

Rational Drugs



An Update on Rational Drug Use

Issue 27
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REVIEW TOPIC

Drugs used in Medical Emergencies

WHO defines Rational Use of Medicines (RUM) as "... patients receive medications appropriate to their medical needs, in doses that meet their individual requirement for an adequate period of time and at low cost to them and their communities. All the molecules are chemically potent and have more than one side effect and have interactions with food and other drugs. Some have severe adverse reaction and contraindication (e.g. all chemotherapeutic agents). But in medical emergencies when doctors use/prescribe drugs to save the life a patient, then this RUM becomes difficult to adhere to.

EMERGENCY MEDICINE, A SPECIALTY

The unique aspect in the field of emergency medicine is that interactions with patients and their families are short-lived. Most patients who arrive in the emergency department come at their worst. Their emotions are peaked and anxiety levels high.

Important criteria to be taken into account when selecting appropriate emergency drugs for use in **general practice**:

- Only drugs that are essential for the first-line management of emergencies need to be kept.
- The recommended emergency drugs can be administered by simple (oral, sub-lingual, inhalation or intra-muscular) routes

Drug	Route of Administration	Indication
Oxygen	Inhalation	All emergencies except hyperventilation)
Adrenaline	IM Inj	Anaphylaxis
Hydrocortisone sodium Succinate	IM Inj	Anaphylaxis and adrenal crisis
Chlorpheniramine maleate	IM Inj	Anaphylaxis
Glucose	Oral or sub-lingual	Diabetic hypoglycaemia (conscious)
Glucagon	IM Inj	Diabetic hypoglycaemia (unconscious)
Salbutamol inhaler	Inhalation	Asthma
Glyceryl trinitrate	Sub-lingual	Angina
Aspirin	Oral	Myocardial infarction

- The drugs should be those which all general practitioners can reasonably be expected to be competent to use.

THE DOCTOR'S BAG

It should contain drugs to treat life-threatening emergencies and other serious medical conditions. Almost all these emergency drugs are administered parenterally, but in some conditions oral and inhaler preparations are useful. The drugs should be relatively safe and simple to use. Some of the non-injectable drugs to be carried are soluble aspirin, diazepam, glyceryl trinitrate (sublingual spray is more stable than tablets), salbutamol aerosol, oral sedatives or hypnotics, analgesics, antibiotics and antiemetics. The drugs should be checked regularly for short expiry that can be replaced.

Let us have a look at some of the emergency situations where medicines play a lead role.

BURN MANAGEMENT

Urine output, mental status, and resolution of base deficit are regarded as indicators of ongoing resuscitation. Initially give 1 L/hour of lactated Ringers solution. Then calculate burn size and using formula, updates fluid requirement. An exception to this recommendation is the patient who presents with profound hypotension, has pre-existing signs of dehydration, or when there has been a delay in resuscitation. In this situation, a rapid infusion is used to restore palpable radial pulses and mentation.

BURN WOUND CARE

Burn-wound sepsis was the leading cause of death before the introduction of topical antimicrobial agents. For those burn cases who can be rapidly transported to a burn center, there may not be a need for application of creams, debridement, or prophylactic antibiotics. The aim is to keep the burns dry, warm, and clean, covering the burns with a dry sheet. In a mass-casualty scenario, transfer of patient to a burn center is often delayed, so application of creams and prophylactic antibiotics is logical. Generous use of pain medication to debride burned tissue and perform dressing changes is essential.

Silver sulfadiazine cream or mafenide acetate cream should be applied as a thick layer as opposed to a lotion. Gram-negative organisms may have some resistance to silver sulfadiazine cream. Mafenide acetate, on the other hand, penetrates eschar and cartilage more effectively, has excellent gram-negative coverage including *Pseudomonas*, but can be quite painful on application to partial-thickness burns.

SEVERE PAIN

If an opioid is given for severe pain, it should be used and recorded in accordance with regulations. Morphine sulphate can be used for acute pulmonary oedema and relief of severe pain such as myocardial infarction (but not pain due to biliary or renal colic where morphine may increase pain by exacerbating smooth muscle spasm). This is usually combined with an injection of antiemetic such as metoclopramide to reduce vomiting, which is a common adverse effect of morphine.

Pethidine 100 mg/2 ml: Pethidine can be used in a variety of severe, painful conditions, especially ureteric and biliary colic. Dependence is an issue, so pethidine should be avoided for frequently recurring conditions such as migraine.

