may survive high-level disinfection.

Methodology of study: To better evaluate whether Whipple's disease can survive high-level disinfection, this study's authors exposed an inoculum of *T. whipplei* (10^5 'inclusion-forming units'¹) to three high-level disinfectants: 2% glutaraldehyde and two different products each containing 1.5% peracetic acid. Whereas these two peracetic acid products were pre-formulated and ready-for-use, the solution of 2% glutaraldehyde was produced for this study by thawing and diluting a frozen concentrate just prior to testing.

Results of study: Exposure to 2% glutaraldehyde for 60 minutes reduced the inoculum of *T. whipplei* by 3 logs (or 99.9%). Similar results were observed for both peracetic acid products.

Discussions: These results, which suggest *T. whipplei* survives high-level disinfection, are unique and warrant cautious interpretation and extrapolation. Because *T. whipplei* is an actinomycete (i.e., bacterium) related to mycobacteria,² high-level disinfection, defined to achieve at least a 6 log reduction of mycobacteria, would ordinarily have been expected to destroy the entire inoculum of *T. whipplei* used in this study (i.e., 10^5).

One factor among others may have contributed to this study's unique results. Excluded from this study is a record of the temperature of the 2% glutaraldehyde solution (and the two peracetic acid products) to which *T. whipplei* was exposed during testing. According to the labels of virtually all 2% glutaraldehyde solutions,

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an elevated temperature of 25° C for an exposure time of 45 minutes is necessary to achieve high-level disinfection of instruments that have not been manually pre-cleaned.³ (Several reports indicate that exposure of *pre-cleaned* instruments to 2% glutaraldehyde for 20 minutes at 20° C achieves high-level disinfection.³) Whether the temperature of the 2% glutaraldehyde solution, which was produced by thawing and diluting a frozen concentrate just prior to testing, was several degrees below 25° C during testing, reducing its effectiveness and preventing it from achieving high-level disinfection, is unclear. Studies that do not report the temperature of the high-level disinfectant used to destroy bacteria or to reprocess instruments can provide results of limited, if any, value.

Also, although possible, it is unlikely that *T. whipplei* is more resistant to high-level disinfection than mycobacteria (to which *T. whipplei* is phylogenetically related) and, like spore-forming bacteria, might require sterilization for its destruction. Some other factor, such as the temperature or chemical composition of each of the three high-level disinfectants used during testing, is a more likely explanation for this study's results. None of the three high-level disinfectants used in this study has been cleared for marketing in the United States by the Food and Drug Administration.

In conclusion, this study should not raise undue concern. Omission of each high-level disinfectant's temperature during testing limits this study's scope and significance. Moreover, application of this study to the clinical setting is somewhat tenuous. This study's results do not reflect the benefits achieved by manual pre-cleaning, a process that is required before high-level disinfection (and sterilization) and reported to achieve at least a 3 to 4 log reduction of microorganisms. Had pre-cleaning been performed, or its expected log reduction incorporated into the study's results, then for each of the three tested high-level disinfectants the entire inoculum of *T. whipplei* would have been destroyed. In short, pre-cleaning followed by high-level disinfection of a GI endoscope contaminated with *T. whipplei* (or any other infectious agent) would be expected to prevent disease transmission. ♦

Storing endoscopes in an AER?

Question: "For how long can an endoscope be stored in an automated endoscope reprocessor (AER) without posing an infection risk?"

Answer: Reports indicate that endoscope channels can provide an ideal environment for bacterial growth. As a result, it is necessary to promptly and thoroughly dry the endoscope prior to storage. Storage of inadequately dried endoscopes — whether in an AER, cabinet, or closet — significantly increases the risk of bacterial colonization and nosocomial infection. This

risk increases as the storage time increases. Most AERs are designed to remove most of the rinse water in the endoscope's internal channels after reprocessing, but they are not generally designed to completely dry the endoscope as required for storage. Additional drying using compressed air may therefore be necessary.

In addition to drying, reprocessing guidelines recommend the endoscope be properly stored at the end of the day by hanging it "vertically with the distal tip hanging freely in a well-ventilated, dust-free area" (see: <http://www.sgna.org/resources/guideline3.cfm>). Improper storage can result in re-contamination of the endoscope and nosocomial infection. Using an AER to store a coiled and potentially wet endoscope, either overnight or for an extended period of time, is inconsistent with reprocessing guidelines and a contraindicated practice. *Neither thorough drying nor proper storage as required can be achieved if the endoscope remains in the AER upon completion of its last reprocessing cycle of the day.*

In short, because bacteria can grow in the moist internal channels of an endoscope during storage, there is no "safe" time frame during which an endoscope can be stored in an AER without posing an infection risk. To minimize the risk of transmission of bacteria during endoscopy, dry the endoscope using a 70% alcohol rinse followed by forced air after completion of the AER's cycle not only before storage but also between patient procedures. ●

References

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2. Fabiola V, et al. *Microbiology* 1999;145:2365-74.
3. Muscarella LF. *Am J Infect Control* 1998 Apr;26(2):153-5.

Thank you for your interest in this newsletter. *I have addressed each issue to the best of my ability. Respectfully, the Publisher: Lawrence F. Muscarella, PhD.* Please direct all correspondence to:

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