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AUSTRALIAN INCIDENTS

Hyperacidity or hypertension?

We have noticed a new brand of ranitidine on the market—mRanitic and Ranitic Forte. There is potential to confuse with Renitec (enalapril 10 mg) and Renitec Plus 20/6 (enalapril 20 mg/hydrochlorothiazide 6 mg). Confusing nomenclature such as this is a real danger to patients and we hope the TGA takes this into account in their future Trans-Tasman product registration processes.

[Australian Alert 39, May 2005]

Potassium oral mixture in an IV syringe

Oral potassium mixture was drawn up into a 5 mL syringe and inadvertently given intravenously. The patient arrested but was resuscitated without adverse consequences. Although this incident occurred 6 years ago, how many near misses like this occur in Australia each week? It is good to know that oral syringes are now readily available on the Australian market from two companies (REM systems, Becton Dickinson). Oral syringes have a straight taper rather than the luer taper on standard IV syringes. The final no-fit connection to an IV cannula will make the person administering medication in this manner stop and wonder why the connection cannot be made. This is a safety forcing function! REM also have a nasogastric tube adaptor which only fits an oral syringe taper and cannot be switched for a luer connection. Check if a compatible nasogastric tube manufacturer's product is in use prior to purchase.

Recommendation: Oral syringes should now be supplied to all areas where oral medication doses are prepared for administration. They come in clear and amber 0.5 mL, 1 mL, 3 mL, 5 mL, 10 mL and 20 mL syringes. Decisions to be made in implementation are to purchase clean or sterile/individually packed—there is some nursing concern about cross-contamination, and whether the colour of the solution being measured can be adequately visualised through an amber syringe even though the white calibrations are clearly obvious.

[Australian Alert 40, May 2005]

qd again!

We feel we could apply a major Oz-Jeer award to Pfizer in their product information for Lyrica (pregabalin). They have used the prohibited abbreviation of 'qd' to indicate daily dosing. All Australian pharmacists recognise that this Latin abbreviation for dosage instructions leads to more errors than the efficiency it creates in abbreviating dosage instructions. Most clinicians in Australia use 'qid' frequently to indicate four times a day dosing and 'qd', when used by overseas trained practitioners is regularly misinterpreted as a contraction of 'qid'. The result is four times overdosing. We hope that all major Australian pharmaceutical companies would recognise safety concerns in their authorship of product information. This might be something which TGA could also take into account.

[Australian Alert 41, May, 2005]

US SAFETY BRIEFS

Phenylephrine mistaken for metoclopramide

Problem: A patient undergoing surgery inadvertently received phenylephrine 10 mg IV instead of metoclopramide after a look-alike phenylephrine vial was retrieved from a metoclopramide bin. Similar instances of misplaced vials had been encountered before at this hospital, but widespread action had not been taken to reduce errors with these and other look-alike products.

Recommendation: Standardise the organisation of anaesthesia carts and store similar looking vials away from each other. Consider attaching a bag of diluent to phenylephrine vials to further differentiate it from metoclopramide.

Australian comment: Although these products may not have similar appearance in Australia, there are many others which do and the habit of separating dosage units from original packaging and binning in clinical areas as well as on anaesthesia carts is asking for errors of this type to occur.

[Medication Safety Alert! April 7, 2005]

Safety is a team effort

Problem: Maintenance staff filled empty detergent containers with used hydraulic fluid, which was later used to wash thousands of surgical instruments.

Recommendation: Never reuse medical containers. Include all non-professional healthcare workers in patient safety efforts and ensure that they recognise the many safety hazards that are under their control <www.ismp.org/Pages/videos.htm>.

[Medication Safety Alert! April 7, 2005]

Drug product confusion in the sterile field

Problem: Ethyl alcohol from an unlabelled basin was drawn into a syringe and injected into a patient's face instead of lignocaine, which was also in an unlabelled basin. The patient suffered partial facial paralysis.

Recommendation: Develop and implement policies and procedures for safe labelling of all medications and solutions within sterile fields.

[Medication Safety Alert! April 7, 2005]

Measuring medication safety

Problem: Measuring medication safety is fundamental to improvement, but identifying practical and accurate methodologies for data collection has long been a problem. Historically, health care has relied on practitioner reporting of errors, which is highly inaccurate and counter productive.