Other analgesics: Paracetamol (500 mg tablets or 120 mg/5 ml paediatric oral suspension) is useful for mild to moderate pain.

Now let us have a look at some groups of emergency medicines that should be available.

Medicines in emergency trolley:

- 1) Sodium Bicarbonate Inj.*
- 2) Adrenalin Inj.*
- 3) Atropine Inj.*
- 4) Calcium Gluconate Inj.*
- 5) Dextrose 50% Inj.*
- 6) Dexamethasone Inj.
- 7) Hydrocortisone Inj.
- 8) Frusemide Inj.
- 9) Dopamine / Dobutamine Inj.
- 10) Phenetoin sodium Inj.
- 11) Potassium Chloride Inj.
- 12) Magnesium Sulphate Inj.

Drugs marked as * are resuscitation medicines. The emergency drugs listed from Sl. No. 1 to 10 are common and universal.

Poison & Antidotes:

Poison	Antidote	Precautions
1. Diazepam compound	Flunazinil	Use cautiously
2. Organo phosphorous compound	Atropine & PAM	Use cautiously
3. Heavy metals	BAL & EDTA	BAL is not used in carbamate poisoning
4. Unknown snake bite	A.S.V.	Use carefully
5. Digitoxin	Digibind	Check side effects

In all these cases, we must first recognise the poison carefully and appropriate specific antidote should be used cautiously.

Cardiac (CV) Drugs:

All these drugs should be used as per arrhythmia guidelines. For digoxin, drug level should be monitored at regular intervals.

1. Amiodarone (Cordirone)
2. Digoxin
3. Quinidine
4. Verapamil
5. Glyceryl trinitrate (GTN/NTG)
6. Frusemide
7. Sodium Nitropruside
8. Adenosine
9. Beta blockers (metoprolol)
10. Diltiazem
11. Lidocaine (xylocard)

Respiratory Drugs:

These should be used as per standard protocols and guidelines.

1. Corticosteroids
2. Salbutamol
3. Aminophyllin (Not to be used if BP is less than 90)
4. Terbutalin
5. Deriphyllin

Anticoagulants:

These need regular monitoring and look for bleeding.

1. All heparins
2. Warfarin

Hemostatics:

These also need regular monitoring and look for bleeding.

1. Vitamin K
2. Botropace
3. Chromostat/Texidet
4. Octreotide
5. Somatostatin

Miscellaneous:

These should be used as per standard protocol.

1. A.T.S. & Tetanus immunoglobulin
2. Paracetamol
3. Pheniramine maleate/Promethazine
4. Metochlopropamide/Ondansetron
5. Ranitidine/Rabiprazole/Pentaprazole
6. Haloperidol

Prioritisation of all emergency drugs is suggested and may be arranged in the following order.

- 1) Poison & antidotes
- 2) Cardiovascular drugs
- 3) Anti cancers
- 4) Antibiotics & antibacterials
- 5) CNS acting drugs
- 6) Respiratory drugs
- 7) Anti diabetics
- 8) T.P.A. (Plasminogen activator)
- 9) Anticoagulant
- 10) Anti allergics & immuno suppressants

Ideally there should not be shortage of any of these drugs at any point of time in any location like store, ward (emergency trolley), casualty and ICU. These are the drugs of choice to meet any medical emergency. These are of low cost and easily available in many brand names. Though they also have the usual side effects, contraindications, ADR and drug interactions; these can be ignored as these are used intravenously in severe shock, anaphylaxis, falling BP, cerebral oedema, etc. The therapeutic actions of these drugs are well defined.

The Pharmacy is responsible in conjunction with the medical staff for establishing a list of emergency drugs to be available in the pharmacy and all patient care areas. The pharmacists can play a key role in promoting rational use of drugs in emergency also.

- a) by strengthening effective drug management
- b) by overcoming chronic shortage of life saving emergency drugs
- c) by combating problems of inferior quality of drugs
- d) by educating patients on use of drugs in terms of dosage, frequency, duration and other aspects

NEW DRUGS

Though a number of combination formulations are approved by the Drugs Controller General India, for the prescriber it is the rationality of use that matters in practice. In the earlier issues we had published the new drugs approved upto February 2006. The following is the list of new drugs approved by the Drugs Controller General (India) between March 2006 and June 15, 2006.

