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STERILIZATION
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17 / 20 NOVEMBER
2021

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Schweizerische Gesellschaft für Sterilgutversorgung
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Increasing patient safety by validating a reproducible method for reprocessing ultrasound probes

Part 1

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Hygiene aims to increase patient safety by preventing infections.

Despite many efforts and approaches, there is still (partially) a perception that hygiene and safety measures are (avoidable) cost factors.

But: Errors in the medical field cause considerable costs

And: they lead to avoidable suffering (and deaths).

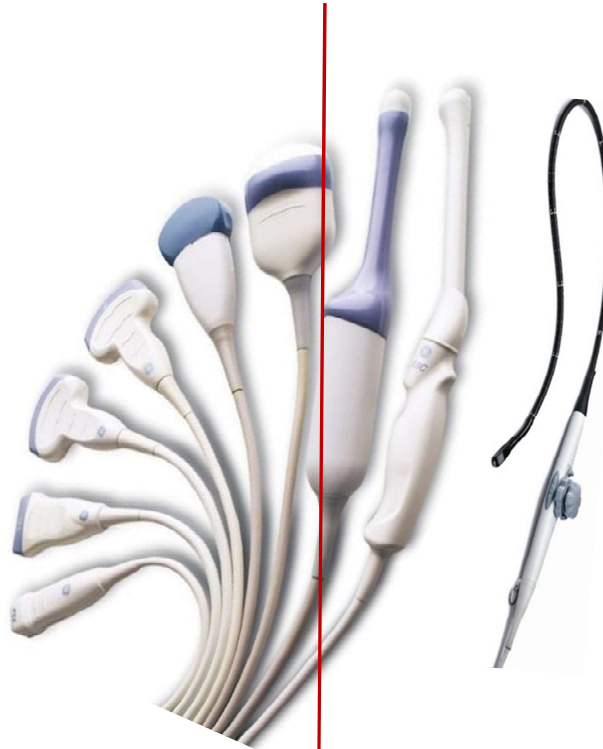
Therefore: Is it important to deal with the greatest possible patient safety

Sonography is an essential method of imaging diagnostics

➤ Ultrasound probes are used in a variety of applications.

Surface probes

- Biopsy
- placement of venous catheters
- Needle guide
- Surface ultrasound of the abdomen
- etc.



Endocavitary

- Transvaginal
- Transrectal
- Prostate Biopsy
- etc.

Risks in the event of improper or insufficient reprocessing

- Residues from previous use (blood, secretions, other body components, microorganisms ("pathogens"))
- Residues from previous reprocessing (chemicals residues)
- Change in physico-chemical or functional properties
- Change in material properties



- Transducers, used on the skin or endocavitary, are usually microbially contaminated and require safe handling and reprocessing for patient protection.
- The proximity of non-sterile material (transducer) to the patient (especially to puncture and injection sites or drains, etc.) is problematic from a hygiene point of view.
- There are only few prospective data on infections caused by the transmission of microorganisms during ultrasound applications, especially on the important topic of infection rates (at the time of the manifestation of infection, the transducer has usually been in use again several times, so that direct evidence is difficult to provide).



Journal of Hospital Infection 111 (2021) 184–188

Available online at www.sciencedirect.com



Journal of Hospital Infection



journal homepage: www.elsevier.com/locate/jhin

Short report

Investigation of *Serratia marcescens* surgical site infection outbreak associated with peroperative ultrasonography probe

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ARTICLE INFO

Article history:

Received 1 October 2020

Accepted 23 December 2020

Available online 12 February

2021

Keywords:

Surgical site infections

Serratia marcescens

Whole-genome sequencing



SUMMARY

Early postoperative infections due to *Serratia marcescens* have been reported by both clinicians and microbiologists in our teaching hospital. Here, we present an interlinked clinical, epidemiological, environmental and genomic investigation of this outbreak due to a T-shaped intraoperative probe contaminated by *S. marcescens* used during peroperative ultrasonography in laparoscopic liver resection.

