However, such items have not been reported previously as a vehicle for Aspergillus infections. A recent report found R. microsporus in surveillance samples, but infection of patients did not occur. The present report illustrates that filamentous fungi present on vehicles in the patient’s environment, may cause fatal infection. We conclude that non-sterile hospital equipment used for splinting limbs of neonates should be considered a potential source of invasive fungal infections. As the skin may be an important portal of entry for invasive aspergillosis, special attention should be paid to all materials that have close contact with the neonate’s skin.

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References


Black pigmented fungi in the water pipe-work supplying endoscope washer disinfectors

Sir,

We wish to report our experience in finding biofilm on the water pipe-work supplying an automated washer disinfector (AFOS ICU 2) used for the decontamination of flexible cytosscopes. The machine was installed in 1995. The water supply is processed by passing mains water through UPVC pipes across a series of three filters (1, 0.4 and 0.2 μm) prior to exposure to an ultraviolet (UV) light source. Decontamination of the water line is performed daily by the installation of a 1:20 dilution of Peraclean (0.1% w/w peracetic acid and 1% w/w hydrogen peroxide, Intersep Ltd) using the Dosatron Pump (AFOS). The solution fills the pipe-work from the pump through to the machine baths and remains in situ from the end of one list to the beginning of the next when it is flushed away to drain. The machine is not used from Thursday evening to Monday morning and for a fortnight over the Christmas and local trade holidays. During these periods, it is disinfected the weekend prior to reuse.

In May 1998, staff reported black debris in the machine baths. There was no obvious blackening of the filters although floating particles of black debris were visible in the filter housings. The rubber seals in the filter housings were intact. Changing the filters made no difference to the problem. Water samples yielded total viable counts of 40, 50 and 2 cfu/mL at 22°C, 30°C and 37°C respectively from one bath and
50, 90 and 0 cfu/mL respectively from the other. Microscopic examination of the black debris revealed a tangled mass of fungal hyphae and the machine was taken out of use. Culture of the debris yielded a complex mixture of organisms including *Pseudomonas aeruginosa* and *Stenotrophomonas maltophilia*, but was composed predominantly of a black pigmented *Phialophora* sp. The black debris (biofilm) was clearly visible along the water pathway between the exit from the Dosatron and entry to the washer disinfector. Interestingly, it was not visible in pipework before the Dosatron, or a small piece of pipe by-passing the Dosatron that was not exposed to the Peraclean solution. It was not possible to see inside the machine itself.

The whole of the external water pipeline including the Dosatron were renewed as were the filters and housings. The internal pipe work of the machine was treated with Virkon (Antec International Ltd., England). Two stainless steel elbows situated after the inlet valves on the machine were replaced. Culture of one of these yielded *Phialophora* sp. No such organisms were found on culture of the water supply.

Several points are raised by this experience. The regular maintenance and decontamination of the pipework and filters did not prevent buildup of biofilm in the system. It is possible that fungi such as *Phialophora* sp. are more resistant to peracetic acid and survived, then entrapped bacteria. Only total aerobic bacterial counts were used as a measure of the water quality and the presence of the predominant fungal growth was not detected. In common with others, we found it was impossible to achieve consistently low (<10 cfu/mL) counts over a prolonged period. Presumably, the mass of the bacteria was contained within the bulk of the biofilm, which would explain the unremarkable total aerobic counts seen in the face of such gross contamination of the pipe-work. It may be that we were not rigorous enough in our demands for bacteria-free rinse water from the start but we felt we had done all that was practically possible to reduce the risks of infection. Cystoscopes were flushed through with a large volume of sterilized water prior to use. The use of UV light in these systems is controversial but in our experience had no obvious beneficial effect on the bacterial quality of the water. It is unlikely that the UV light contributed significantly to the degradation or inactivation the peracetic acid over the period it was exposed, but it may have added heat to the system to encourage growth.

How long the biofilm had been present is unknown but the density of growth suggested that this was not an acute problem. It is possible that the concentration of the disinfectant/cleaner recommended is inadequate for the microbial challenge in these systems or that some environmental strains may grow in acidic medium (personal communication Dr GS de Hoog, Baarn). We have no option but to continue with the recommended decontamination procedures, but with no guarantee that the problem will be solved. We have added specific fungal cultures to the routine monitoring of the rinse water.

These systems are expensive to install and maintain. The production of bacteria-free product water over prolonged periods is difficult. The risk of infection from the black pigmented fungi is probably low but the co-existing bacteria such as *Ps aeruginosa* are more worrying. We suggest that the process of producing bacteria free rinse water for use with automated endoscope washer disinfectors should be assessed by a multi-disciplinary group of experts. We would be interested to hear of others’ experience.

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**Reference**