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AUSTRALIAN INCIDENTS

Comments are provided by the Committee of Specialty Practice in Medication Safety members in Victoria.

Alphabet soup—thrombolytic confusion

A 65 year old male with ECG changes consistent with an anterior myocardial infarction (AMI) was admitted to the Emergency Department (ED). The cardiac catheterisation laboratory could not take the patient immediately so he was to be thrombolysed in the ED. The AMI protocol described the administration of two 10 unit doses of reteplase 30 minutes apart. The ED consultant retrieved two alteplase 10 mg vials from the drug cupboard and verbally ordered two 10 mg doses 30 minutes apart pointing to the alteplase, then prescribed 'rPA 10 mg IV then 30 minutes later rPA 10 mg IV'. Before withdrawing the alteplase 10 mg, the nurse questioned the consultant stating that this was different to how she had administered rPA in the past, as it usually came with a syringe. The consultant confirmed that this was the medication intended and the nurse administered alteplase 10 mg. The nurse was concerned about the different packaging and was still unsure. She paged the ED pharmacist, who confirmed that the incorrect medication had been given. Less than five minutes had elapsed since the alteplase 10 mg had been administered. The pharmacist recommended continuing with alteplase in the 'front-loaded regimen' recommended for AMI. The patient received an additional 5 mg to complete the initial bolus component, followed by 50 mg over 30 minutes and 35 mg over 60 minutes to give a total dose of alteplase 100 mg. Thrombolysis was successful and the patient was ultimately discharged from hospital with a good outcome.

The following steps were initially undertaken:

- Alteplase was removed from the emergency room drug cupboard and stored only in the ED imprest cupboard. Reteplase remained in the emergency rooms to facilitate achievement of benchmark 'door to needle' times.
- Notes were placed in the imprest and emergency room drug cupboards warning against the use of abbreviations for thrombolytics.
- This case was included in the ED weekly newsletter read by most ED staff. The importance of doctors not using abbreviations and nurses not administering orders written as abbreviations was discussed at the ED nurses and medical staff meetings.

Prescribing improved for a number of months, until a new group of doctors and nurses rotated through the ED, when the ED pharmacists were involved in clarifying a number of thrombolytic orders for a variety of indications. Confusion stemmed from the fact that abbreviations were once again being used and uncertainty about exactly what dose should be used and when heparin should be initiated for each indication. In response to ongoing interventions by the pharmacists, the following additional measures were instituted:

- 'Lunch-boxes' containing the maximum dose of the appropriate thrombolytic for each indication were created. Each indication has a different coloured box. On the lid of each box is the regimen for the specific indication and when heparin should be initiated. These sealed boxes are only stored in the emergency room drug cupboards. When replacement stock is required, the box is returned to the pharmacy for refilling.
- A poster was placed in each emergency room outlining the appropriate thrombolytic and dose regimen for each diagnosis and highlighting the importance of avoiding abbreviations.
- The series of protocols for AMI, pulmonary embolism and stroke discovered in ED, Intensive Care and Coronary Care Units were revised and standardised.

[Australian Incident 11, December 2003]

Aminoglycoside duplication

An order for tobramycin was changed from daily to 36-hourly, the original order was not ceased and a new order was written (there were two valid orders). A nurse drew up the drug and a second nurse checked, but neither saw the new order and administered the drug according to the original order.

Comment: When drugs are prescribed in unusual regimens, e.g. 36-hourly, it is very easy to misread the order if it is not clearly ceased and rewritten. Pharmacists can assist by checking charts carefully and crossing out administration times.

[Australian Incident 16, February 2004]

Temporary suspension of orders?

A drug order was to be withheld for four days and was crossed out in the administration section of a drug chart to indicate this. The pharmacy column stated 'check prescriber before giving' but there was no written indication from medical staff about what to do on day five. On the fifth day the nurse did not see the pharmacy note and administered the drug as charted, but the intention was for the medications to be withheld.

Comment: When ceasing a drug for a number of days, medical staff need to cross out the order and all the days remaining on the administration chart and rewrite the order on a new line if the drug is to be restarted at a later date. All medication changes must be documented in the medical record in addition to the medication chart. All staff should check the pharmacy column before giving each charted medication.

[Australian Incident 17, February 2004]

Sound-alike + combination confusion is rife!

Errors frequently occur when drugs with similar sounding or looking names are confused by nursing staff when administering drugs. Some recent examples are:

- temazepam for oxazepam
- MS Contin for oxycontin
- glipizide for gliclazide

- irbesartan for irbesartan+hydrochlorothiazide

Comment: Combination products are particularly dangerous as many nurses are unaware that they exist. Busy junior medical officers often don't have time to fully research the drugs they are prescribing and unfortunately often rely on the patient's verbal recollection which may miss key details. Insisting on complete prescriptions consisting of generic, brand, strength **and** directions, whilst appearing pedantic, will help to eliminate confusion. Try to encourage maximum detail as the rule, not the exception. [Australian Incident 18, February 2004]