Recommendation: Process measures, structure measures, balancing measures, and outcome measures must be tracked to improve medication safety. See the full newsletter article for examples of each type of measure and how to collect data to demonstrate whether improvement efforts have been successful.

[Medication Safety Alert! April 7, 2005]

Building a case for medication reconciliation

What do all these medication errors have in common? 1) A patient who was transferred from one hospital to another received a duplicate dose of insulin because the receiving nurse did not know it had been given before transfer. The patient's medication history had not been provided to the receiving facility until several hours after the patient's arrival. 2) Using the patient's handwritten list of medications taken at home, a physician misunderstood an entry for Desogen (ethinyloestradiol/desogestrel) and prescribed digoxin 0.25 mg daily. Later, a nurse discovered the error when she asked the patient why she was receiving digoxin. 3) Shortly after admission, a patient became lightheaded and fell in the bathroom after a physician prescribed Toprol XL (metoprolol extended-release) at a dose larger than she took at home. The patient required telemetry monitoring and hydration for 24 hours. 4) A newly admitted patient with pulmonary hypertension had been receiving Flolan (epoprostenol) IV at home at 2.4 mL/hour. The physician prescribed Flolan at the same flow rate, but did not specify the concentration. The hospital used a concentration of 0.5 mg/100 mL, but the patient had been using 0.3 mg/100 mL at home. The error was discovered after the patient experienced symptoms common with higher doses. 5) Pamelor (nortriptyline) was prescribed for a newly admitted patient. While clarifying another order with the patient's pharmacy several days later, the pharmacist learned that the patient had been taking Panlor (paracetamol/caffeine/dihydrocodeine) at home. 6) A patient who had been transferred from an extended-care unit to a medical unit received extra doses of all her morning medications: warfarin, thyroxine, metoprolol, amlodipine, and sertraline. The patient's extended-care medication administration record was not located until several hours after transfer. 7) Enalapril 2.5 mg IV was administered to a patient after transfer from a critical care unit to a medical unit. The drug had been discontinued upon transfer, but the orders had not yet been transcribed. 8) An emergency department patient with chest pain received a 7000 unit heparin bolus prior to starting a heparin infusion. Upon admission to the critical care unit, the heparin bolus dose was repeated in error, delaying the patient's cardiac catheterisation. 9) Before surgery, a patient had been receiving daily doses of IV vancomycin. The drug was not reordered post-operatively, but it continued to be dispensed and administered for several days. 10) Before discharge, Lexapro (escitalopram) was increased to 10 mg daily, but the patient's discharge instructions listed 5 mg daily. When the error was noticed, the pharmacist called the patient, who had been cutting in half the 10 mg tablets provided with her new prescription. Each error is the direct result of failed communication about prescribed medications during vulnerable transition points in the continuum of healthcare: admission, transfers between care settings, and discharge. Another shared characteristic is that all of these errors were reported to ISMP within the past few months! According to the Institute for Healthcare Improvement, experience from hundreds of organisations has shown that poor communication of medical information at transition points is responsible for as many as 50% of all medication errors and up to 20% of adverse drug events in hospitals. This is precisely why the Joint Commission has focused the nation's attention on reducing the risk of errors during these transition points through a process called medication reconciliation. A 2005 Joint Commission National Patient Safety Goal requires

hospitals to reconcile medications across the continuum of care. Outlined below are the steps we suggest for implementing this process.

Obtain a medication history. Obtain the most accurate list possible of the patient's current medications upon admission to the organisation before administering the first dose of medications (except in emergency or urgent situations). This includes prescription and over-the-counter medications (including herbals and dietary supplements), listing the dose, route, frequency, indication, and time of last dose. Most organisations use a specific form for this purpose, on which an assessment of patient compliance with drug therapy and the source of the medication history information can also be documented. Besides the patient and family, other sources of information may include visual inspection of the patient's medications brought into the facility, previous medical records, as well as the patient's pharmacy and physician office.

Prescribe medications. As soon as the list is reasonably complete, have the prescriber review and act upon each medication on the list while prescribing the patient's admission medications.

Reconcile and resolve discrepancies. Require another person to compare the prescribed admission medications to those on the medication history list and resolve any discrepancies.

Reconcile again upon transfer and discharge. Each time a patient moves from one setting to another, review previous medication orders alongside new orders and plans for care, and resolve any discrepancies. When the patient is discharged, the reconciled list of admission medications must be compared against the physician's discharge orders along with the most recent medication administration record. Any differences must be fully reconciled before discharge.

