Hazardous drugs handling in hospital: a standardized toxicological screening method to evaluate occupational risks

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BACKGROUND & OBJECTIVES
In hospital setting, employees may be exposed to hazardous drugs. Risks and protective measures needed when handling parenteral cytotoxic drugs are well described, whereas information related to drugs like monoclonal antibodies or antivirals are lacking. We developed a standardized method to evaluate drugs potential toxicity and occupational risks. The pharmaceutical forms of the drugs have been taken into account to balance the risks.

DESIGN
We developed an algorithm (Fig. 1) for toxicity evaluation using Material Safety Data Sheet and their Risk and Safety phrases1), International Agency for Cancer Research (IARC) classification2) and official manufacturers’ data3).

1. Evaluation of chronic toxicity: mutagenicity and carcinogenicity (R45, R46, R49 or IARC group 1, 2A or 2B or other official data) (Table 1 & 2), acute toxicity: sensitisation or irritation in contact with skin, with eyes or by inhalation (R20-28, 34-38, 41-43; S22-28, 36-39) (Table 3) and toxicity to reproduction (R60-63; cat. D, X or other official data) (Table 4)

2. Ponderation of toxicity according to the pharmaceutical forms (Table 5)

3. Assessment of protective measures (centralization of drug preparation in the pharmacy, wearing of mask, gloves and/or glasses) (Table 6)

RESULTS
Occupational risks of 14 parenteral monoclonal antibodies, 8 oral and 5 parenteral antivirals, 12 oral cytotoxics and 43 other drugs were analysed. According to our algorithm, crushing of 36% of the 33 tablets forms should be done in the pharmacy (e.g. valganciclovir). Only 1 parenteral antiviral should be reconstituted at the pharmacy (ganciclovir). Monoclonal antibodies were found not to be at risk of mutagenicity or carcinogenicity and only gloves will be recommended for their manipulation. No “class-effect” has been pointed out (e.g. only a few antivirals were found to be hazardous). 31 products were at risks for pregnant women. Protective measures to be taken by pregnant nurses or those wishing to have a baby will be discussed.

CONCLUSIONS
Toxicity evaluation of hazardous drugs handling in hospital should take the pharmaceutical forms into account as some toxic drugs may not be associated with occupational risks (e.g. coated tablets). Our method allows a standardized way to evaluate whether a drug should be treated as hazardous or not. A table summarizing the proposed protection measures for the studied drugs will be published on our website. Results will be discussed institutionally in order to implement applicable policies and procedures.

References:
2) http://monographs.iarc.fr/ENG/Monographs/index.php
3) www.kompendium.ch

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