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Traceability of an outbreak of *Serratia marcescens* to an ultrasound probe (used intraoperatively)

- 8/9 patients treated with ultrasound probe (liver resection) became infected.
- Lack of final disinfection after cleaning.
- No sterile probe cover used.
- Damaged probe (damaged seal between cable and probe body as probable pathogen reservoir).

Conclusion: The results of the study indicate the need for proper reprocessing of ultrasound probes and the use of sterile protective covers.

When considering scientific studies on microbial contamination of ultrasound probes, there are a number of factors whose influence on the result must be taken into account

- Was the analysis performed during clinical practise or specifically after disinfection?
- What method of sampling was used (contact plate or swab)?
- Which microbiological test methods were used (incubation temperature and duration, culture media, differentiation methods, etc.)?
- Has the presence of viruses been investigated?
- Are the hygiene conditions and antiseptic measures standardised and traceable in retrospective analyses?
- In which type of procedure was the ultrasound probe used? (The spectrum of detectable microorganisms is strongly dependent on this)

- Contamination rates determined during clinical practise have been documented in many studies.
- Patient-to-patient transmission of *Staphylococcus aureus* through transducers that have merely been wiped dry and not disinfected was demonstrated more than 30 years ago (O'doherty et al. 1989 [1]).
- Cross-contamination with different pathogens (bacteria and viruses) can occur when handling the ultrasound probe, ultrasound gel and covers.
- study found contamination rates of 12.9% for bacteria and 1% for viruses on endovaginal probes after "wipe/spray disinfection" (low level disinfection) (Leroy 2013 [2]).
- Meta-analysis found contamination rate of transducers of 50% for bacteria and 4% for viruses immediately after examination (Aryanti 2017 [3]).

Original Research

ULTRASOUND

Risk of infection following semi-invasive ultrasound procedures in Scotland, 2010 to 2016: A retrospective cohort study using linked national datasets

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Abstract

Introduction: Outbreak reports indicate a risk of cross-infection following medical procedures using semi-invasive ultrasound probes. This study aimed to evaluate the risk of infection, using microbiological reports and antibiotic prescriptions as proxy measures, associated with semi-invasive ultrasound probe procedures, including transoesophageal echocardiography, transvaginal and transrectal ultrasound.

Methods: Patient records from the Electronic Communication of Surveillance in Scotland and the Prescribing Information System were linked with the Scottish Morbidity Records for cases in Scotland between 2010 and 2016. Three retrospective cohorts were created to include inpatients/day-cases and outpatients in the following specialities: Cardiology, Gynaecology and Urology. Cox regression was used to quantify the association between semi-invasive ultrasound probe procedures and the risk of positive microbiological reports and community antibiotic prescriptions in the 30-day period following the procedure.

Results: There was a greater hazard ratio of microbiological reports for patients who had undergone transoesophageal echocardiography (HR: 4.92; 95% CI: 3.17–7.63), transvaginal (HR: 1.41; 95% CI: 1.21–1.64) and transrectal ultrasound (HR: 3.40; 95% CI: 2.90–3.99), compared with unexposed cohort members after adjustment for age, co-morbidities, previous hospital admissions and past care home residence. Similarly, there was a greater hazard ratio of antibiotic prescribing for those who had received transvaginal (HR: 1.26; 95% CI: 1.20–1.32) and transrectal (HR: 1.75; 95% CI: 1.66–1.84) ultrasound, compared with unexposed patients.

Conclusion: Analysis of linked national datasets demonstrated a greater risk of infection within 30 days of undergoing semi-invasive ultrasound probe procedures, using microbiological reports and antibiotic prescriptions as proxy measures of infection.

Keywords

Cross infection, infection control, ultrasound, endosonography, endocavitary probe, echocardiography

Date received: 31 January 2018; accepted: 9 April 2018

Ultrasound
0(0) 1–10
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DOI: 10.1177/1742271X18774594
journals.sagepub.com/home/ult
SAGE

- Study commissioned by the Scottish Executive Health Protection Agency
- Links retrospective cohort analysis with national datasets
- Patient records were retrospectively reviewed up to 30 days after transvaginal/transrectal ultrasound examination
- Over a 6-year period, nearly 1 million people were followed through national health databases
- Cohorts include gynecologic and urologic patients who were or were not examined by ultrasound probe.