Share the list. Communicate a complete list of the patient's medicines to the next provider of service when transferring a patient to another setting, service, practitioner, or level of care within or outside the organisation. This includes sending a list of medicines prescribed upon discharge from the hospital to the patient's primary care physician, as well as encouraging patients to share the list with their pharmacy. The Joint Commission requires hospitals to initiate this type of medication reconciliation process now. The Joint Commission has also made medication reconciliation a National Patient Safety Goal in ambulatory care, assisted living, behavioural health, home care, and long-term care organisations. If all these healthcare settings are involved in the process, it will make obtaining an accurate medication history and reconciliation of prescribed therapy much easier.

[Medication Safety Alert! April 21, 2005]

Open packages for patients

If you are a pharmacist, there is a good chance you have heard the story about a patient who received a prescription for rectal suppositories but inserted them, foil-wrapper and all, because no one said to remove the foil first. Similarly, patients might swallow wrapped oral unit-dose products. In ambulatory care, if you expect patients to unwrap dosages themselves and use the drug properly, patient education is extremely important. However, accidents have also happened in hospitalised patients, when nurses have handed patients unit-dose packages

without explanation. If plastic unit-dose packages are swallowed, intestinal perforation can occur. In one such incident, a man was injured by the sharp corner of a plastic blister package that cut through all layers of the intestinal wall (Norstein J, et al. *Lancet* 1995; 346: 1308). Confused, somnolent, or visually impaired patients should never be handed wrapped packages of medications.

[*Medication Safety Alert! May 5, 2005*]

Pharmacy intervention trigger

Phytomenadione (vitamin K₁) is a well established trigger drug that may uncover an adverse drug event with warfarin. However, when prescribed, it could also signal an overly aggressive attempt to reverse the effects of warfarin in preparation for a procedure (e.g. cardiac catheterisation). When it is time to restart the warfarin after the procedure, the effects of phytomenadione may last as long as a week. Thus, doctors may keep increasing the warfarin dose for days, not realising that the phytomenadione administered before the procedure is still blocking the effects of warfarin. When the effects subside, the warfarin dose may be dangerously high, leading to the risk of bleeding. To help avoid such an event, pharmacists should investigate all orders for 10 mg or higher doses of phytomenadione. If it is being used to treat bleeding due to warfarin use, document and track this as an adverse drug event. If it is being used to reverse the effects of warfarin before a procedure, recommend a lower dose and ensure the physicians understand that the effects of phytomenadione will linger after the procedure. If warfarin is restarted, it may take a few days to reach a therapeutic dose.

[*Medication Safety Alert! May 5, 2005*]

What's on your list?

Over the past year we have had the opportunity to review hospital-prepared lists of abbreviations that should not be used. Such a list is often in response to a Joint Commission National Patient Safety Goal, which we support. However, the lists sometimes include abbreviations that we would consider less prone to serious errors. For example, qid, if dangerous at all, is only so because qd and qod are sometimes misread as qid. The result is a 4-fold dosing error. The opposite error—mistaking qid as qd or qod—results in an underdose, which may be less harmful. Thus, it is qd and qod that should be the primary focus on your prohibited list of abbreviations! A similar example can be found with the abbreviations od, os, and ou, and ad, as, and au. The abbreviations for right/left/both ears (ad, as, au) are sometimes misread as the abbreviations for right/left/both eyes (od, os, ou). However, eliminating the use of one set of abbreviations, preferably the less used ad, as, and au, should be enough to prevent confusion between 'ears' and 'eyes'. In our opinion, having qid and both sets of abbreviations for eyes and ears on your list will only make it harder to achieve success with eliminating the more dangerous abbreviations. We have repeatedly published patient injuries caused by confusion when dangerous abbreviations have been used. For example, patients have died from 10-fold overdoses linked to an unseen decimal point when an unnecessary zero followed it (5.0 = 50). Medicines have been administered four times a day instead of daily when the abbreviation qd was misread as qid. The abbreviation U for units has been misinterpreted as a zero (6U = 60), the number four, or cc, leading to overdoses of insulin, heparin, and other drugs measured in units. A Joint Commission National Patient

