

Single Dose Ultrasound Couplant for Control of Nosocomial Infection



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According to the Center for Disease Control, the estimated incidence of nosocomial infections exceeds 2 million cases per year, with an added expenditure in excess of \$2 billion.¹ Nosocomial infections are caused by viral, bacterial and fungal pathogens. The utilization of ultrasound gel bottles and bottle refilling practices can be a source of nosocomial infections and patient cross-contamination.

Patient Safety

Hospital Infection Control specialists and epidemiologists are identifying a contamination potential in the use of squeeze bottles and the practice of refilling bottles of ultrasound gel.² Bottles and the ultrasound gel contents exposed to hospital environmental air, patient skin, or body fluids such as perspiration, can become contaminated with a wide range of pathogens that could be transmitted to another patient during a subsequent procedure. For example, in December 2000, Infection Control and Hospital Epidemiology reported an outbreak of pyoderma among neonates caused by ultrasound gel contaminated with Methicillin-Susceptible Staphylococcus Aureus. In this outbreak, 10 newborns with pyoderma and one with redness of the trunk were identified in a teaching hospital.³

Sonographers squeeze bottles to dispense gel, and as the bottle relaxes after squeezing, environmental air is introduced into the container promoting gel contamination by microorganisms. With repeated exposure to environmental air, airborne pathogen transmission becomes a greater risk for patients. If the bottle accidentally touches or comes close to the patient and the bottle is not withdrawn before the pressure is released on the sides of the bottle, the vacuum formed within the bottle could aspirate both gel and flora from the surface of the patient or the probe into the bottle.⁴

In an effort to reduce cost, sonographers commonly refill bottles from 5-liter containers, which compromises patient safety by allowing the new gel to mix with the residual gel inside the bottle, thus contaminating the new gel. Wiping the bottles before refilling does not ensure that exterior surfaces are contaminant free, nor does it address the residual contaminated gel. Even the most thorough disinfection protocol can only address the exterior of the gel bottle.⁵ Thorough washing of the bottle prior to refilling is not common practice.

Many ultrasound departments heat gel; however, warming and re-warming bottles that have cooled to room temperature can incubate bacteria.

Work-Related Musculoskeletal Disorders in Sonography

According to the Society of Diagnostic Medical Sonography (SDMS), "More than 80% of sonographers are scanning in pain and 20% of these professionals eventually experience a career-ending injury. On average, within 5 years of entering the profession, sonographers experience pain while scanning."⁶ Work-related musculoskeletal disorders (WRMSD) are caused by prolonged positioning and thousands of repetitive movements which produce micro-trauma in muscles, tendons, and ligaments, leading to inflammation. The fragments left by inflammation create scar tissue, which in turn causes adherence and contracting of soft tissues.

Fifty-three percent (53%) of all repetitive motion injuries occur in the wrist.⁷ The ultrasound gel dispensing bottle requires filling, squeezing, and shaking. Over time, these repetitive motions can cause cumulative trauma and lead to tendonitis and carpal tunnel syndrome. An estimated 41% of hospital employees are more likely to miss work due to work-related illness and injury than workers in other industries, as stated by the National Safety Council.⁸ These injuries are also responsible for temporary or permanent replacement of personnel, resulting in escalating costs and loss of revenue.

SDMS states that good ergonomic design must be an integral part of equipment design and (must) significantly influence purchasing decisions.

Waste- Only 50% of the gel is ever removed from the bottle.

Sonotech sponsored a study to determine the amount of gel remaining in the bottle prior to normal refilling or discard. The average evacuation rate of an 8-ounce bottle was 54% - with approximately 3.7 ounces remaining in the bottle. These results were consistent with Sonotech in-house evaluations of gel evacuated without aggressive shaking and squeezing.

Summary

- The current ultrasound gel-dispensing method does not protect against cross-contamination and contributes to musculoskeletal injuries for sonographers.
- Ultrasound gel dispensing bottles are evacuated less than 50%, on average, before refilling.
- When cartons of pre-filled 8-ounce bottles are purchased, between 30-50% of the ultrasound gel is discarded.

The Single Solution

Clear Image Singles® –The Unit Dose Delivery System

Sonotech has developed unit dose flexible packaging for its Clear Image ultrasound gel as an alternative to the standard gel dispensing squeeze bottle. The 30 mL and 15 mL Clear Image Singles packaging is perforated for easy opening and dispensing. Clear Image Singles can be warmed in a standard ultrasound gel warmer with no concerns of microorganism growth. Clear Image Singles warm faster than a 250 mL bottle.

Patient Safety–Prevents nosocomial infection from ultrasound gel and bottles

Clear Image Singles prevent the spread of ultrasound gel based infection by eliminating the opportunity for cross-contamination from the refilled gel contents and/or the bottle surface.

Eliminates repetitive motions that result in WRMSD

SDMS recommends that gel bottles have large openings to reduce the strength needed to squeeze the bottle and be of suitable diameter to avoid extended grip position. Clear Image Singles eliminate bottle shaking and squeezing and could be opened using scissors to further minimize repetitive motion.

Economic Comparison Study⁹

At \$0.20 each, Clear Image Singles are less expensive per ounce than most 250 mL bottles and 5-Liter containers.

Environmental Waste Reduction

Fifty-seven percent (57%) less plastic waste will be generated when the average hospital, performing 20,000 scans per year, uses Clear Image Singles rather than 250 mL bottles.

Benefits of The Clear Image Singles® Unit Dose Packaging:

- Prevents cross-patient contamination; eliminates nosocomial infection potential from refilling and reusing ultrasound gel bottles
- Reduces potential for musculoskeletal injury
- Reduces institutional liabilities
- Economical packaging
- Ease of use
- Reduces plastic waste up to 57%

Clear Image® Ultrasound Scanning Gel

Tested and approved by major U.S. ultrasound equipment manufacturers, Clear Image has been a trusted product for 14 years. Sonotech's unique manufacturing process produces gels free of air bubbles. Air bubbles in gel cause scattering and reflection of the sound waves, resulting in potential performance degradation of ultrasound imaging. Clear Image has acoustic properties that minimize refraction through the skin while optimizing coupling.

Clear Image contains no silicones, surfactants, alcohol, or mineral oil – which can harm transducers, probes, and scan heads. Clear Image contains no dyes, fragrance or propylene glycol –all-known skin irritants. The salt stabilized formula of Clear Image reduces gel thinning and run-off from patient perspiration.

REFERENCES

¹ Center for Disease Control, www.cdc.gov

² Ruggiero, B., *Ultrasound Gel: A Breeding Ground for Germs*, Advance for Imaging and Radiation Therapy Professionals. Vol. 15 No. 12, June 3, 2002, pages 47-48.

³ Weist, Klaus, MD et al., *An Outbreak of Pyoderma among Neonates Caused by Ultrasound Gel Contaminated With Methicillin-Susceptible Staphylococcus Aureus*, Infection Control and Hospital Epidemiology, Volume 21 No. 12, December 2000.

⁴ APIC Archives, February 2002

⁵ Ruggiero, pages 47-48.

⁶ Society of Diagnostic Medical Sonography, *Sonography Benchmark Survey*, Dallas, Texas: 2000.

⁷ "Repetitive Motion Injuries", Bureau of Labor Statistics 2002, Occupational Injuries and Illnesses in the United States, National Safety Council, www.nsc.org.

⁸ *ibid.*, www.nsc.org

⁹ Available from Sonotech



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