Improved Interventional Hygiene using a Disinfectant Ultrasound Couplant Spray

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Background

During endovenous procedures the use of conventional ultrasound gel goes along with several problems: Color markings can hardly be applied on gel covered skin, gel requires intense wiping for complete removal, gel deposits will delay punctions and catheter handling, and even sterile gel may be contaminated with bacteria mobilized from hair follicles, pores and wrinkles by transducer movements.

Objective

To compare a new disinfectant ultrasound couplant spray (DUCS, Fig.1) with alcoholic standards.

Patients and Methods

DUCS contains Octenidin and Phenoxyethanol, known as slow acting disinfectants, and starch for increased viscosity. The substance is sprayable but not forming aerosols (Fig. 1), evaporation time is > 20 min.

A pilot study was performed 4 - 8/2014 in 20 healthy individuals aged 35 to 77 years. Endovenous treatment (GSV catheter intervention with tumescent anesthesia) was simulated in both legs (Fig. 2).

The legs were randomized to two different procedures, A: standard, consisting of mapping using conventional ultrasound gel (Aquagel), removal of all gel, disinfection according to surgical requirements with alcoholic agent (Octeniderm, 2 x 60 s), sterile covering of ultrasound transducer, and simulated treatment using sterile ultrasound gel for > 7 min., or B: mapping using DUCS for > 7 min., sterile covering, simulated intervention using DUCS > 7 min.

After removal of all remnants of gel or spray with sterile tissue, samples were taken prior to "puncture" at symmetric locations (sites for access or tumescent anesthesia, Fig. 2) using contact plates (RODAC, 40 cm^2) containing inhibitors to the disinfectant. The number of colony forming units (CFU) was determined, furthermore the group of growing species, procedural time and gel consumption. In 5 cases of each group, additional samples were taken at termination of the "treatment".

Fig. 1: Disinfectant ultrasound couplant spray

Fig 2: Test patient

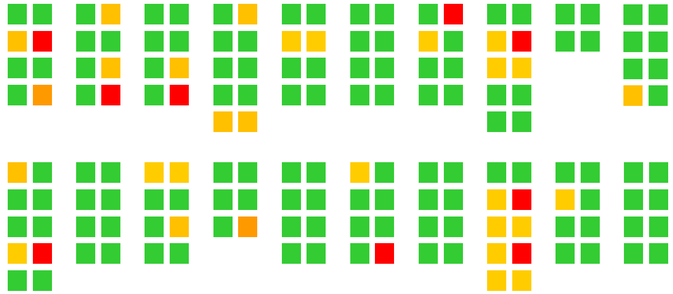
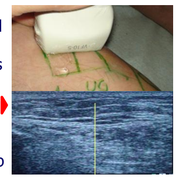


Fig. 3: Diagram of results: One block represents one test patient.
Standard disinfectant (mode A, right row); DUCS (mode B, left row).
Colony forming units (CFU) per plate: green: 0, orange: 1 - 10, red: 11 - 200

Fig. 4a,b: Novelty vs. standard
no dissolving of color markings
ultrasound quality

a



b

Results

The evaluation of 20 cases (40 legs, 162 samples) showed these results:

	CFU prior to puncture		CFU after "treatment"	
A) standard	10.5	(0 – 46)	17.5	(2 – 180)
B) DUCS	2.4	(0 – 10)	2.1	(0 – 10)

Comparing corresponding locations, DUCS - treated areas were superior or equal to standard in 93.8 % (Fig. 3).

Samples taken after termination of "treatment" were not different to pre-treatment status for DUCS, but worse for standard mode. The spectrum of detected resident and transient germs did not give evidence of any activity gap of DUCS.

Mean procedural time was 18:15 min. for standard and 13:00 for DUCS. Gel consumption was 32 – 75 ml (mean: 54) for standard, and 4 – 7 ml (5.6 ml) for DUCS.

Ultrasound quality was equal in both groups (Fig. 4b)

Discussion

After few initial cases, a third mode (1 x alcoholic pre-disinfection, mapping and "treatment" using DUCS, was abandoned because of obvious inferiority to mode B (CFU: 0 – 36, mean 7.8).

Conclusion

The novel gel spray, if applied with a residence time of > 7 min., seems to provide similar or even better hygienic conditions than standard disinfection.

The modality may help to simplify endovenous procedures and to reduce intervention time.

Further studies to evaluate the minimum residency time of DUCS will be performed 2015, hoping for a coming manufacturer.

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