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NON-TOUCH FITTINGS IN HOSPITALS: A PROCEDURE TO ERADICATE PSEUDOMONAS AERUGINOSA CONTAMINATION

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Non-touch taps, which are now common in hospitals, can easily be contaminated with *Pseudomonas aeruginosa*. We report our experience with 87 non-touch taps in a newly built wing of our teaching hospital contaminated with *P. aeruginosa* due to the central pipe water system. Serotyping and genotyping of strains revealed genetic diversity of implicated isolates but also showed that major clones are able to persist a long time in non-touch taps despite chlorination. It is notoriously difficult to decontaminate such taps with biocides and disinfectants. We describe an easy and economical procedure for the eradication of *P. aeruginosa* contamination from non-touch taps. This procedure does not require the removal of contaminated taps.

2

STERILISABLE WATER FILTERS: COST OF OBTAINING A WATER OF MICROBIOLOGICAL QUALITY

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INTRODUCTION

Obtaining water of bacteriological quality is essential in the fight against nosocomial infections. Micro filtration, by installation of final filters on the water points, makes it possible to control the quality of water to the operating theatre. ln the CHU of Dijon, water sterilisable filters are currently used. A study was then undertaken to evaluate the cost of annual operation of the points of water supply. ln parallel, the results of the bacteriological analyses carried out on the filters were analysed over the year 2004.

MATERIEL AND METHODS

The cost of operation of the points of water supply with filters corresponds to the sum of the purchase price, the incineration cost, the 45 sterilizations and 3 bacteriological analysis cost. The unit cost of the sterilization of a filter was estimated by distinguishing various expenditures: personnel, consumable and small material, equipment and operating costs.

The costs were calculated by Excel® on the basis of price and hourly wages in 2004. The results of the bacteriological analyses carried out on the filters were provided by the service of bacteriology and treated by Excel®.

RESULTS

55 points of water supply were equipped in 2004 with water filters: 50 stations of hand washing (30 on the site of « Hopital du Bocage» (HB) and 20 on the site of « Hopital général» (HG)) and 5 showers (HB). The cost of sterilization of this filter was estimated at € 2.74 in HG and € 2.08 in HB. 63 and 50% of these costs are represented by the personnel. The cost of consumable represents the 2nd expenditure. Annual operation with reusable water filters then has a cost of approximately of 91 000 €.

The bacteriological analyses carried out on the sterilisable filters show a rate of non-conformity considered to be satisfactory (15%) and increasing regularly with the number of sterilizations.

DISCUSSION-CONCLUSION

The annual cost of operation of the points of water supply with reusable filters is high. It is higher than single use filters (about 86 000 €), which would carry out an annual saving of 5000 €, without no major difference in quality.

These results led the Committee of fight against nosocomial infections to recommend the use of single use filters, while waiting the systematic use of the alcohol-based hand rub.

3

PREVENTION DU RISQUE INFECTIEUX LORS DU TRANSFERT D'UN SERVICE D'HEMODIALYSE

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Six mois avant le transfert d'un service d'hémodialyse ambulatoire sur un site partiellement occupé jusqu'alors, une cellule de réflexion multi-disciplinaire s'est constituée. Celle-ci comprenait le pharmacien en charge de l'hémodialyse, un microbiologiste hygiéniste, un néphrologue référent, un représentant administratif, l'industriel concevant le réseau, un membre des services techniques ainsi que le technicien d'hémodialyse présent sur le site. En outre, un nouveau système de désinfection de la boucle (désinfection thermique) était envisagé. Une réflexion s'est ainsi engagée non seulement en terme de maîtrise du risque infectieux pour le patient, mais aussi en terme de gestion des coûts pour la structure. L'eau circulant dans la boucle plusieurs mois avant l'ouverture, un série de points stratégiques à contrôler permettant de refléter la qualité microbiologique de l'eau au sein de la boucle a donc été définie ainsi que la fréquence des prélèvements à effectuer. En outre, un cahier des charges ainsi qu'une procédure d'alerte dégradée en cas de non conformité ont été mis en place. Quelques jours avant le transfert, des contrôles microbiologiques de l'air et des surfaces ont été pratiqués en coordination avec le service clinique conformément aux recommandations DGS/DHOS CTIN 2002. Face à la présence massive d'Aspergillus dans tout le service, l'alerte immédiate donnée par le laboratoire au cadre a permis la mise en oeuvre d'une désinfection efficace des locaux et la disparition du pathogène sans différer la date prévue d'arrivée des premiers patients.