Safety Goal now prohibits these and other unsafe abbreviations in over 15 000 accredited healthcare facilities. Progress has been made in changing prescribing habits that included these unsafe designations. Still, changing habits has been a difficult task. Since the 1990s, ISMP has urged FDA to establish a guidance document so advertisers and companies know what abbreviations and dose expressions to avoid in labelling, packaging, and promotional materials. Yet the problem still exists. Scan through the pages of *JAMA*, *New England Journal of Medicine*, *Annals of Internal Medicine*, and so on, and you will see the same unsafe abbreviations and dose designations identified by ISMP and Joint Commission readily appearing in advertisements. The same problem in pharmaceutical package labels and official inserts is more disconcerting since, as early as 1996, FDA and the Pharmaceutical Research and Manufacturers Association, both members of the National Coordinating Council for Medication Error Reporting and Prevention, endorsed the list of abbreviations that should never be used in prescribing. It is time for FDA and the drug industry to demonstrate their commitment to safety by setting a good example and prohibiting the use of error-prone abbreviations and dose expressions in advertising, labelling, and packaging.

[*Medication Safety Alert! May 19, 2005*]

Strangulation by IV tubing

A tragic case of strangulation by IV tubing was described in Lunetta P, et al. *Lancet* 2005; 365: 1542. A 10-month-old baby, hospitalised with leukaemia, had been restless but was sleeping just an hour before she was found by nursing staff, pulseless, cyanotic, and apnoeic. IV tubing leading to a right clavicular vein was tightly wrapped twice around her neck. Resuscitation attempts failed. Legal authorities later confirmed the accidental strangulation. After similar cases in Canada in 2002, Health Canada sent a notice in December 2003 to Canadian hospitals warning staff, parents, and caregivers about risks imposed by IV tubing, oxygen tubing, and monitor leads, recommending individual risk assessment, appropriate supervision, and use of accessories to stabilise flexible lines. In Finland, where the latest fatality occurred, video surveillance systems are being recommended.

[*Medication Safety Alert! June 2, 2005*]

Patches and hot flashes?

The benefit of an oestrogen patch is its time released delivery of oestrogen over a period of days. We received a report about a patient who experienced hot flashes after several days of sun tanning while wearing Climara (once-a-week oestradiol) patch. She also noticed dark spots where her patch had been applied. It is unknown whether an early release of oestrogen from a heated patch occurred, leading to an abrupt drop in continuous drug delivery, decreased oestrogen blood levels, and the subsequent symptoms. However, it was suggested that there might be such a tie, and that people are often unaware of problems associated with exposing transdermal systems to excessive heat. In fact, the total amount of drug absorbed and the resulting plasma drug concentrations from transdermal systems can increase during heat exposure. Duragesic (fentanyl) labelling, advises patients to avoid exposing the Duragesic application site to direct external heat sources, such as heating pads, electric blankets, heat lamps, saunas, hot tubs, and heated water beds. Heat can increase

skin permeability, vasodilation, and blood flow to the skin and may influence the delivery of other drugs from transdermal systems. Educate patients about this possibility, as increased drug absorption has compromised efficacy or led to drug toxicity (Carter KA. *Am J Health Syst Pharm* 2003; 60: 191-2). The reporter also mentioned that, until more is known, patients who are currently using the Ortho-evra (norelgestromin/ethinyloestradiol) contraceptive patch should be advised to avoid prolonged sun exposure in the area of the patch.

[Medication Safety Alert! June 2, 2005]

AORN national campaign

The Association of Perioperative Registered Nurses (AORN) is conducting a national campaign to urge health professionals to focus on reducing the risk of medication errors in operating room settings, with particular emphasis on labelling of all medications and solutions on the sterile field. According to AORN, this year's emphasis on medication errors was prompted by an ISMP survey of 1600 hospitals which found that only 41% of hospitals always labelled medications and solutions used in operating room settings. According to this survey, an alarming 18% of hospitals did not label containers at all, and another 42% applied labels inconsistently. To jump start this year's campaign, AORN distributed Safe Medication Administration Tool Kits to more than 5000 hospitals and 13 000 AORN members who are managers or educators. This is the second positive initiative stemming from a tragic Seattle case in which a patient died after being injected accidentally with chlorhexidine skin disinfectant instead of contrast media. This mix-up resulted from unlabelled cups used during an angiography procedure. Unlabelled medications and solutions on the sterile field have caused many other errors, some with similarly tragic outcomes. Thus, a new Joint Commission National Patient Safety Goal now requires organisations to label all medications, medication containers (e.g. syringes, medicine cups), or other solutions on and off the sterile field in perioperative and procedural areas.