Medication lists and carer information

An intellectually impaired patient with uncontrolled epilepsy was admitted to hospital for seizure management. Her carer provided medical information including a list of current medications. This was clearly typed on a word processor. The admitting resident used the typed list as a reference when writing up the drug chart. Unfortunately, the resident misinterpreted the dose provided and prescribed clonazepam 2500 micrograms per day when the patient was actually on 500 micrograms twice a day. This mistake resulted in somnolence and behavioural changes in the patient. On examining the typed list provided, the carer had written:

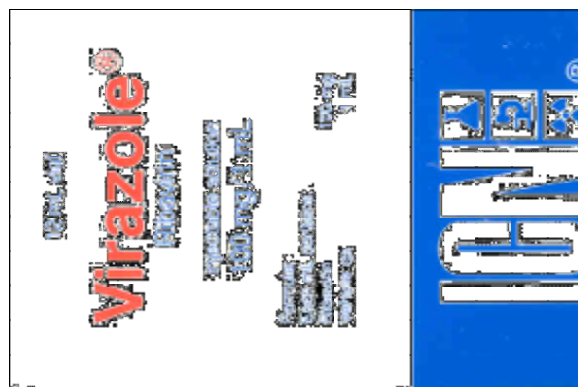
Clonazepam 2 500 micrograms daily.

Comment: It is easy to see how the mistake was made and reinforces the need to be careful when interpreting information provided particularly from external sources. In addition, the resident did not challenge the dose as the list and medical information provided by the carer was clearly typed out and well organised.

[Australian Incident 19, February 2004]

SPECIAL ACCESS SCHEME DRUGS

A patient was admitted to the intensive care unit and commenced on ribavirin 700 mg IV 8-hourly with a suspected severe acute respiratory syndrome diagnosis. Ribavirin is a special access scheme (SAS) drug and the lack of familiarity and the overseas packaging lead to a 7-fold dosing error. The packaging is from Mexico and states in English that the vial contains 100 mg/mL. In small print at the top of the box is the fact that the vials contain 12 mL or 1200 mg. The nurses misunderstood the labelling and assumed that there was 100 mg in each vial and administered seven vials to the patient.



SAS drug labelling can be problematic, as they are not registered in Australia. It is therefore incumbent on the Pharmacy Department to ensure clear instructions are available as most staff may be unfamiliar with the product. [Australian Incident 20, February 2004]

IM/IV Morphine

In an attempt to cover multiple possibilities, medical staff will commonly prescribe a drug with a variable dose and administration route. This means that should an IV line no longer be viable, the IM route can be used. This has the potential to cause significant problems. Recently we had a spate of incidents associated with junior medical staff prescribing morphine 2.5 to 10 mg IV/IM postoperatively. The intention is to give 2.5 mg IV or up to 10 mg IM if needed.

Comment: The obvious problem with this type of order is that eventually the order will be misinterpreted as prescribing up to 10 mg IV. This happened and resulted in a narcotised patient. While this type of order may be perceived as time saving and giving nurses flexibility to dose the patient depending on the administration route available, it can be misunderstood and should be discouraged.

[Australian Incident 21, February 2004]

US SAFETY BRIEFS

ISMP's list of high-alert medications

High-alert medications are drugs that bear a heightened risk of causing significant patient harm when they are used in error. Although mistakes may or may not be more common with these drugs, the consequences of an error with these medications are clearly more devastating. Based on error reports submitted to the USP-ISMP Medication Errors Reporting Program and reports of harmful errors in the literature, ISMP created a list of potential high-alert medications. During August and September 2003, more than 350 practitioners responded to an ISMP survey designed to identify which of these medications were most frequently considered high alert by individuals and organisations. Further, to assure relevance and completeness, the clinical staff at ISMP, members of our advisory board, and safety experts throughout the US were asked to review the potential list. The following list of 30 drugs and drug categories reflects the collective thinking of all who provided input.

- adrenergic agonists, IV (e.g. adrenaline)
- adrenergic antagonists, IV (e.g. propranolol)
- anaesthetic agents, general, inhaled and IV
- cardioplegic solutions
- chemotherapeutic agents, parenteral and oral
- colchicine injection
- dextrose, hypertonic, 20% or greater
- dialysis solutions, peritoneal
- epidural or intrathecal medications
- glycoprotein IIb/IIIa inhibitors (e.g. eptifibatide)
- heparin, low molecular weight, injection
- heparin, unfractionated, IV
- hypoglycemics, oral
- inotropic medications, IV (e.g. digoxin, milrinone)
- insulin, subcutaneous and IV
- liposomal forms of drugs (e.g. liposomal amphotericin)
- magnesium sulfate injection
- methotrexate, oral, non-oncologic use
- moderate sedation agents, IV (e.g. midazolam)
- moderate sedation agents, oral, for children (e.g. chloral hydrate)
- narcotics/opiates, IV and oral (including liquid concentrates, immediate- and sustained-release)
- nesiritide

- neuromuscular blocking agents (e.g. suxamethonium)
- nitroprusside, sodium, for injection
- potassium chloride for injection concentrate
- potassium phosphates injection
- radiocontrast agents, IV
- sodium chloride injection, hypertonic, more than 0.9% concentration
- thrombolytics/fibrinolytics, IV (e.g. tenecteplase)
- total parenteral nutrition solutions
- warfarin

We hope you will use this list to determine the medications that require special safeguards to reduce the risk of errors. This may include strategies like limiting access to these medications, using auxiliary labels and automated alerts, standardising the ordering, preparation, and administration of these products, and employing automated or independent double-checks when necessary. Manual double-checks are not always the optimal error reduction strategy and may not be practical for a few of the medications on the list. During 2004, we plan to issue a series of surveys to learn more about the special precautions that are in place in healthcare organisations for several of these medications.

