

Prevention of medication error and unintentional drug poisoning in the elderly

Medication error and unintentional drug poisoning are important because of their potential effect on patient safety. Careful review of information, which characterises such adverse events, is essential to the development of effective preventive strategies.

The elderly are particularly vulnerable to drug-induced morbidity. They may suffer from multiple medical problems leading to long-term drug use.¹ Polypharmacy together with ageing-related changes in pharmacokinetics, pharmacodynamics and homeostatic mechanisms increases the risk of adverse drug reactions.² Drug-related problems (adverse drug reactions, therapeutic failure and poisoning) are important reasons for acute hospital admissions among the elderly.³ The ingestion of extra doses of medications because of forgetfulness, mistaken identity of drugs, incorrect route of administration and improper storage of medications are among the primary reasons for unintentional drug poisoning.⁴

One of the major areas of medical error is the improper administration of medications. Health care professionals and caregivers of elderly patients are responsible for applying the 'five rights' of medication administration as a standard of care—the right drug, the right dose, the right time, the right route and the right patient.

A poisoning exposure can be defined as the ingestion, injection, inhalation, absorption or contact with a substance that produces a toxic effect or bodily harm. Unintentional drug or poison exposures are a leading cause of unintentional injury. The majority of these exposures (90%) occur in the home. The elderly and, in particular, children under the age of 6 years are more likely to have unintentional poisoning from a wide variety of substances and exposures.⁵ There are a number of general modifications or system changes that can be introduced into homes or other social environments to reduce the risk of exposure and increase preparedness in the event that it occurs. Important preventive measures include the storage of poisonous products and medications in locked cabinets, carefully reading directions on medications and household products, keeping substances in their original containers and having quick access to expert poison information advice.⁶

Medication error and unintentional poisoning involving potent drugs and hazardous chemicals may lead to serious complications even in relatively small doses.⁷ For example, sulphonylureas, especially the long-acting agents such as chlorpropamide and glibenclamide, can produce life-threatening hypoglycaemia. The risk is even higher in frail elderly patients with impaired renal function.⁸ The

hypoglycaemia is expected to be more prolonged and profound in non-diabetic patients since they do not have pre-existing hyperglycaemia and insulin resistance.⁹

In this issue, Ching et al¹⁰ report and discuss the inadvertent drug administration and therefore unintentional poisoning involving sulphonylureas and other oral hypoglycaemic agents in the community. From June 2005 to March 2006, 51 suspected cases were referred to the Hospital Authority Toxicology Reference Laboratory. Through the toxicological analysis of serum, urine and non-prescription drugs of these patients, the authors confirmed the diagnosis of drug-induced hypoglycaemia in 23. Gliclazide and glibenclamide were responsible for 14 and 8 cases, respectively. Seventeen (74%) subjects were aged 70 years or over, including nine from residential care homes. Reasons for drug exposure in these elderly subjects were: confirmed (one patient) or suspected (eight patients) drug administration error in residential care homes, taking the drugs of family members (three patients) or from previous stock (two patients) and unknown (three patients). This paper serves as a timely reminder of just how serious medication error and unintentional drug poisoning can be. This diagnosis should be suspected, especially if patients hospitalised for hypoglycaemia do not have one or more predisposing condition.¹¹

Medication error and unintentional drug poisoning involving sulphonylureas are not difficult to recognise since hypoglycaemia produces distinct autonomic and neuroglycopenic symptoms.¹¹ However, the extent of the problem due to other commonly used drugs remains to be determined.

What actions are needed to reduce medication error and unintentional drug poisoning in the community? Preventive measures should target the high-risk group (the elderly) and minimise poison exposure. Doctors, nurses and pharmacists must collaborate to review the medication list (including the old stock and non-prescription items) and provide guidance to the patients and caregivers on drug administration, usage and storage. Caregivers helping a patient with medication administration have the greatest responsibility. They must provide supervision to the elderly. Drugs from previous consultations and other patients should be locked away. Caregivers of residential care homes for the elderly may not have the training needed for medication supervision and administration. Delegating this task to non-nurse personnel entails increased risk for the patient. It is important to find out to what extent non-nurse personnel are engaged in drug administration. It is necessary to assess the knowledge of caregivers in drug administration,

common diseases, symptoms and adverse drug reactions. The task of medication administration and supervision cannot be dedicated to caregivers with clear deficiency in experience and knowledge. Doctors, nurses, pharmacists and government department representatives can make visits to the residential care homes to ensure compliance with recommendations and advise on improvements needed. Partner with other programmes (eg community nurse service and community geriatric service) that make home visits can help develop an inspection checklist to identify and remedy possible problem areas. There should be regular programmes to promote awareness and the role of preventive measures.

TYK Chan, MD, PhD
(e-mail: tykchan@cuhk.edu.hk)
Centre for Food and Drug Safety
Faculty of Medicine
The Chinese University of Hong Kong
Shatin, New Territories, Hong Kong

References

1. Avorn J, Gurwitz JH. Drug use in nursing home. *Ann Intern Med* 1995; 123:195-204.
2. Chan TY, Wang AY, Woo J, Critchley JA. Adverse drug reactions in the elderly—the local scene. *J Hong Kong Med Assoc* 1991;43: 200-4.
3. Chan TY, Critchley JA. Drug-related problems as a cause of hospital admissions in Hong Kong. *Pharmacoepidemiol Drug Saf* 1995;4:165-70.
4. Haselberger MB, Kroner BA. Drug poisoning in older patients. Preventative and management strategies. *Drugs Aging* 1995;7:292-7.
5. Chan TY. Poisonings in Hong Kong [PhD Thesis]. Hong Kong: The Chinese University of Hong Kong; 2000.
6. Chan TY, Critchley JA, Chan JC, et al. The Drug and Poisons Information Bureau at the Chinese University of Hong Kong. *J Hong Kong Med Assoc* 1993;45:202-5.
7. Chan TY. Small doses, big problems—medications that are highly dangerous to a toddler. Centre for Health Protection website (Poisoning.Comm 2006;1:2): <http://www.chp.gov.hk>. Accessed 4 Sep 2006.
8. Chan TY, Chan JC, Critchley JA. Severe hypoglycaemia in Chinese patients with non-insulin-dependent diabetes treated with insulin or sulphonylureas. *Pharmacoepidemiol Drug Saf* 1992;1:207-11.
9. Klonoff DC, Barrett BJ, Nolte MS, Cohen RM, Wyderski R. Hypoglycemia following inadvertent and factitious sulfonylurea overdoses. *Diabetes Care* 1995;18:563-7.
10. Ching CK, Lai CK, Poon WT, et al. Drug-induced hypoglycaemia—new insight into an old problem. *Hong Kong Med J* 2006;12:334-8.
11. Fischer KF, Lees JA, Newman JH. Hypoglycemia in hospitalized patients. Causes and outcomes. *N Engl J Med* 1986;315:1245-50.