La mise en place de cette cellule plusieurs mois avant le transfert du service nous a ainsi permis de planifier efficacement les différents contrôles au fur et à mesure de l'avancée des travaux, de réduire le surcoût lié aux non conformités ainsi qu'au retard éventuel du transfert du service, de permettre une continuité des soins pour les patients concernés ainsi que de valider la méthode de désinfection thermique.

4

MISE EN PLACE D'UNE STRATEGIE D'AQUAVIGILANCE EN SECTEUR DE DIALYSE AU CHU DE TOULOUSE

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La circulaire DGS/DH/AFSSAPS n° 2000-317 du 20 Juin 2000 relative à la diffusion d'un guide sur la production de l'eau pour

l'hémodialyse fixe un nombre minimal annuel de contrôles des installations de traitement de l'eau en fonction du nombre de scéances pratiquées par an dans l'établissement. Etant donné la politique de prévention du risque infectieux lié à l'eau de dialyse dans notre établissement, nous avons souhaité mettre en place une stratégie d'aquavigilance en vue d'une amélioration de la qualité des soins. Une cellule a donc été constituée, impliquant : le pharmacien responsable de la qualité en dialyse, un microbiologiste hygiéniste, un biochimiste, un néphrologue référent, un responsable administratif, un membre des services techniques ainsi qu'un technicien d'hémodialyse. Le but de cette cellule d'aquavigilance a été d'établir en partenariat : un planning des contrôles microbiologiques et biochimiques à effectuer ainsi qu'une procédure d'alerte dégradée de façon à signaler les non conformités, les actions correctives ainsi que les nouveaux contrôles; le tout dans une logique de rapidité et de traçabilité.
A ce jour, la mise en place de cette stratégie nous a essentiellement permis de réduire régulièrement les non conformités, en particulier concernant la qualité microbiologique de l'eau et la présence d'endotoxines en quantité supérieure à la norme (évènements indésirables : 2004 : 6 ; 2003 : 10 ; 2002 : 11 ; le nombre de contrôles étant resté identique).
En outre, la réflexion concertée entre les différents acteurs impliqués nous a permis de préparer la mise en place de la technique d'hémodiafiltration en ligne aux plans logistique et technique, mais également financier, grâce à une évaluation du coût minimal engendré pour le pôle de néphrologie.

5

SOFTWARE: RES'EAU

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Management software about medical risks in reference with water in hospital environment and especially prevention of Legionnaires' disease risk.
This software allows to replace the paper version of the health book which was needed for the follow-up and maintenance of the equipments in relation with the water networks (ou water system).
It allows:
- the identification of your installations, of your equipments, of the responsibility concerning the management of the water inside the health center ;
- planification and follow-up of maintenance ;
- management of water analysis ;
- definition and follow-up of the investigations, which are to be set up in case of detecting Legionnaire's disease or high levels of this bacterium in the water networks (ou water system).
This allows the health center:
- to play for time (ou to win time);
- to avoid any loss of information ;
- to permit a better relation between the different parties (technical services / healt service / laboratory / person responsible for quality / CLIN / Management).
The aim of this software, which is a quality tool to help decision, is to be able to trace any operations realised on the water network, be it maintenance or control and to improve reactivity in case of drifting.

