

# Time to restock the doctor's bag

## SUMMARY

The Pharmaceutical Benefits Scheme provides emergency drugs for the doctor's bag.

Most of the drugs are for injection into patients with acute medical or psychiatric problems. However, it is not appropriate to give some of these drugs without critical care support.

In some situations an injection is not the preferred route of administration.

Several of the drugs are not best practice. It is therefore time to review the contents of the doctor's bag.

## Introduction

There are relatively few conditions that mandate the administration of emergency drugs outside hospital. However, there will be occasions when a general practitioner may be required to give emergency drugs. Such cases include patients with status epilepticus, cardiac arrest, acute severe asthma, anaphylaxis, acute severe pain or when there is a suspicion of sepsis, especially meningococcal disease.

For many years the Pharmaceutical Benefits Scheme has provided general practitioners with emergency (doctor's bag) drugs. However, there has been little substantive review of the scheme. Some of the drugs currently available no longer represent best practice and should be replaced. Consideration should also be given to withdrawing some drugs from the scheme on the grounds of lack of efficacy, necessity or safety.

All medical practitioners should know about the dosage and administration of emergency drugs and should be equipped and prepared to manage adverse events that may arise from their use. Important potential adverse effects include hypotension, cardiac arrhythmias, altered level of consciousness, upper and lower airway obstruction, respiratory depression and convulsions.

Most parenteral emergency drugs should be administered intravenously and if possible an intravenous infusion of normal saline or Hartmann's solution should be established before their administration. Occasionally the oral route is preferable, such as an oral benzodiazepine for acute anxiety states or oral olanzapine in acute agitation.

## Drugs that should be replaced

Some drugs are no longer first-line in the treatment of emergencies. They should be replaced or supplemented with better alternatives.

### *Benzylpenicillin*

The early administration of antibiotics can be lifesaving in overwhelming sepsis. In particular, meningococcaemia may result in extremely rapid deterioration and suspected cases must be treated urgently. Benzylpenicillin is still recommended as a first-line treatment before the patient gets to hospital, but there is increasing antibiotic resistance. Around 70% of meningococcal isolates in Australia show decreased susceptibility to penicillins,<sup>1</sup> but high doses of benzylpenicillin may overcome some of the antibiotic resistance.

Ceftriaxone or cefotaxime (intramuscularly or intravenously) may be better options as currently all Australian meningococcal isolates remain sensitive to these cephalosporins.<sup>1</sup> With a broad spectrum of antibacterial activity, they are also indicated in severe undifferentiated sepsis of any cause.

A small proportion of patients with hypersensitivity to penicillin may also have an anaphylactoid response to cephalosporins. When confronted with likely meningococcal disease, the risks of treatment need to be weighed against the imperative of early antibiotic treatment. In patients with known penicillin hypersensitivity, ceftriaxone or cefotaxime should be given in preference to benzylpenicillin but the practitioner must be prepared to resuscitate with adrenaline and intravenous fluids in the event of a major anaphylactoid reaction.<sup>2</sup>

### *Diazepam*

Benzodiazepines are indicated in status epilepticus and severe agitation. The parenteral form of diazepam is highly irritant to veins and has unpredictable bioavailability when administered intramuscularly. Rectal diazepam is rarely used. Midazolam is an alternative to diazepam in both adults and children. Unlike diazepam, midazolam can be administered either intramuscularly or intravenously with more predictable effects. As with all sedating drugs, the practitioner must be able to recognise and treat adverse effects including hypotension and compromised airway and breathing which can be fatal.

## John L Holmes

Senior staff specialist  
Emergency Medicine  
Sunshine Coast Area  
Hospitals  
Queensland

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**Haloperidol and chlorpromazine**

Haloperidol is useful in the management of an acutely agitated or psychotic patient, but may cause severe extrapyramidal adverse effects, prolonged sedation and cardiac arrhythmias due to prolongation of the QTc interval. Chlorpromazine may cause significant hypotension.

Olanzapine (5–10 mg orally or intramuscularly) may be a better option for behavioural disturbance in psychosis.<sup>3</sup> It has fewer adverse effects than haloperidol, but large doses of olanzapine may cause cardiorespiratory collapse. Antipsychotics and benzodiazepines should not be given within one hour of each other. In long-term use of olanzapine there is an increased risk of stroke and death in patients with dementia.

**Furosemide**

The traditional role of furosemide in the management of acute ventricular failure is now uncertain. In acute pulmonary oedema, first-line therapy is preload reduction with nitrates such as glyceryl trinitrate either sublingually or (preferably) by intravenous infusion, and non-invasive ventilation with continuous positive airway pressure (CPAP) or bi-level positive airway pressure (BiPAP). The diuretic action of furosemide may not be as important as reducing cardiac preload, and vascular depletion may be deleterious especially in right ventricular failure. Furosemide may also raise plasma renin and noradrenaline levels, exacerbating

afterload and increasing myocardial oxygen demand, thereby aggravating coronary ischaemia.<sup>4,5</sup>

For the present it is reasonable to continue to recommend the use of intravenous boluses of furosemide in acute left ventricular failure as second- or third-line treatment.

