

Proposals for the Practical Implementation of the Biological Monitoring of Occupational Exposure for Antineoplastic Drugs

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Abstract : Context: Most antineoplastic drugs (AD) have a potential carcinogenic, mutagenic and/or reprotoxic effect and are classified as 'hazardous to handle' by National Institute for Occupational Safety and Health Their handling increases with the increase of cancer incidence. AD contamination from workers who handle AD and/or care for treated patients is, therefore, a major concern for occupational physicians. As part of the process of evaluation and prevention of chemical risks for professionals exposed to AD, Biological Monitoring of Occupational Exposure (BMOE) is the tool of choice. BMOE allows identification of at-risk groups, monitoring of exposures, assessment of poorly controlled exposures and the effectiveness and/or wearing of protective equipment, and documenting occupational exposure incidents to AD. This work aims to make proposals for the practical implementation of the BMOE for AD. The proposed strategy is based on the French good practice recommendations for BMOE, issued in 2016 by 3 French learned societies. These recommendations have been adapted to occupational exposure to AD. Results: AD contamination of professionals is a sensitive topic, and the BMOE requires the establishment of a working group and information meetings within the concerned health establishment to explain the approach, objectives, and purpose of monitoring. Occupational exposure to AD is often discontinuous and 2 steps are essential upstream: a study of the nature and frequency of AD used to select the Biological Exposure Indice(s) (BEI) most representative of the activity; a study of AD path in the institution to target exposed professionals and to adapt medico-professional information sheet (MPIS). The MPIS is essential to gather the necessary elements for results interpretation. Currently, 28 urinary specific BEIs of AD exposure have been identified, and corresponding analytical methods have been published: 11 BEIs were AD metabolites, and 17 were AD. Results interpretation is performed by groups of homogeneous exposure (GHE). There is no threshold biological limit value of interpretation. Contamination is established when an AD is detected in trace concentration or in a urine concentration equal or greater than the limit of quantification (LOQ) of the analytical method. Results can only be compared to LOQs of these methods, which must be as low as possible. For 8 of the 17 AD BEIs, the LOQ is very low with values between 0.01 to 0.05µg/l. For the other BEIs, the LOQ values were higher between 0.1 to 30µg/l. Results restitution by occupational physicians to workers should be individual and collective. Faced with AD dangerousness, in cases of workers contamination, it is necessary to put in place corrective measures. In addition, the implementation of prevention and awareness measures for those exposed to this risk is a priority. Conclusion: This work is a help for occupational physicians engaging in a process of prevention of occupational risks related to AD exposure. With the current analytical tools, effective and available, the (BMOE) to the AD should now be possible to develop in routine occupational physician practice. The BMOE may be complemented by surface sampling to determine workers' contamination modalities.

Keywords : antineoplastic drugs, urine, occupational exposure, biological monitoring of occupational exposure, biological exposure indice

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