Improving Infection Control in the use of Ultrasound Equipment in the Emergency Department.

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Background

Point of care ultrasound has significantly changed practice in Emergency Medicine and most UK Emergency Departments (ED) have at least one device. However a disappointingly frequent observation is for the ED devices to be left unclean after patient use. Manufacturer's guidelines on optimal cleaning methods for ultrasound equipment exist but awareness of these is suboptimal in the ED[1]. Despite no proven infection control risk from non-invasive ultrasound probes used on intact skin[2], any attempt to improve the cleanliness of equipment being used regularly will reduce potential infection control risks, enhance patient confidence, and prolong the working life of invaluable equipment. This study aims to improve the standard of cleanliness of ultrasound equipment in the ED through an educational intervention for doctors using these devices.

Method

A prospective interventional before-after study was undertaken in the ED of Chelsea & Westminster NHS Foundation Trust in August 2017. Assessment of impact of the intervention was triangulated through three parameters.

Pre-intervention testing week: Daily for 5 days at 0800, 1600 and 2200 (i) a visual assessment was made of whether the machine probes were clean, (ii) adenosine tri-phosphate (ATP) swabbing of the probe was undertaken (recording the relative light units (RLU)), and (iii) bacteriology swabs of the probe tip were taken for microscopy culture and susceptibility testing (MCS)).

Intervention Week: Education of all staff using ultrasound in the ED on optimal cleaning methods based on manufacturer's guidance.

Post-intervention testing week: Daily for 5 days at 0800, 1600 and 2200 the same data as the pre-intervention week was recorded.

Results

- Visual inspection scores improved after the intervention from 3/15 contaminated probes to 0/15.
- Median ATP values reduced from 252 to 50 RLUs.
- The number of positive MCS swabs reduced from 5/15 to 2/15 with no resistant organisms found post intervention.

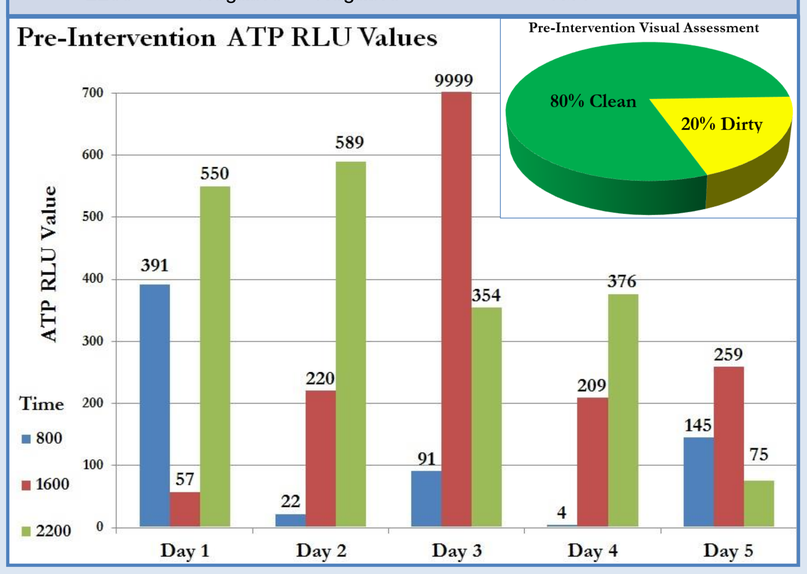
I would hope that all would agree that this is **COMPLETELY UNACCEPTABLE**. To leave a >£50,000 piece of equipment in this state is shocking.

