High Level Disinfection at Bedside? High Level Disinfection Wipes for Ultrasound Probes in the ED

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BACKGROUND

A 26-year-old woman presents with a one-day history of lower abdominal cramping. She reports a positive home pregnancy test, with her last menstrual period occurring six weeks ago. On examination, she is hemodynamically stable but has mild tenderness in the suprapubic region. You perform a bedside transvaginal ultrasound confirming a 6-week intrauterine pregnancy with an appropriate fetal heart rate and no adnexal masses. After reassuring her, you arrange follow-up with the on-call OB/GYN and discharge her within 90 minutes of her arrival. As you hand the transvaginal ultrasound probe to the ED technician, they ask for guidance on how to properly clean it.

Typically, probes used on the skin surface are cleaned after each use by removing visible contamination, followed by disinfection with a low-level disinfectant (LLD). LLDs, which are often alcohol- or quaternary ammonium compound-based, are applied via spray or wipes.

However, internal probes, such as those used for transvaginal imaging, are more prone to contamination, even when probe covers and LLDs are used. One study reported a condom breakage rate of up to 13% during transvaginal examinations.[1] Another study found bacterial contamination rates of 33.7% after sheath removal, which decreased to 12.9% after LLD cleaning. Similarly, viral contamination rates were 19.4% after sheath removal and dropped to 1.0% following LLD cleaning.[2] Due to the significant risk of cross-contamination, current guidelines recommend high-level disinfection (HLD) for ultrasound transducers after internal use.[3]

Traditional HLD systems often utilize chemical solutions like glutaraldehyde or hydrogen peroxide and require a separate device for cleaning. However, in 2023, the FDA approved an HLD solution in a wipe form, which is now available in the U.S. as an alternative to machine-based HLD platforms. These wipes have been approved and used in Europe since 2008.[4]

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Why You Should Switch to HLD Wipes

One of the biggest challenges with current HLD systems is the cost. These systems require a significant upfront investment for the equipment if installed in the emergency department (ED). Additionally, each use incurs ongoing expenses for disposable supplies needed to clean the probes. Maintenance of the equipment can also involve substantial fees. Furthermore, some systems require a dedicated ventilated area to manage fumes produced during the cleaning process, which can add additional costs.

Some HLD consumables, such as glutaraldehyde-based solutions, are highly caustic. These solutions can cause irritation or injury upon contact and may produce significant discomfort if inhaled. Additionally, many of these chemicals can degrade ultrasound probes over time, reducing their lifespan. Each HLD device requires specific training and ongoing competency maintenance for ED staff, which can be time-consuming. Improper use of these devices or solutions can result in damage to the HLD equipment, the ultrasound probes, or both.

If the HLD system is not within the ED, then staff will need to send the probes to another department (e.g. radiology) for cleaning, which can have a significant turnaround time. This could limit the availability for the next case.

In contrast, HLD wipes eliminate the need for costly equipment and the associated expenses. Applying the HLD solution is quick, taking only two minutes, after which the probe is wiped dry and ready for use. Additionally, because these wipes do not require a specialized ventilation system, cleaning can be performed anywhere in the ED, including at the bedside. HLD wipes are also not known to degrade or damage the ultrasound probes.

Why You Shouldn't Switch to HLD Wipes

While the high level disinfectant wipes present several clear advantages, there are some disadvantages which should be considered as well. The first is that the manufacturer's instructions require two minutes of contact between the wipe and the probe. This presents a time burden to the physician, and it is unlikely that a busy emergency physician would truly wipe the probe for two minutes. In that case, the probe would not be fully disinfected and would present an infectious risk. In addition, the probe would need to be grossly decontaminated, similar to the current HLD systems. ED staff may not remember this step and it is unclear if the wipes would be effective in the setting of gross contamination, such as that commonly seen in the trauma bay.

A second consideration is cost. Sending a probe to hospital disinfection incurs minimal cost to the ED as the high cost of installing disinfection equipment is a sunk cost. However, the high level disinfection wipes cost approximately $2.50 to $3 per application, which, while not an insurmountable barrier, could present a significant cost if used consistently.

Finally, there is no published data on the long-term effect of these wipes on the probe. Further data is needed to see if consistent use of these wipes would cause degradation of the probe. Although the wipes have been used in Europe for over a decade, it is unclear if any specific evaluation on probe degradation has been performed.

CONCLUSION

High level disinfection for ultrasound probes can

present a logistical challenge, but is essential for patient safety. Sending probes out of the ED for high level disinfection requires a prolonged turnaround time, and installing necessary equipment for high level disinfection in the ED requires a significant up front cost and ongoing dedicated personnel and training. HLD wipes present a potential way to alleviate both problems, with no dedicated equipment installation required and minimal training requirement. In addition, HLD wipes are portable and relatively cost effective. However, HLD wipes do have potential concerns such as compliance with proper use as recommended by the manufacturer and limited long-term data on effect on probe integrity. EDs considering the use of HLD wipes should consider both risks and benefits prior to implementation.

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