



**Mercy  
Ships<sup>®</sup>**

Bringing Hope and Healing...

# Formulary 2009-2011



**An Essential Medicines Dosing Guide  
Based on the WHO Model Formulary**

## ANTIDOTES & DIAGNOSTIC AGENTS

### 14.01 ANTIDOTES

#### WHO MODEL FORMULARY 2008 NOTES:

These notes are only guidelines and it is strongly recommended that poisons information centres be consulted in cases where there is doubt about the degree of risk or about appropriate management.

#### GENERAL CARE AND NON-SPECIFIC TREATMENT

All patients who show features of poisoning should generally be admitted to hospital. Patients who have taken poisons with delayed actions should also be admitted, even if they appear well; delayed-action poisons include acetylsalicylic acid, iron, lithium, paracetamol, paraquat, tricyclic antidepressants and warfarin. The effects of modified-release or prolonged-release preparations are also delayed. However, it is often impossible to establish with certainty the identity of the poison and the size of the dose but information on the type and timing of poisoning may be useful for symptomatic management. Few patients require active removal of the poison.

Most patients must be treated symptomatically and monitored. Particular care must be given to maintenance of respiration and blood pressure. Assisted ventilation may be required. Cardiac conduction defects and arrhythmias often respond to correction of underlying hypoxia, acidosis, or other biochemical abnormalities. Hypothermia which may develop in patients who have been unconscious for some hours is best treated by wrapping the patient in blankets to conserve body heat. Convulsions which are prolonged or recurrent may be controlled by IV diazepam. In rare situations removal of the poison from the stomach by gastric lavage may be appropriate (see below). Activated charcoal can bind many poisons in the stomach and therefore prevent absorption. Active elimination techniques such as repeated administration of activated charcoal can enhance the elimination of some drugs after they have been absorbed (see below). Other techniques to enhance elimination of poisons after their absorption are only practical in hospital and are only suitable for a small number of patients and only to a limited number of poisons. Methods include haemodialysis and haemoperfusion. Alkalinization of urine can be used to increase the elimination of salicylates. Forced alkaline diuresis is no longer recommended.

**GASTRIC LAVAGE.** Gastric lavage is rarely required and should only be considered if a life threatening amount of a substance that cannot be removed

BNF Section: Emergency treatment of poisoning

effectively by other means (for example, iron), has been ingested within the last hour. Gastric emptying is clearly unnecessary if the risk of toxicity is small or if the patient presents too late. The main risk is with inhalation of stomach contents and gastric lavage should not be undertaken unless the airways can be protected adequately. Gastric lavage must **not** be attempted after corrosive poisoning or for hydrocarbon products which could be dangerous if aspirated.

EMESIS. Induction of emesis for the treatment of poisoning is **not recommended**. There is no evidence that it prevents absorption of the poison and it may increase the likelihood of aspiration. Furthermore, the effects of the emetic substance may complicate diagnosis.

PREVENTION OF ABSORPTION. Given by mouth **activated charcoal** can bind many poisons in the gastrointestinal system, thereby reducing their absorption. The sooner it is given, the more effective it is, but it may be effective for up to 1 hour after ingestion of the poison. It may be effective several hours after poisoning with modified-release preparations or drugs with anticholinergic (antimuscarinic) properties. It is relatively safe and particularly useful for prevention of absorption of poisons which are toxic in small amounts, for example, antidepressants. Furthermore, repeated doses of activated charcoal enhance the faecal elimination of some drugs (that undergo enterohepatic or enteroenteric recycling) several hours after ingestion and after they have been absorbed, for example phenobarbital, theophylline.