I would therefore like to highlight the responsibilities of each clinician using the machine:-

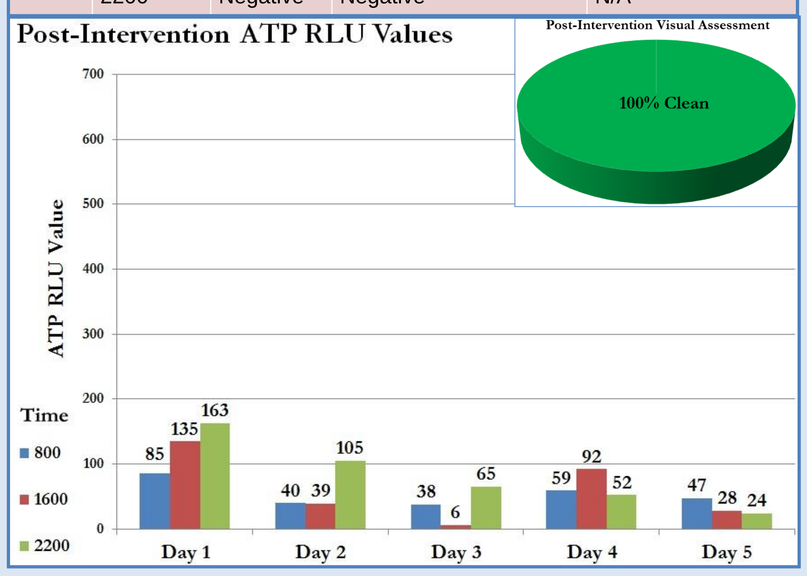
- **Clean before and after each patient use. Wipe of excess gel with a paper towel followed by a detergent wipe. This should be left to air dry to kill microbes.**
- **DO NOT USE ALCOHOL BASED WIPES. Only use detergent wipes such as Green CLINELL wipes.**
- **Use sterile gloves or probe covers with sterile gel for PERIPHERAL AND CENTRAL VENOUS ACCESS.**
- **Be aware of the fragile nature of the machine, probes and cables. Theses should not be left hanging on the floor for the wheels to run over. The probes and cables themselves are £10,000. Hook the cables off the floor on the grey plastic hooks.**

All doctors in the ED were assessed cleaning the ultrasound machine and then educated on the optimal method during a 10 minute training session. The poster above was emailed to all staff and attached to the machine.

Pre-Day	Sample Time	MRSA Agar	RGNB Agar	Antimicrobial Resistance
1	0800	Negative	Negative	N/A
	1600	Negative	Negative	N/A
	2200	Negative	*Pseudomonas spp.*	Susceptible
2	0800	Negative	*Pseudomonas spp.*	Susceptible
	1600	Negative	*Pseudomonas spp.*	Susceptible
	2200	Negative	*Pseudomonas spp.*	Meropenem resistant
3	0800	Negative	Negative	N/A
	1600	Negative	Negative	N/A
	2200	Negative	*Enterococcus spp.*	Susceptible
4	0800	Negative	Negative	N/A
	1600	Negative	Negative	N/A
	2200	Negative	Negative	N/A
5	0800	Negative	Negative	N/A
	1600	Negative	Negative	N/A
	2200	Negative	Negative	N/A



Post Day	Sample Time	MRSA Agar	RGNB Agar	Antimicrobial Resistance
1	0800	Negative	Negative	N/A
	1600	Negative	Negative	N/A
	2200	Negative	Negative	N/A
2	0800	Negative	Negative	N/A
	1600	Negative	*Staphylococcus aureus*	Susceptible
	2200	Negative	Negative	N/A
3	0800	Negative	Negative	N/A
	1600	Negative	Negative	N/A
	2200	Negative	Negative	N/A
4	0800	Negative	Negative	N/A
	1600	Negative	Negative	N/A
	2200	Negative	Negative	N/A
5	0800	Negative	Negative	N/A
	1600	Negative	*Acinetobacter lwoffii*	Susceptible
	2200	Negative	Negative	N/A



References

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Conclusions

- The consistent run of *Pseudomonas spp.* and worryingly multi-drug resistant strain in the pre-intervention group highlights the capacity for the USS machine to harbour potentially harmful micro-organisms.
- Whilst the overall sample size was small, the reduction in positive MC&S swabs and ATP values following the intervention is encouraging and highlights the need for continued education around the optimal cleaning of ultrasound equipment in the Emergency Department. Further work to describe potential user fatigue from this intervention and hence optimal re-training intervals is needed.

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