6

QUANTIFICATION OF LEGIONELLA PNEUMOPHILA BY REAL-TIME PCR ASSAY

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Background: A real-time PCR assay for the quantification of *Legionella pneumophila* in environmental water samples was developped using two platforms: GeneExtract for DNA preparation and GeneDisc Cycler for real-time PCR operations run with GeneDiscs, a ready to use PCR product.
Materials and methods: Specificity of the detection was evaluated on a panel of 104 bacterial strains including environmental Legionella strains and other bacterial strains likely to be recovered in environmental water samples. Detection and quantification limits of the real-time PCR assay were measured with seriaI dilutions of *L. pneumophila* SI DNA under repeatability conditions. The optimal yield of the method was evaluated in water samples seeded artificially with seriaI dilutions of cultured *L. pneumophila* SI. Four water types were tested: potable water, warm water, river water and cooling tower water.
Results: The designed set of primers/probe was specific for our extended list of bacterial species: positive PCR results were obtained with aIl L. pneumophila strains tested and no cross-amplification was found in any species of Legionella spp. and other bacteria. The detection limit of the PCR assay was of 5 genomic units per reaction PCR which corresponded to 167 genomic units per Liter of water sample. The quantification threshold was of 20 genomic units per PCR reaction i.e. 666 genomic units per Liter of water sample. This molecular method was able to detect L. pneumophila in the approximate seeded log concentrations whatever the water type. Standard curves were obtained by plotting the cycle threshold (Ct) obtained by real-time PCR versus the logarithm of the number of seeded L. pneumophila. The obtained linear regressions demonstrated that molecular method was efficient and reproducible.
Conclusion: The technology developed by GeneSystems proved to be valuable tools for investigation of Legionella pneumophila contaminations in water systems.

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EVALUTATION OF THE EFFICACY OF DISPOSABLE SHOWER HEAD FILTER FOR PROTECTION AGAINST LEGIONELLA

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Legionella pneumophila is frequently found in hospital hot water mains. To prevent Legionella infection, numerous methods have been applied to eradicate Legionella pneumophila from the hospital water circuit, hyperchlorinization through the use of sodium hypochlorite, calcium hypochlorite and chlorine dioxide, overheating and flushing, copper and silver ionization, UV radiation and ozonization. Nevertheless, the above methods are not always effective, at times achieving only temporarily solving the problem.

Installation of anti-bacterial filters at the points where water is used (taps and shower heads) offers some indisputable advantages: installation can be limited to the high risk areas; installation and maintenance are simple and inexpensive. Nevertheless, it is worth noting that most filters last a maximum of 15 days and this constitutes a significant drawback to their use. Recently, however, a filter to protect showerheads from passage of Legionella has been created with a porosity of 0.2 mm (Pall – Aquasafe Shower Head Filter, AQL3). The filter membrane resists a maximum recommended water temperature of 60°C and has an operating lifespan of one month. The purpose of the present research was to evaluate whether installation of this filter in 8 showers found in different departments located in different areas of the S. Orsola Malpighi Hospital in Bologna, Italy could prevent the presence of this microorganism in the water over the period of one month. At the time of installation all showers showed the presence of Legionella contamination (102 – 104 cfu/l). Moreover, it is worth noting that, for the entire test period, no other water sanitation system was used. The samples were taken before installation of the filter and once a week thereafter for 4 weeks. After a month the filters were changed and additional samples were taken after 15 and 30 days. All colonies fell under serum group 3. After installation of the filter, no Legionella colonies were found in the water downstream of the filter nor was it possible to detect Legionella 15 and 30 days after the filters were replaced. For the quantities sampled and the dilutions used, the lower limit for Legionella detection was 50 cfu/l. The results lead one to conclude that, prior to installation of the filter, the number of Legionella bacteria present in the hot water mains was at limit levels. As in most countries, Italian Guidelines permit possible water contamination containing between 102-104 cfu/l of Legionella. Therefore it is clear that use of the filters made it possible to eliminate the potential risk of infection.