[Medication Safety Alert! June 30, 2005]

No bacteriostat confusion

We have previously reported that the labelling, 'No bacteriostat added', is not equivalent to 'No preservatives'. We noted a case in which a pharmacist, who was dispensing intrathecal morphine to refill an implanted intrathecal pump reservoir, noticed at the last second a warning statement in small print on a side label panel of the product: 'Not for epidural or intrathecal use. Contains sodium metabisulfite'. Luckily, in this instance, the product did not reach the patient. Use of antioxidants like sodium metabisulfite may cause allergic reactions and the potential for neurotoxicity is a concern. Preservatives may also alter the material properties of the Medtronic Implantable SynchroMed Infusion System and affect its function. We have received another report of an error involving the same product under similar circumstances. In this case, the technicians and pharmacists did not see the warning on the side of the packaging and dispensed the product to two patients. Both patients were given the morphine product intrathecally. Fortunately, neither suffered any adverse effects to date. On follow-up with the pharmacy, it seems that the technician and pharmacy staff all interpreted 'No bacteriostat added' to mean 'No preservatives' and, thus, dispensed the product without

further investigation. Ensure staff are aware that labels stating, 'No bacteriostat added', do not necessarily indicate a preservative-free product. Educate staff to evaluate the labelling of products thoroughly to ensure suitability for intrathecal or epidural administration before dispensing.

[Medication Safety Alert! July 28, 2005]

Avoid inadvertent IV administration of nimodipine

Nimotop (nimodipine) is a calcium blocker indicated for subarachnoid haemorrhage. It improves neurological outcome by relaxing cerebral smooth muscle vasculature and preventing vasospasm, thus reducing the incidence and severity of ischaemic deficits. Nimodipine is available in a soft gelatin capsule and normally given orally. The manufacturer, Bayer, notes that in patients who are unable to swallow and have a nasogastric (NG) tube in place, doses can be prepared by extracting the contents of the capsule into a syringe with an 18-gauge needle, administering it via the NG tube, and flushing with 30 mL of saline. This procedure is potentially dangerous, as there have been several reports in which the drug was drawn into a parenteral syringe and accidentally given IV, resulting in severe hypotension, cardiovascular collapse, and cardiac arrest. A recent event demonstrates that recommendations for preventing this error are worth repeating. A pharmacy dispensed nimodipine capsules, unaware that they were being used for patients who could not swallow. Thus, the pharmacy had not provided instructions on how to prepare the capsule contents for feeding tube administration, or to flush the dose with 30 mL of saline. In one instance, a nurse softened the gelatin capsule in hot water and subsequently withdrew the medication into a parenteral syringe. In the chaos of the day, the dose was administered IV instead of via the feeding tube. The nurse noticed the error and tried unsuccessfully to withdraw the drug from the IV tubing. The patient decompensated almost immediately and subsequently died. In light of this event, the pharmacy has now created a new drug entry in the computer for oral nimodipine 30 mg/mL with default comments that doses given via NG tube should be flushed with 30 mL of saline after each administration. The new entry produces a label for use with amber oral syringes stocked in the pharmacy. According to a recent study (Green AE, et al. *Am J Health Syst Pharm* 2004; 61: 1493-6), nimodipine liquid extracted from capsules, stored in amber oral syringes and placed in light-protected bags, is stable at room temperature for 31 days. The hospital prepares nimodipine syringes in batches; each amber oral syringe contains a use by date of 30 days from production and is stored in an amber plastic bag with a sticker 'For oral (NG) use only'. Some NG tubes have a connection that is not compatible with an oral syringe, while others are available with a suitable port that is compatible. Therefore, the style of NG tube should be investigated before implementing this procedure or nurses may have to empty the oral syringe into a parenteral syringe, thus defeating this safety measure. Since this error has occurred numerous times with fatal results, whenever nimodipine is dispensed, it is critical that pharmacy communicate the potential danger of inadvertent IV injection directly to the person responsible for administering the drug. A reminder in the computer and on the drug container and product labelling may trigger this response.

[Medication Safety Alert! July 28, 2005]