Australian comment: This list of high-alert medications from the USA has formed the basis of similar lists for drugs in Australia. Many strategies to minimise opportunities for error such as 4pm dosing of warfarin and the introduction of premixed solutions to replace potassium chloride ampoules, have already been implemented in some hospitals. Methotrexate taken weekly has a high potential for error and alerts and stocking only one strength to prevent the wrong strength being dispensed is a well recognised error prevention method.

[ISMP Medication Safety Alert! October 16, 2003]

Questioning orders

A poorly transcribed verbal order for insulin glargine led to a massive overdose for a diabetic patient. When taking the verbal order, a nurse transcribed the dose as 10 units. After the nurse read the order the physician decided to change the order to 8 units. The nurse crossed out '10' and wrote '8' next to it on the same line. The cross out was not clear and the dose was misread by the pharmacist as '108'. Because the order was prescribed by a diabetes specialist, it was not questioned by the pharmacist or nurse administering the order. The error was discovered when the patient developed significant hypoglycaemia, but no permanent harm occurred.

Staff often feel reluctant to question an order from a specialist in a particular field. It is important to question any order that they feel may be dangerous, for insulin a suggestion is to double-check any new SC insulin order above 50 units and any IV order above 25 units. A reliable process for comparing the previous 24-hour's insulin therapy to that ordered could have uncovered the error.

Australian comment: Here two staff are required to listen to a prescriber giving a telephone order. This is better than one nurse reading back the order as two people are more likely to notice a problem.

[ISMP Medication Safety Alert! October 16, 2003]

Know the drug's purpose

A dispensing error alert has been posted recently about mix-ups between the antiepileptic Keppra (levetiracetam) and antiretroviral combination Kaletra (lopinavir+ritonavir).

The products are available in different milligram strengths but both are available as oral solid and oral solution dosage forms. Several near misses have been reported through the ISMP Medication Errors Reporting Program.

A physician asked a pharmacist about the availability of Keppra and the pharmacist thought he heard Kaletra. The error was discovered when the pharmacist reviewed the patient's medical profile and discovered that the patient didn't have HIV. In another case, a hospital pharmacist found a bag in the refrigerator containing a prescription for Kaletra when the patient was actually supposed to receive Keppra. Similarly, in a community pharmacy, although a prescription for Keppra was entered into the computer, the wrong drug was taken from stock. Before the patient took any medication, his fiancé noticed that the Kaletra bottle had a prescription label for Keppra. Misspelling of a drug name also resulted in an error. A physician recorded Keppra while dictating an epileptic patient's discharge summary—the medical transcriptionist typed it as Capra. Later, when the patient was readmitted, the surgeon misunderstood this as Cipro (ciprofloxacin) and prescribed Tequin (gatifloxacin) since Cipro wasn't available. Although the patient received Tequin for three days, he fortunately did not have any seizures.

Obviously, in any of these cases, patients with epilepsy who do not receive an antiepileptic could experience serious consequences. Likewise, the consequences for HIV patients who receive an antiepileptic instead of an antiretroviral drug could be serious. The drug's purpose for any of these medications should be included in the directions, and pharmacists should match the drug therapy to the patients' diagnosis.

[ISMP Medication Safety Alert! October 30, 2003]

Spectrum of problems with colours

The use of colour for differentiation and to aid the identification of products is employed in many instances to help reduce medication errors. Thus, it is important to note the differences between colour-coding, colour-differentiation and colour-matching and be aware of the deficiencies associated with these approaches.

Colour-coding is the systematic, standard application of colour to aid in classification and identification. Colour-coding allows people to memorise a colour and match it to its function. However, it can also be error prone and there is a limit to the variety of discernible colours available for commercial use. Colour-coding has not been scientifically tested as a way to prevent medication errors.

Colour-differentiation entails the use of colour to make certain features stand out or, to help distinguish one item from another thus, enable efficient identification or selection of a product. For example, an adult vaccine formulation may be packaged in an orange box whilst the paediatric formulation may be packaged in a light blue box. Whilst the idea of colour-differentiation is for users to efficiently find and select medications from storage, the use of colour-differentiation to prevent medication errors has not been scientifically proven.

Colour-matching is also used sometimes to reduce the risk of errors. For example, a medical device may have a blue plug that attaches to a blue receptacle. Little scientific evidence exists to prove the value of colour-matching related to medication use or pharmacological products.

[ISMP Medication Safety Alert! November 12, 2003]