## SPECIFIC ANTIDOTES

PARACETAMOL OVERDOSAGE. As little as 10-15 g (around 20-30 tablets) or 150 mg/kg of paracetamol taken within 24 hours may cause severe hepatocellular necrosis and less frequently renal tubular necrosis. The only early features of poisoning, nausea and vomiting, usually settle within 24 hours. Persistence beyond this time, often with the onset of right subcostal pain and tenderness, usually indicates the development of liver damage which is maximal 3-4 days after ingestion. In spite of a lack of significant early symptoms, patients who have taken an overdose of paracetamol should be transferred to hospital urgently. Administration of **activated charcoal** should be considered if paracetamol in excess of 150 mg/kg or 12 g, whichever is smaller, is thought to have been ingested within the previous hour. **Acetylcysteine** protects the liver if given within 24 hours of ingesting paracetamol. Acetylcysteine, given intravenously is most effective within 8 hours of overdose, but is effective for up to and possibly beyond 24 hours. Alternatively, in remote areas, if acetylcysteine cannot be given promptly, **methionine** [not on Mercy Ships list] may be given by mouth provided the overdose was ingested within 10-12 hours *and* the patient is not vomiting. However, acetylcysteine is the preferred treatment. Concurrent use of activated charcoal and specific oral antidotes

should be avoided. Once the patient is in hospital the need to continue antidote treatment can be assessed from plasma-paracetamol concentrations.

**OPIOID ANALGESIC OVERDOSAGE.** Opioids cause coma, respiratory depression and pinpoint pupils. **Naloxone** is a specific antidote indicated if there is coma or bradypnoea. Naloxone has a shorter duration of action than many opioids so close monitoring and repeated injections are required depending on respiratory rate and depth of coma; naloxone may alternatively be given by continuous intravenous infusion and the rate of infusion adjusted according to vital signs. The effects of some opioids such as buprenorphine are only partially reversed by naloxone. Methadone has a very long duration of action and patients may need to be monitored for long periods after large overdoses. Acute withdrawal syndromes may be precipitated by the use of naloxone in patients with a physical dependence on opioids or in overdose with large doses; a withdrawal syndrome may occur in neonates of opioid-dependent mothers.

**ORGANOPHOSPHATE AND CARBAMATE POISONING.** Organophosphates are absorbed through the bronchi and intact skin as well as from the gastrointestinal tract. Initial treatment of organophosphate or carbamate poisoning includes prevention of further absorption by emptying the stomach by moving patient to fresh air supply, removing contaminated clothing and washing contaminated skin. A clear airway must be maintained. Gastric lavage may be considered if the airway is protected. Organophosphates inhibit cholinesterases and thus prolong the effects of acetylcholine. Toxicity depends on the particular compound involved, and onset after skin exposure may be delayed. **Atropine** will reverse the muscarinic effects of acetylcholine and is used (in conjunction with oximes such as pralidoxime) with additional symptomatic treatment. Additional treatment for carbamate poisoning is generally symptomatic and supportive. **Atropine** may be given but may not be required because of the rapidly reversible type of cholinesterase inhibition produced.

**METHAEMOGLOBINAEMIA.** **Methylthioninium chloride** can lower the levels of methaemoglobin in red blood cells and is used in the treatment of methaemoglobinaemia. In large doses, it may cause methaemoglobinaemia and therefore methaemoglobin levels should be monitored during treatment.

GENERIC (TRADE) NAME	CAT.	INDICATION/DOSE
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## 14.02 DIAGNOSTIC AGENTS

### WHO MODEL FORMULARY 2008 NOTES:

Radiographic contrast media are needed for delineating soft tissue structures such as blood vessels, stomach, bowel loops and body cavities not otherwise visualized by standard X-ray examination. The contrast media in this group containing heavy atoms (metal or iodine) absorb a significantly different amount of X-rays than the surrounding soft tissue, thereby making the examined structures visible on radiographs.

**Barium sulfate** is a metal salt which is used to delineate the gastrointestinal tract. It is not absorbed by the body and does not interfere with stomach or bowel secretion or produce misleading radiographic artefacts. Barium sulfate may be used in either single- or double-contrast techniques or computer-assisted axial tomography. For double contrast examination gas can be introduced into the gastrointestinal tract by using suspensions of barium sulfate containing carbon dioxide or by using separate gas-producing preparations based on sodium bicarbonate. Air administered through a gastrointestinal tube can be used as an alternative to carbon dioxide to achieve a double-contrast effect.

