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The hospital tap waters: a risk of Legionella contaminated aerosol inhalation

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Background: Hospital-acquired legionellosis is recognized to be a severe pneumonia with a mortality rate of 20% for immunocompromised patients. The contaminated hot water showers are the main source of contamination but the contaminated aerosol from taps remains few documented. A case of fatal nosocomial Legionella pneumophila infection due to exposure to contaminated water from a washbasin in a haematology unit was recently reported (Brulet A, et al., 2008, Inf Hosp Epid, 29, 1091). Our objective is an analytical approach to improve exposure assessment to Legionella in aerosols generated by tap waters. The aim of this study is to evaluate the contamination of the aerosol generated by colonized washbasin water. Methods: A colonized hospital tap was investigated. The water was running 30 min and 2 impingement technologies of aerosol collection were used: Impinger (Areco) and CIP10M (Bio-Rad) air sampler. Each aerosol was collected in a DNA free buffer (BioRad) compatible with culture. The air collections were respectively 300 L in 3 mL for CIP and 360 L in 20 mL for Impinger. The water samples (WS), samples from 2 CIP and 2 Impingers were tested in each run and repeated 10 times. 20 WS and 40 aerosol samples were tested for Legionella using 2 methods: culture NFT90-431 and PCR XPT 90-471 using BioRad method (Aquadien kit, iQ-Check Legionella, Chromo4). The ATP value (Aquatools), Pseudomonas (NF EN ISO 16266) and microbial colonization were also analysed for 3 runs. Results: The WS of the tap were positive for culture (103-4 CFU/L, Lp 1 and L. anisa) and for PCR (Lp and Lspp 104 GU/L). No cultivable Legionella were reported for the aerosol samples. 18/40 aerosol results were positive for PCR Lspp: 3-57 GU/well and 5/40 aerosol results were >DL and <QL for PCR Lp (respectively 2.5 and 15 GU/well). The ATP concentrations of aerosol samples were 0.8-5.2 pg/ml, the results of Pseudomonas were <1 CFU/100ml and microbial analysis showed no colonization. Conclusions: The aerosol generated by colonized water of a washbasin showed the presence of Legionella DNA and could be a source of contamination for high risk patients. Further analyses are in process to investigate the potential viable Legionella (Dusserre E, et al., 2008, AEM, 74, 4817).

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