Sl.No	Name of Drug	Pharmacological Classification	Date of Approval
1.	Fluorescein Sodium Solution for Inj (100mg/ml)	Ophthalmological diagnostic agent	02-03-2006
2.	Cefditeron (as pivoxil) 200mg Tab	Antibiotic	03-03-2006
3.	Sodium Hyaluronate Cream 0.2%	For leg & diabetic ulcer etc.	16-03-2006
4.	Saquinavir 500mg tablet (addl. Strength)	Anti AIDS	20-03-2006
5.	Eflornithine Hcl Cream 139mg/gm	For reduction of unwanted facial hair in women	22-03-2006
6.	Propionyl-L-Carnitine Hcl Tab 500mg & Inj 300mg/vial	Chronic congestive heart failure	22-03-2006
7.	Tobramycin Inhalation solution 300mg/5ml	For chronic pulmonary infection cystic fibrosis	22-03-2006
8.	Lactulose Enema 20%	For constipation & hepatic encephalopathy	28-03-2006
9.	Haloperidol Tablet 0.5mg (Addl. Lower strength)	Sedative & tranquillizer	30-03-2006
10.	Cholestyramine Powder for oral suspension (4gm/sachet)	For hypercholesterolaemia	30-03-2006
11.	Doxofylline Syrup 20mg/ml	For bronchial asthma & COPD	30-03-2006
12.	Resperidone Tablet & Syrup (Addl. Indication)	Acute mania & mixed episode in bipolar-I disorder	04-04-2006
13.	D-trans Fentanyl Transdermal patches	For pain	05-04-2006
14.	Pantoprazole as Sodium E.C 40mg + Itopride 150mg S.R	For GERD	08-04-2006
15.	Oseltamivir formulation (additional indication)	For Prophylaxis of influenzae in adult and children > 14 years of age	24-04-2006
16.	Atazanavir 100/150/200mg	Anti HIV in adults	24-04-2006
17.	Nicorandil E.R Tablet 10mg/20mg	Angina Pectoris	24-04-2006
18.	Amlodipine (as besylate) 5mg + HCTZ 12.5mg Tablet	For hypertension	24-04-2006
19.	Nadifloxacin Gel 1%	Acne vulgaris	10-05-2006
20.	Formoterol Fumarate 6mcg + Fluticasone Propionate 100/250/500mcg dry powder inhaler	For Asthma & COPD	10-05-2006
21.	Midazolam (as maleate) 7.5mg/15mg tablet	For insomnia	10-05-2006
22.	Olmesartan (as Medoxomil) 10mg (Addl. Strength)	Antihypertensive	18-05-2006
23.	Pregabalin Capsule 25/50/100/200mg (Addl. Strength)	Anticonvulsant (also used in peripheral neuropathic cases)	19-05-2006
24.	Oxcarbazepine S.R 450mg/900mg (Addl. Strength)	Antiepileptic	19-05-2006
25.	Ciclesonide rotacaps 200/400mcg	For Asthma	19-05-2006
26.	Itopride 150mg capsule S.R	For GERD	22-05-2006
27.	Nevibolol (as HCl) 5mg + Amlodipine (as besylate) 5mg/10mg	For hypertension	24-05-2006
28.	Levocetirizine 5mg + Ambroxol Hydrochloride 75mg SR Tab	For productive cough	24-05-2006
29.	Ibandronic Acid Tablet 150mg (Addl. Strength)	-----	25-05-2006
30.	Zonisamide capsule 25/50mg (Addl. Strength)	Partial seizures	25-05-2006
31.	Perflutren liquid microsphere injectable suspension	For diagnostic use	31-05-2006
32.	Cyclosporin Eye drops 0.1% (Addl. Strength)	For Ophthalmic use	02-06-2006
33.	Gatifloxacin 0.3% + Prednisolone Acetate 1% eye drops	For Ophthalmic use	02-06-2006
34.	Amlodipine (as besylate) 5mg + Metoprolol Succinate equivalent to Metoprolol Tartrate 50mg	For hypertension	05-06-2006
35.	Nadifloxacin 1% + Miconazole Nitrate 2% + Mometasone Furoate 0.1% Cream	For dermatoses	06-06-2006
36.	Bemiparin Sodium Solution for Inj 5000/7500/10,000 I.U	For deep vein thrombosis	08-06-2006
37.	Icodextrin 7.5% peritoneal dialysis solution	For peritoneal dialysis	08-06-2006
38.	Lamotrigin 200mg Tab Addl. Strength & Dispersible Tab 5mg/50mg/100mg/200mg	Anti-epileptic	08-06-2006
39.	Amoxicillin 1000mg + Clavulanate Potassium 62.5mg E.R tablet	Antibiotic	08-06-2006
40.	Lopinavir 200mg + Ritonavir 50mg Tablet (Addl. Strength)	Anti HIV	08-06-2006
41.	Olopatadine Ophthalmic solution 0.1%	For allergic conjunctivitis	08-06-2006
42.	Ferrous ascorbate (equivalent to 50mg Iron) + Folic acid 1.5mg	For iron deficiency anemia	08-06-2006
43.	Methyl Prednisolone Aceponate Cream 0.1%	For atopic dermatitis	15-06-2006

