

EDITORIAL

Improving dose accuracy and reducing medication errors in neonates

Medication errors are a significant problem in neonates. An incorrect dose is the most frequent type of medication error that occurs in paediatric patients¹. It is also the one that is most likely to be associated with a fatality¹. Ten-fold errors in dose are a significant problem especially on the neonatal unit. Frequently the dosage form used has been designed for older children or adults and may contain many times more than the dose required for a neonate. The potential problems associated with ampoules containing adult sized doses being used on neonatal units have been highlighted previously². However, even ampoules or vials intended for children may contain much more than required for neonates and are associated with increased error potential (e.g. digoxin paediatric injection 100 microgram/ml).

The accuracy with which an intended neonatal dose can be measured is also a cause for concern. Allegaert and colleagues have used a novel approach (using the calculation of pharmacokinetic parameters) to confirm what paediatric health professionals have often thought, i.e. that there is greater accuracy associated with the use of a paediatric vial³. The use of a paediatric vial does not automatically mean that tenfold drug errors will not occur. Allegaert and colleagues have, however, elegantly demonstrated that there were more amikacin plasma concentrations within the target zone and less variability in other pharmacokinetic parameters following the use of paediatric vials.

The findings emphasise the need for pharmaceutical manufacturers to provide injection vials of appropriate strength for use in neonates and young children. This is especially important in relation to those medicines that are likely to result in significant drug toxicity following dosage errors⁴. It is of concern that even when a medicine is authorised

for use in neonates or children an appropriate dosage form may not be marketed. Surveying the Australian market, Tan and colleagues⁵ found that 26% of medicines authorised for neonates did not have an appropriate dosage form. One also, however, needs to ensure that where paediatric vials do exist that hospitals purchase these for use in neonatal units. These paediatric vials are usually more expensive and hence there is often a reluctance to use the paediatric vials and incur a greater cost. Allegaert and colleagues clearly show that if one wishes to use a medicine effectively, then this is more likely to be achieved using an appropriate formulation, i.e. a paediatric vial.

Imti Choonara

Derbyshire Children's Hospital, University of Nottingham, Derby, UK

Anthony J Nunn

Alder Hey Children's Hospital, Liverpool, UK

References

1. Cousins D, Clarkson A, Conroy S, Choonara I. Medication errors in children – an eight year review using press reports. *Paed Perinat Drug Ther* 2002;5:52-58.
2. Chappell K, Newman C. Potential tenfold drug overdoses on a neonatal unit. *Arch Dis Child Fetal Neonatal Ed* 2004;89:F483-F484.
3. Allegaert K, Anderson BJ, Vrancken M et al. Impact of a paediatric vial on the magnitude of systematic medication errors in neonates. *Paed Perinat Drug Ther* 2006;7:59-63.
4. Choonara I. How to harm children in hospital – A guide for junior doctors. *Paed Perinat Drug Ther* 1999;3:34-35.
5. Tan E, Cranswick NE, Rayner CR, Chapman CB. Dosing information for paediatric patients: are they really 'therapeutic orphans'? *Med J Aust* 2003;179:195-198.

CrossRef links are available in the online published version of this paper:
<http://www.librapharm.com>

Paper PPDT-0153_3 Accepted for publication: 15 May 2006

Published Online: 31 May 2006

doi:10.1185/146300906X105104