**Amidotriozates** (meglumine amidotriozate and sodium amidotriozate) are iodinated ionic monomeric organic compounds. Both salts have been used alone in diagnostic radiography including computer-assisted axial tomography but a mixture of both is often preferred to minimize adverse effects and to improve the quality of the examination. Amidotriozates are used in a wide range of procedures including urography and examination of the gallbladder, biliary ducts and spleen. Owing to their high osmolality and the resulting hypertonic solutions, they are associated with a high incidence of adverse effects. Radiodensity depends on iodine concentration, and osmolality depends on number of particles in a given weight of solvent. The osmolality for a given radiodensity can be reduced by using an ionic dimeric medium such as **meglumine iotroxate** (not available on the Mercy Ships list) which contains twice the number of iodine atoms in a molecule or by using a non-ionic medium such as **iohexol [or ioversol]** on Mercy Ships list]. Low osmolality media such as iohexol (and ioversol) are associated with a reduction in some adverse effects (see below), but they are generally more expensive. Iohexol is used for a wide range of diagnostic procedures including urography, angiography and arthrography and also in computer-assisted axial tomography.

**ANAPHYLACTOID REACTIONS** to iodinated radiocontrast media are more common with ionic, high osmolality compounds. Patients with a history of asthma or allergy, drug hypersensitivity, adrenal suppression, heart disease, previous reaction to contrast media, and those receiving beta-blockers are at increased risk. Non-ionic media are preferred for these patients and beta-blockers should be discontinued if possible.

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GENERIC (TRADE) NAME	CAT.	INDICATION/DOSE
<p><b>loversol 240mg l/ml or 300mg l/ml (Optiray 240 or 300)</b></p> <p><b>[Radiocontrast media-iodinated]</b> (iodine content 240mg/ml and 300mg/ml respectively)</p> <p><b>NOTE: Anaphylaxis risk, observe patients for 30-60 minutes after administration, ensure presence of emergency equipment.</b></p>		<p>X-ray &amp; CT scan contrast medium. Ensure adequate hydration before and after administration to prevent possible renal failure. Avoid in manifest hyperthyroidism or iodine sensitivity.</p> <p>IV or intra-arterial route. NOTE: Optiray must NOT be used by the intrathecal route.</p> <p>See product leaflet for dose details. Only by specialist radiographers.</p>
<p><b>Methylthionium Chloride Inj 1% or 10mg/ml (Methylene Blue)</b></p>	EML	<p>As dye in diagnostic procedures such as fistula detection and for delineation of certain body tissues during surgery.</p>
<p><b>Tuberculin PPD Inj, Purified 100iu/ml (Mantoux test, Monotest)</b></p>	<p>IDA</p> <p>EML</p>	<p>Routine Mantoux tuberculosis test: Adult/Child 5-10 units (0.05-0.1ml) <i>intradermally</i>, preferably at the flexor surface of the forearm, and examined 48-72 hours later. See product leaflet for detail.</p>

**COMMENT/CAUTIONS:**

- **Radiocontrast Media:** Anaphylactoid reactions to iodinated radiocontrast media are more common with high osmolality compounds. Patients with a history of asthma or allergy, drug hypersensitivity, adrenal suppression, heart disease, previous reaction to contrast media, and those receiving beta-blockers are at increased risk. Non-ionic media are preferred for these patients and beta-blockers should be discontinued if possible.
- **Radiocontrast Media:** For patients on biguanides, withdraw biguanides 48 hours before and after administration except in emergent situations where withholding 48 hours after administration is acceptable; restart biguanides only when renal function is stabilised.
- **Iohexol (Omnipaque):** Iohexol is also approved for use in other body cavities such as the urinary bladder (cystograms), uterus and fallopian tubes, bladder/bile ducts, joints etc. Please refer to the specialist radiographer and/or see product leaflet for further details.

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**COMMENT/CAUTIONS (CONT.):**

- **Tuberculin/Mantoux Test:** The **tuberculin test** has limited diagnostic value. A positive tuberculin test indicates previous exposure to mycobacterial antigens through infection with one of the tubercle bacilli, or BCG vaccination. The tuberculin test does not distinguish between tuberculosis and other mycobacterial infection, between active and quiescent disease, or between acquired infection and seroconversion induced by BCG vaccination.
- Opened vials of tuberculin PPD should be discarded after 1 month of use.