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Sporocidal Disinfection of the Environment of CDI–Patients – An essential strategy for prevention of nosocomial transmission of *Clostridium difficile* spores?

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Objectives:

Clostridium difficile infection (CDI) has been changing in its clinical severity and epidemicity. Hypervirulent strains of Clostridium difficile are causing hospital outbreaks in the US and Europe. This phenomenon is associated with particular PCR ribotypes including ribotype 027.

This spore-forming bacterium is highly resistant in the environment. Therefore sporocidal disinfecting concepts have to be in place for surfaces adjacent to patients.

Whether routine cleaning and and non-sporocidal disinfection of the patient environment could be sufficient to prevent transmission for C diff. Spores was investigated by two different sampling methods.

Material and Methods:

The two different methods used for recovery of Clostridium difficile spores were 25cm² bloodagar contact plates (Biotest) and single cotton-tipped plastic swabs (COPAN).

In March and April 2010 from a total of 12 patients, from different departments of a university hospital, 118 samples in total were taken. From 5 specified sites adjacent to the patient (bed gallows, bedrail, mattress, bedpan or toilet seat, bedframe) one sample per method was taken. Targeted sporocidal surface disinfection was started after sampling.

The samples were cultivated on Clostridium difficile selective agar (bioMérieux), and, together with the contact plates, incubated for 48 hours under anaerobic conditions. Any colonies were sent to AGES in Vienna for PCR-ribotyping.

Table 1:
Diagnostic characteristics of CDI patients

Ward/ Department	Age	Sex	Toxin	semiquant. Culture-Result	PCR-Ribotype
Paediatric Surgery	10	f	A/B +	no growth	-
Vascular Surgery	62	m	A/B +	moderate	053
Cardiac care unit	55	m	A/B +	no growth	-
Pulmology	91	f	A/B +	no growth	-
Vascular Surgery	83	f	A/B +	many	053
Onocology	78	f	A/B +	no growth	-
Gastro-Enterology	85	m	A/B +	many	053
Vascular Surgery	71	m	A/B +	many	n.d.
Vascular Surgery	89	m	A/B +	many	n.d.
Dermatology	65	m	A/B +	no growth	-
Gastro-Enterology	75	m	A/B +	moderate	AI-8/0
Gastro-Enterology	57	m	A/B +	moderate	050

Results:

None of the 118 environmental samples showed a positive result, despite of clinical manifestation of CDI and proof of toxin A and toxin B in all 12 patients (Table 1).

Out of these 12 only seven patients showed a positive toxigenic culture result. (Table 1)
Among the five culture-negative patients, contamination of the environment was very unlikely.

Five out of the seven isolates of the culture-positive patients were available for PCR-ribotyping.
Three isolates were identified as PCR-ribotype 053, one as PCR-ribotype 050 and one as AI-8/0. (Table 1)

Conclusions:

No difference was seen comparing the two methods.

During the investigation-period no clusters of CDI were observed.

Therefore it can be assumed, standard cleaning and non-sporocidal disinfection of surfaces adjacent to the patients seem to be sufficient to prevent transmission of C.difficile-spores in an endemic situation.

To clarify possible insufficient sensitivity of the used methodology, investigation of the surfaces should be extended in frequency and area.

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