CLEANING AND DISINFECTING ULTRASOUND TRANSDUCERS

There has been much recent concern at Pregnancy Help Medical Clinics regarding proper methods of disinfecting ultrasound transducers—particularly the trans-vaginal probe, after patient use. An informal survey regarding transvaginal probe disinfection has shown that many OB outpatient clinics doing ultrasounds disinfect using a combination of detergent and water, antimicrobial wipes, and T-Spray to disinfect transvaginal probes. Most products that are recommended by ultrasound manufacturers contain glutaraldehyde and are expensive to use, potentially toxic to personnel, and require special equipment, handling and disposal. In addition, PHMCs have expressed concerns regarding the possibility of loss of warranty if they use products not recommended by the manufacturers of ultrasound machines. 

NIFLA shares the concerns of the PHMC for patient and personnel safety. Therefore, we have done considerable research to provide information and resources to help clinics make decisions regarding safe methods of disinfecting the probes. This issue of Clinic Tips will summarize those findings with up-to-date resources for the PHMCs regarding the disinfection issue.

Published reports show that nosocomial infections (those acquired while in a healthcare facility) are on the rise, as is resistance to antibiotics to treat infections. Furthermore, nosocomial infections occur most frequently in the genitourinary and respiratory tract. This is of particular concern to the personnel of a PHMC, since using a trans-vaginal transducer is generally the preferred method of obtaining the best ultrasound images in early pregnancy (most, if not all of the first trimester). Though the vagina is host to normal flora, the PHMC does not want to be introducing pathological microorganisms.

Preventing infection requires diligence in adherence to aseptic technique and cleaning methods with transvaginal probes so there is no transmission of infectious disease organisms from one patient to another when performing ultrasounds.

PHMCs should be aware that the American Institute of Ultrasound in Medicine (AIUM), which published “Guidelines for Cleaning and Preparing Endocavitary Ultrasound Transducers Between Patients,” has changed its recommendations of proper disinfectants to conform to the Center for Disease Control’s (CDC) published principles of disinfection of patient care equipment. Web sites for the AIUM and CDC (listed at the end of this Tip) are for the use of the PHMC personnel when determining proper methods of probe disinfection.

According to AIUM and CDC principles for disinfection of patient care equipment, a high level disinfection, rather than
actual sterilization, is recommend for maximum safety for instruments that are considered “semi-critical” and come into contact with mucous membranes. **High-level disinfection** refers to the destruction and/or removal of all microorganisms except for bacterial spores.

The AIUM guidelines list examples of high-level disinfectants that fall into four categories with some important concerns for PHMCs regarding their usage. (Most of these commercially available products are also listed on the U.S. Food and Drug Administration’s Center for Device and Radiological Health list of FDA-Cleared Sterilants and High Level Disinfectants). The four categories are:

1) **Glutaraldehyde (2.4 – 3.2%) products** that include Cidex, Metricide or Procide.
2) **Non-glutaraldehyde agents** including Cidex OPA (o-phthaldehyde), Cidex PA (hydrogen peroxide and peroxyacetic acid).
3) **7.5% Hydrogen Peroxide solution** such as Sporox.
4) **Common household bleach (5.25% sodiumhypochlorite)** diluted to yield 500 parts-per-million chlorine (10 cc in one liter of tap water).

**Probe Cleaning**

Though every PHMC is advised to consult the AIUM Guidelines for specific recommendations on steps to clean the probes after patient use, a summary of cleaning procedures includes the following:

1) Use aseptic technique and gloves to remove the probe cover.
2) Remove residue or remnant gel from the probe with a wipe, then use running water with mild detergent and possibly a pad or brush in crevices, followed by thorough rinsing and drying the transducer.
3) Disinfect with a high level disinfectant product (such as listed above), according to manufacturer’s directions.
4) Thoroughly rinse the probe and allow it to air dry with the faceplate of the transducer up.

Methods of disinfection that the AIUM describes as in compliance with CDC principles can be found in FDA approved sterilants and high level disinfectants and is available for consulting at their website listed at the end of this publication.

**USE OF QUATERNARY AMMONIUM PRODUCTS**

A quaternary ammonium product (T-Spray) widely used to disinfect ultrasound probes is no longer on the list of disinfectants from the AIUM or FDA. **Since this product is not recommended for vaginal probes, NIFLA can no longer encourage its use.** T-Spray is still preferred for disinfecting the abdominal ultrasound probes, and is reported not to be harmful, but actually beneficial for the probe faceplates. At present, lab swab tests are being done for the presence of positive cultures of microorganisms on transvaginal probes cleaned with T-Spray in a PHMC. An article in the Journal of Diagnostic Medical Sonography, in reporting on research involving cleaning both abdominal and transvaginal probes, states that in addition to wiping off residue from transducers, “to prevent nosocomial infections, transducers should be wiped with alcohol or sprayed with T-Spray between patients and at the end of the day to prevent overnight growth of bacteria.”

The medical personnel of each PHMC will need to decide what methods of
Each of the products mentioned in 1 and 2 can be compared on the FDA list of cleared High Level Disinfectants. All require exposure time to the probe surface for effective use that varies from 20-90 minutes. They may only be re-used from 14-28 days maximum, when it is necessary for them to be disposed of properly. Some require test strips to determine effectiveness. NONE of the above products can be disposed of down sewers and requires special disposal handling due to their toxicity. Care must be taken to protect personnel from contact with the solutions with gloves, eye wear and ventilation systems providing ten air exchanges per hour. When considering these products, it is important to consult the product literature (including MSDS) for all the requirements for exposure, re-use, disposal and protective equipment for personnel cleaning the probes. The cost of ventilation systems cost is expected to be about $600, and require filter replacement in accordance with usage. Due to health concern for personnel with the potential toxicity of the above disinfectants, some state OSHA divisions have expressed to PHMCs their preference that other disinfectant products to be used. Overexposure to the above high-level disinfectants is also harmful to ultrasound transducers, so disinfection times must be carefully monitored, followed by thorough rinsing.

This high level disinfectant requires approximately 30 minutes exposure time and has a 21-day maximum reuse. It requires personal protective equipment, and can damage ultrasound probes. Thorough rinsing the probe is necessary to remove the solution.

This high level disinfectant solution can be mixed daily, requires no special disposal, and is inexpensive. Caution should be used to limit probe contact time, though there is no specific time for exposure given in the literature, as it can damage both plastic and metal parts. Thorough rinsing the probe is necessary to remove the bleach solution. Gloves and eye protection are recommended as in using any bleach product, as they are highly corrosive.

Resources for further information:


Sterilization or Disinfection of Medical Devices: General Principles. Centers for Disease Control, Division of Healthcare Quality Promotion.

(c) ODE Device Evaluation Information—FDA Cleared Sterilants and High Level Disinfectants with General Claims for Processing Reusable Medical and Dental Devices, May 2005.

To: NIFLA members  
From: Shimadzu America  
Date: July 13, 2006  

Subject: Cleared Sterilants and High Level Disinfectants, Supplement  

In addition to the recommendations and procedures detailed in the Shimadzu ultrasound system manual covering disinfectants and sterilants use for ultrasound imaging probes, Shimadzu America also supports FDA and AIUM published guides for use with the Shimadzu Transvaginal ultrasound probe, TV 11R-055U. The FDA guidelines are titled: “FDR- cleared Sterilants and High Level Disinfectants with General Claims for Processing Reusable Medical and Dental Devices May 13, 2005, Manufacturer Active Ingredient(s) Sterilants Contact Conditions High Level.”