Cohort transvaginal ultrasound examination

41% higher risk of infection than in patients who have not undergone transvaginal ultrasound

26 % higher risk of antibiotic prescription

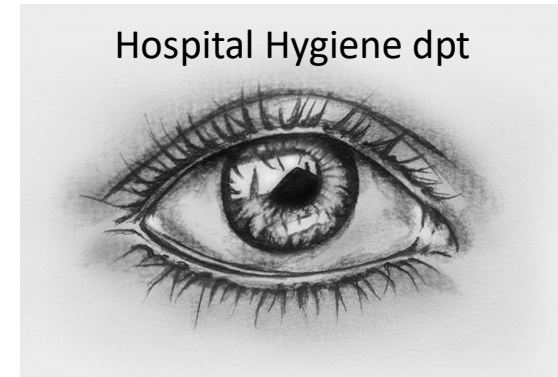
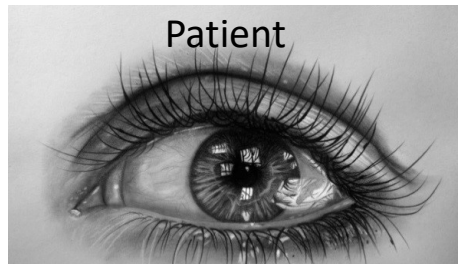
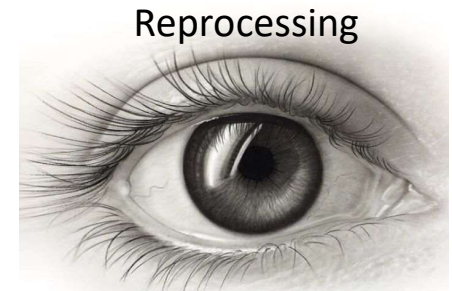
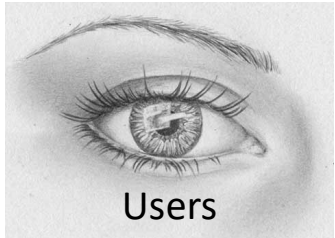
Cohort transrectal ultrasound examination

3.4 times higher risk of infection

75 % higher risk of antibiotic prescription

90.5% of the facilities included in this study performed "low level disinfection" (spray, wipe disinfection) of ultrasound probes.

Conclusion: The results of the study highlight the need for proper reprocessing of ultrasound probes.



Proper reprocessing ↑ Patient safety.

What does proper reprocessing mean?

In Germany, legal regulations apply to the use of medical devices and their reprocessing, detailed by recommendations of the Commission for Hospital Hygiene and Infection Prevention (KRINKO) of the Robert Koch Institute (RKI).

Validierung der abschließenden Desinfektion von
semikritischen Medizinprodukten mittels
Wischdesinfektion
Information der für Medizinprodukte zuständigen Obersten
Landesbehörden, des Bundesinstituts für Arzneimittel und Medizinprodukte
(BfArM) und des Robert Koch-Instituts (RKI)

Status: 28.10.2021

➔ **"Increase of patient safety by validation of a reproducible method
for the reprocessing of ultrasound probes
- Part 2"**

[1] O'doherty AJ, Murphy PG, Curran RA. Risk of Staphylococcus aureus transmission during ultrasound investigation J Ultrasound Med 1989; 8: 619-620.

[2] Leroy S. Infectious risk of endovaginal and transrectal ultrasonography: systematic review and meta-analysis. J Hosp Infect 2013; 83: 99-106.

[3] Aryanti C. Contamination level of transvaginal ultrasound probes in standard setting: A meta-analysis. J Physiol Pharm Pharmacol 2017; 7: 1-17