Cardiovascular drugs: Linked to many errors

Drug products used to treat cardiovascular diseases (e.g., hypertension, congestive heart failure, ischemia, and arrhythmias) have been associated with a significant number of adverse drug events. Cardiovascular drug products are among the most widely used in both hospital and ambulatory care settings, and previous studies that have examined cardiovascular patients suggest that a significant degree of morbidity and mortality may be preventable.

Analyses of records submitted to USP's MEDMARX program from January 2001 through August 2004 revealed over 80,000 errors involving a cardiovascular drug product. Approximately 46% (n = 36,759) of these errors did reach the patient (categories C and higher) and 1.8% (n = 1,459) were harmful (categories E-I).

The most frequently reported types of errors involving cardiovascular drugs were *Improper dose/quantity, Omission error*, and *Prescribing error*. A two-way cross-tabulation analysis of types of errors by *Error Category Index* revealed that several types exceeded the historical overall percentage of harm of 1.87% for errors reported to MEDMARX from 1999 to 2003. Similar to previous MEDMARX reports, the findings indicate that the most harmful errors disproportionately arise from *Wrong administration technique errors* (6.4%).

Depending on their severity, medication errors can result in the provision of additional care and resources. MEDMARX captures over 20 different levels of care that may be rendered in response to an error event. Nearly three-quarters (72.5%) of respondents said no additional care was provided to patients after an error was made. However, increases in both patient observation and patient monitoring and changes in drug therapy were provided in response to approximately 46% of the errors.

In one case, an IV diltiazem drip was discontinued when the patient converted to a normal sinus rhythm, and an order for oral diltiazem 60 mg was made. However, 24 hours later, the patient returned to atrial fibrillation, necessitating an extra day in the hospital. It was discovered that the order for oral diltiazem 60 mg was never administered.

Observations

1. Pharmacies face a unique safety challenge in dispensing activities, given the large number of products used to treat the various cardiovascular diseases. Look-alike/sound-alike names, labeling and packaging similarities, and storage space limitations both in central and decentralized pharmacies as well as within automated dispensing devices can all contribute to the risk of an error event.
2. Although improper dose/quantity errors and prescribing errors were the first and third most frequently reported types of errors, neither fell into the top five most harmful error types (i.e., neither resulted in a percentage of harm that exceeded the overall 1.8% of harm for all cardiovascular agents). Omission errors, sometimes thought to be relatively "benign" types of errors, resulted in a harmful outcome nearly twice as often as other types of errors overall. This finding provides further evidence that omission errors can and do negatively impact patient care.
3. Causes of error that involve some aspect of communication (e.g., verbal orders, illegible handwriting, abbreviations, look-alike or sound-alike names) comprise 37% of all causes, thereby approaching the top error cause—performance deficit. Combined causal factors associated with transcription and documentation followed in frequency with 30%; computer entry-related activities 15%; and knowledge deficit 11%. These broad areas appear to comprise a large majority of the causes associated with cardiovascular drug errors and are worthy of further focus by healthcare facilities.

Safety recommendations

General approaches to improving medication safety also apply to improving the safety of medications used in treating cardiovascular diseases:

- Use standardized medication order forms for high-risk medications and avoid the use of abbreviations for the generic or brand name of any drug product.
- Review drug protocols to ensure they require that an appropriate assessment is made of all recent drug therapy.
- Provide alerts or prompts on order forms to record the patient's weight for weight-based therapy.
- Limit the number of products in a given therapeutic class to avoid confusion and look-alike/sound-alike errors.
- Include a pharmacist's participation in patient rounds. A study on the use of a clinical pharmacist on the cardiology wards at Duke University Hospital showed an improvement in the identification and correction of medication errors.

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USP operates two complementary reporting programs: the Medication Error Reporting Program, presented in cooperation with the Institute for Safe Medication Practices, and MEDMARX. For more information on how to report errors, visit: **www.usp.org/patientsafety**.