Improving patient care by reducing missed doses of time critical medicines

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Introduction

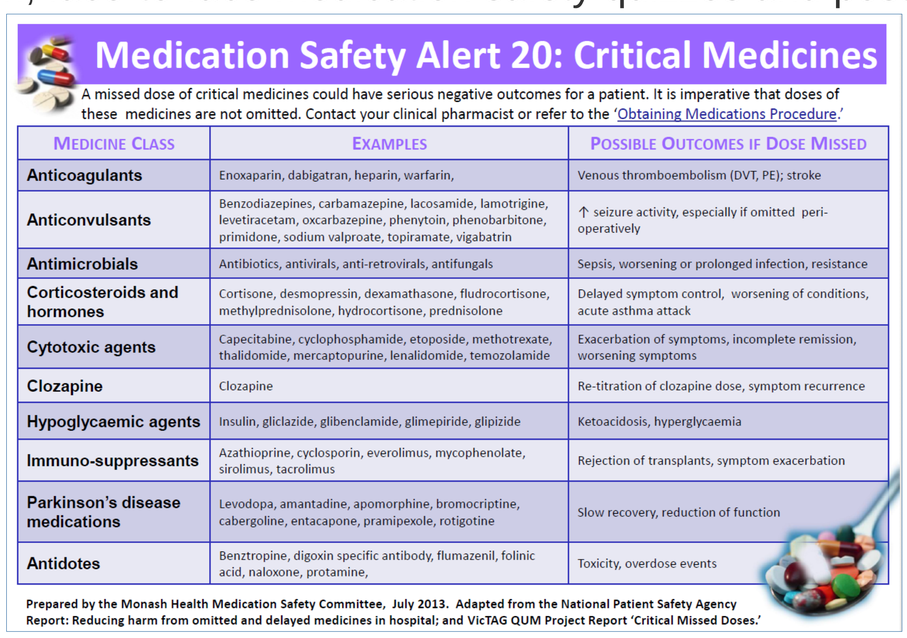
Missed doses of time critical medicines can result in undesirable health outcomes for patients[1]. Studies have shown omitted medication doses are of concern in Australian hospitals, and many are preventable[2,3].

Aim

To quantify the number of missed doses of time critical medicines and determine the nursing staff level of understanding of time critical medicines and the barriers preventing administration.

Methods

A critical medicines procedure, based on international and national literature, was launched across Monash Health, a multi-site healthcare organisation in 2012 with extensive verbal and written education, face-to-face medication safety quizzes and posters.



Medication Safety Alert 20: Critical Medicines

A missed dose of critical medicines could have serious negative outcomes for a patient. It is imperative that doses of these medicines are not omitted. Contact your clinical pharmacist or refer to the 'Obtaining Medications Procedure.'

Medicine Class	Examples	Possible Outcomes if Dose Missed
Anticoagulants	Enoxaparin, dabigatran, heparin, warfarin,	Venous thromboembolism (DVT, PE); stroke
Anticonvulsants	Benzodiazepines, carbamazepine, lacosamide, lamotrigine, levetiracetam, oxcarbazepine, phenytoin, phenobarbitone, primidone, sodium valproate, topiramate, vigabatrin	↑ seizure activity, especially if omitted peri-operatively
Antimicrobials	Antibiotics, antivirals, anti-retrovirals, antifungals	Sepsis, worsening or prolonged infection, resistance
Corticosteroids and hormones	Cortisone, desmopressin, dexamathasone, fludrocortisone, methylprednisolone, hydrocortisone, prednisolone	Delayed symptom control, worsening of conditions, acute asthma attack
Cytotoxic agents	Capecitabine, cyclophosphamide, etoposide, methotrexate, thalidomide, mercaptopurine, lenalidomide, temozolamide	Exacerbation of symptoms, incomplete remission, worsening symptoms
Clozapine	Clozapine	Re-titration of clozapine dose, symptom recurrence
Hypoglycaemic agents	Insulin, gliclazide, glibenclamide, glimepiride, glipizide	Ketoacidosis, hyperglycaemia
Immuno-suppressants	Azathioprine, cyclosporin, everolimus, mycophenolate, sirolimus, tacrolimus	Rejection of transplants, symptom exacerbation
Parkinson's disease medications	Levodopa, amantadine, apomorphine, bromocriptine, cabergoline, entacapone, pramipexole, rotigotine	Slow recovery, reduction of function
Antidotes	Benztropine, digoxin specific antibody, flumazenil, folinic acid, naloxone, protamine,	Toxicity, overdose events

Prepared by the Monash Health Medication Safety Committee, July 2013. Adapted from the National Patient Safety Agency Report: Reducing harm from omitted and delayed medicines in hospital; and VicTAG QUM Project Report 'Critical Missed Doses.'

Figure 1. Critical Medicines Medication Safety Alert– distributed to all clinical areas

A prospective audit was conducted across all inpatient clinical areas in December 2016. National Inpatient Medication Charts (NIMC) were reviewed for missed doses of time critical medicines as defined by the local procedure. Results were compared to audits conducted in 2012 and 2013.