Source: CDSCO, Ministry of Health, Government of India

ACHIEVERS

Congratulations

An international competition was conducted by the Ecumenical Pharmaceutical Network (EPN), Kenya (www.epnetwork.org) with the aim of promoting rational drug use. Participants were asked to write an article on rational drug use. A CMAI member and a member of Rational Drugs Editorial team, Dr Sujith J Chandy, Christian Medical College, Vellore, won the first prize and has been invited to be a part of the EPN team to attend the World Health Assembly, Geneva in May 2007.

Dr Joe Varghese, Policy Advocacy Group, CMAI, is the 1st runner up winning 300 dollars to purchase professional books. His article focussed on the strategy of a CMAI pilot project currently being implemented in 30 mission hospitals in India with the support of WHO, SEARO.

RARELY USED & EMERGENCY DRUGS WITH INDICATION

1. **Argipressin:** Haemorrhagic oesophageal varices
2. **Bee Venom Extract:** Hyposensitisation of bee stings
3. **Botulism Antitoxin/Botulinum Antitoxin:** Post-exposure prophylaxis and treatment of botulism
4. **Complement C1-esterase inhibitor:** Management of acute hereditary angioedema
5. **Dicobalt edetate:** Treatment of cyanide poisoning ETP
6. **Digoxin-specific Antibody Fragments Inj:** Treatment of digoxin./ digitoxin overdose
7. **Dimercaprol:** Treatment of heavy metal poisoning ETP
8. **Diphtheria Antitoxin:** Post-exposure prophylaxis of diphtheria
9. **Gas Gangrene Antitoxin, Mixed:** Treatment of gas gangrene
10. **Hepatitis B Immunoglobulin (HBIG):** Post-exposure prophylaxis of hepatitis B
11. **Human Normal Immunoglobulin (HNIG):** Control of specific viral outbreaks
12. **Pralidoxime Mesylate Inj.:** Treatment of organophosphorus poisoning ETP
13. **Rabies Immunoglobulin (Antirabies Immunoglobulin Inj):** Post-exposure prophylaxis of rabies
14. **Rabies Vaccine (Human Diploid Cell Vaccine):** Pre- and post-exposure prophylaxis/treatment of rabies
15. **Ribavirin Inhalation:** (powder) Treatment of RSV infections in children
16. **Sodium Calciumedetate:** Treatment of heavy metal poisoning ETP
17. **Sodium Nitrite Injection:** Treatment of cyanide poisoning ETP
18. **Sodium Thiosulphate Inj.:** 50%, 50ml Treatment of cyanide poisoning ETP
19. **Terlipressin Injection:** Treatment of haemorrhagic oesophageal varices
20. **Tetanus Immunoglobulin IM:** 250 units Post-exposure prophylaxis of tetanus
21. **Tolazoline Inj.:** Treatment of pulmonary hypertension
22. **Trisodium Edetate Inj.:** Treatment of hypercalcaemia
23. **Trometamol Inj.:** Treatment of metabolic acidosis
24. **Varicella -Zoster Immunoglobulin:** Prophylaxis in high risk patients
25. **Wasp Venom Extract:** Hypersensitisation of wasp stings

Source: Trent Medicines Information Service, Jan 2000

The focus theme for the next issue will be on 'Diagnostics & Devices'. We welcome readers to contribute for 'Readers Forum'.

READERS FORUM

An invitation

Readers are invited to share/send ADR & Pharmacovigilance related problems observed/ experienced with details of the concerned product.

We look forward for contributions from the readers to our future issue on, Drugs used in accidents and trauma

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