

Occupational Exposure and Contamination to Antineoplastic Drugs of Healthcare Professionals in Mauritania

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Abstract : Context: In Mauritania, the activity of the National Center of Oncology (NCO) has steadily risen leading to an increase in the handling of antineoplastic drugs (AD) by healthcare professionals. In this context, the AD contamination of those professionals is a major concern for occupational physicians. It has been evaluated using biological monitoring of occupational exposure (BMOE). Methods: The intervention took place in 2015, in 2 care units, and evaluated nurses preparing and/or infusing AD and agents in charge of hygiene. Participants provided a single urine sample, at the end of the week, at the end of their shift. Five molecules were sought using specific high sensitivity methods (UHPLC-MS/MS) with very low limits of quantification (LOQ) (cyclophosphamide (CP), Ifosfamide (IF), methotrexate (MTX): 2.5ng/L; doxorubicin (Doxo): 10ng/L; α -fluoro- β -alanine (FBAL, 5-FU metabolite): 20ng/L). A healthcare worker was considered as 'contaminated' when an AD was detected at a urine concentration equal to or greater than the LOQ of the analytical method or at trace concentration. Results: Twelve persons participated (6 nurses, 6 agents in charge of hygiene). Twelve urine samples were collected and analyzed. The percentage of contamination was 66.6% for all participants (n=8/12), 100% for nurses (6/6) and 33% for agents in charge of hygiene (2/6). In 62.5% (n=5/8) of the contaminated workers, two to four of the AD were detected in the urine. CP was found in the urine of all contaminated workers. FBAL was found in four, MTX in three and Doxo in one. Only IF was not detected. Urinary concentrations (all drugs combined) ranged from 3 to 844 ng/L for nurses and from 3 to 44 ng/L for agents in charge of hygiene. The median urinary concentrations were 87 ng/L, 15.1 ng/L and 4.4 ng/L for FBAL, CP and MTX, respectively. The Doxo urinary concentration was found 218ng/L. Discussion: There is no current biological exposure index for the interpretation of AD contamination. The contamination of these healthcare professionals is therefore established by the detection of one or more AD in urine. These urinary contaminations are higher than the LOQ of the analytical methods, which must be as low as possible. Given the danger of AD, the implementation of corrective measures is essential for the staff. Biological monitoring of occupational exposure is the most reliable process to identify groups at risk, tracing insufficiently controlled exposures and as an alarm signal. These results show the necessity to educate professionals about the risks of handling AD and/or to care for treated patients.

Keywords : antineoplastic drugs, Mauritania, biological monitoring of occupational exposure, contamination

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