All nursing and midwifery staff were invited to complete a voluntary online survey consisting of a series of multiple choice questions to determine level of understanding of time critical medicines.

Results

A total of 601 inpatients were included in the study and were prescribed 31,373 doses with 558 (1.78%) being omitted. Of the omitted doses, 48 (8.60%) were considered to be time critical, accounting for 0.15% (48/31,373) of all prescribed doses. Omitted doses of time critical medicines had reduced from 0.36% (5/1,265) in 2012 and 0.18% (4/2,260) in 2013 (p=0.036).

	2012	2013	2016
Doses administered	96.80% (1,224/1,265)	96.42% (2,179/2,250)	98.07% (30,767/31,373)
Non-time critical doses omitted	2.84% (36/1,265)	3.40% (77/2,580)	1.78% (558/31,373)
Time critical medicines omitted	0.36% (5/1,265)	0.18% (4/2,250)	0.15% (48/31,373)

Table 1. Number of prescribed medication doses administered and omitted by year

Of the 48 omitted doses the most common time critical medicine class was anticoagulants (21/48) (chart 1). The most common administration route of the omitted time critical medicines was subcutaneous (23/48) (chart 2).

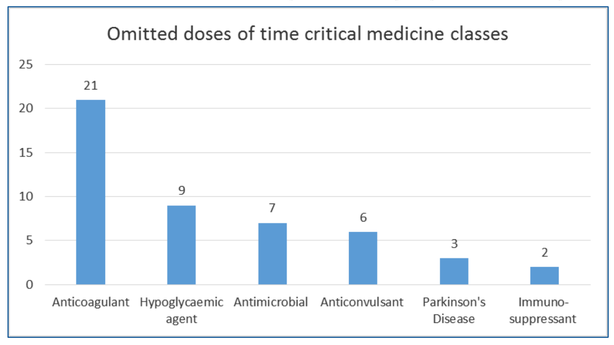


Chart 1. Omitted time critical medicine classes

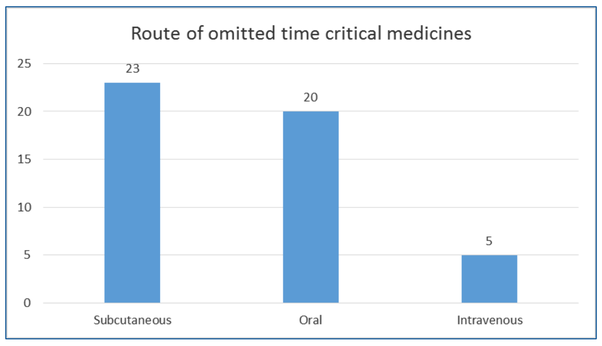


Chart 2. Omitted time critical medicine route

Of the 201 survey respondents, 97% (195/201) correctly identified warfarin as a time critical medicine (chart 3), and 87% (174/201) correctly identified cytotoxic agents as a time critical medication class (chart 4).

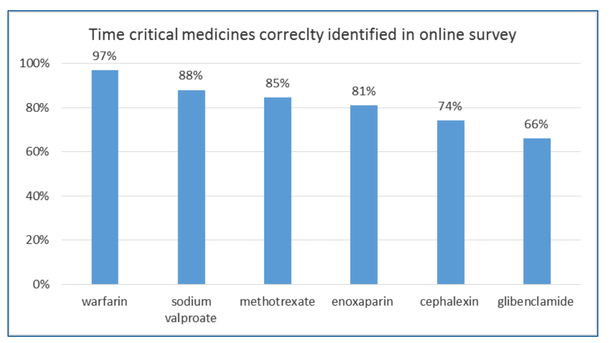


Chart 3. Time critical medicines correctly identified in online survey

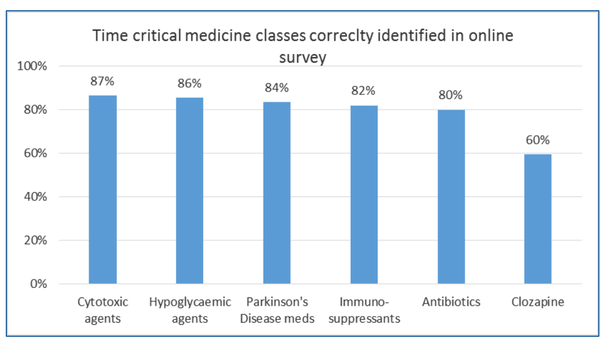


Chart 4 Time critical medicine classes correctly identified in online survey

The most common reason for a dose of a critical medicine being omitted was identified as 'overlooked on the medication chart' (51%), followed by 'difficult to locate medicine on the ward' (39%).

Conclusion

The number of omitted critical medicines reduced from 0.36% to 0.15% which was statistically significant. Further education is required to ensure staff can correctly identify time critical medicines.

References:

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2. O'Shea TJ, Spalding AR, Carter FA. Impact of nurse education on the incidence of omitted medication doses in hospital inpatients. J Pharm Pract Res 2009; 39:114-16
3. Green CJ, Du-Pre P, Elahi N, Dunckley P, McIntyre AS. Omission after admission: failure in prescribed medications being given to inpatients. Clin Med 2009; 9: 515-8

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