**Drugs that should be withdrawn or restricted**

Some drugs should be withdrawn from the doctor's bag because they are relatively ineffective, inappropriate or unsafe. Many drugs are potentially more dangerous than beneficial and a medical emergency is not the time for a practitioner to be giving an unfamiliar drug.

**Antiarrhythmics – lignocaine and verapamil**

Drugs have no first-line role in cardiac arrest outside hospital where the highest priority is basic life support, in particular effective chest compressions. Electrical defibrillation should be administered as soon as possible when cardiac arrest is due to ventricular fibrillation or pulseless ventricular tachycardia.<sup>6</sup>

The management of acute cardiac dysrhythmias requires specific training and experience. Attempts at cardioversion should be made only in hospital unless a patient is critically haemodynamically compromised.

Amiodarone or sotalol are now preferred over lignocaine in the treatment of ventricular tachyarrhythmias, but may do more harm than good if the patient is otherwise stable. Similarly adenosine has largely superseded verapamil for the treatment of atrioventricular nodal re-entry tachycardia (the commonest cause of paroxysmal supraventricular tachyarrhythmia) but has potential adverse effects including bronchospasm.

As with ventricular arrhythmias, it is dangerous to treat supraventricular tachyarrhythmias in an uncontrolled environment. The diagnosis may not be straightforward and verapamil may be inappropriate for some supraventricular dysrhythmias. For example in Wolff-Parkinson-White syndrome, blocking the atrioventricular node with verapamil may lead to unopposed conduction down the accessory pathway and precipitate ventricular tachycardia, or even ventricular fibrillation. Verapamil is also a negative inotrope and can exacerbate hypotension especially if cardioversion has failed.

It follows that any attempt at pharmacological cardioversion should only be attempted with full resuscitation facilities and ongoing cardiovascular monitoring. There is no necessity for any antiarrhythmic to be available in the doctor's bag for use outside hospital.

As a general rule, patients with acute dysrhythmias should be transferred to hospital. No immediate treatment is required if they are haemodynamically stable. Drug therapy is contraindicated if the patient is haemodynamically compromised in which case the safest treatment is direct current cardioversion.

**Procaine penicillin**

There is no emergency indication to justify the continued use of this outdated formulation.

**Terbutaline injection**

Acute severe asthma is initially treated with inhaled bronchodilators, systemic corticosteroids and oxygen when indicated. Current asthma guidelines do not recommend the use of parenteral beta agonists.<sup>7,8</sup> Systematic reviews show that these drugs offer little if any benefit and have been associated with worse outcomes, probably due to increased ventilation-perfusion mismatching.<sup>8</sup> Intravenous beta agonists also cause hypokalaemia and adverse cardiovascular effects.

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## Drugs have no first-line role in cardiac arrest outside hospital

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### Tramadol

Tramadol is less effective than morphine and offers no advantage in the treatment of acute pain. Unless the patient has a proven allergy, morphine is the drug of choice and can safely be used for all causes of severe pain not controlled by oral analgesia including ureteric and biliary colic. Morphine can be given subcutaneously, intramuscularly or intravenously. Repeated small doses titrated until the patient is comfortable minimise the risk of respiratory depression.

Morphine may cause histamine release, but true anaphylaxis is very rare. Tramadol, however, has been associated with life-threatening angioneurotic oedema. It also has potentially serious interactions with commonly used drugs, especially selective

serotonin reuptake inhibitors with which it can precipitate a serotonergic syndrome.

### Conclusion

The emergency drug supply system is a valuable resource for general practitioners. The best outcomes occur when the patients are expeditiously transported to a hospital. In time-critical cases, however, a general practitioner may be required to respond urgently to an acutely ill patient. It is essential that the drugs in the doctor's bag should reflect current best emergency practice, efficacy and safety. With these principles in mind, the current doctor's bag emergency drug scheme should be reviewed. <

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### FURTHER READING

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## Cover story



*Australian Prescriber* has been published by the NPS since 2002. In 2010 the National Prescribing Service changed its name to NPS: Better choices, Better health, and decided to rebrand all its publications. As the previous design of *Australian Prescriber* first

appeared in 2004, there was also a need for an update.

Health professionals and students participated in the research for the new design of *Australian Prescriber*. Their comments have helped to create a layout which

will make it easy for readers to find all the information which interests them.

In addition to the summary of each article, key points and self-test questions will be highlighted. There is more white space in the design to aid readability, particularly for busy health professionals.

Since 2010 *Australian Prescriber* has used paper certified by the Forest Stewardship Council. The new stock also comes from responsible sources.

Our new design includes not only the NPS brand, but also elements from the history of *Australian Prescriber*. The capsules on the cover recall the first design of the journal in 1975. Although it is in a stylised form, the eye of Horus from 1994 is still there, looking to the future of medicine and *Australian Prescriber*.