Children, Accidental overdose of most commonly consumed medicines.
Antihistamine overdose can produce a variety of cardiac arrhythmias. For the majority of antihistamines this effect is mediated by myocardial sodium channel block—a quinidine like effect. Two of the newer non-sedating antihistamines, terfenadine and astemizole, cause delayed cardiac repolarisation by potassium channel blockade. This is associated with prolongation of the QT interval and may predispose to the development of ventricular tachyarrhythmias.

Children should be observed for a minimum of four hours following ingestion. Symptomatic children, and those who have ingested terfenadine, astemizole, or slow release preparations, even in the absence of symptoms, require admission. Activated charcoal should be considered up to four hours post-ingestion as gut motility is impaired. Treatment is otherwise largely supportive.

While the anticholinergic side effects of antihistamines are unpleasant they are not generally life threatening. The majority of clinically significant effects of antihistamine poisoning are not anticholinergic mediated. For this reason acetylcholinesterase inhibitors, such as physostigmine, are not recommended in antihistamine poisoning.

Hypotension should be treated with intravenous fluids. Where inotropes are considered necessary, adrenaline should be avoided as paradoxical hypotension can occur.

Convulsions and paradoxical excitement can be treated with a benzodiazepine. Phenothiazine based sedatives should be avoided because of their anticholinergic side effects.

Continuous ECG monitoring is advised for symptomatic children and those who have ingested terfenadine or astemizole. The management of arrhythmias in antihistamine poisoning can be difficult. Sinus tachycardia is the most frequently seen abnormality. This can usually be managed conservatively. A number of other arrhythmias can occur. Care must be taken in the choice of antiarrhythmic drugs. Sodium bicarbonate is the first drug of choice for QT prolongation with sodium channel blocking antihistamines. Class Ia and III prolongation with sodium channel blockade is the first drug of choice for QT prolongation. Convulsions, central nervous system depression, and hypotension also occur.

Cardiac arrhythmias occur frequently and are the most common cause of death. The mechanism of cardiac toxicity is complex. Blockade of noradrenaline reuptake at the adrenergic synapse produces initial stimulation followed by α adrenergic blockade. Tricyclics also exert a quinidine like membrane stabilising effect. This causes delayed conduction and myocardial depression. The anticholinergic effects of tricyclics on the heart are not of major significance.

Activated charcoal should be administered if the maximum recommended daily dose has been exceeded. A 12 lead ECG should be performed in all cases. The index of risk for cardiac toxicity is a QRS duration of more than 0.1 seconds. Sinus tachycardia, QT or PR prolongation, and ventricular ectopics are all common.

Asymptomatic children, with a normal ECG, should be observed for a minimum of six hours. Patients with any ECG abnormality should be monitored until resolution of the abnormality.

Compromising arrhythmias should be treated with an initial bolus of 1 ml/kg of 8.4% sodium bicarbonate. Arterial pH should subsequently be maintained between 7.45 and 7.55, using further doses of sodium bicarbonate as required. Arrhythmias unresponsive to sodium bicarbonate may be treated with phenytoin, atenolol, or propranolol. Class Ia antiarrhythmic drugs should be avoided. Life threatening arrhythmias may respond to cardioversion. Survival has been reported in patients with tricyclic induced electromechanical dissociation, following several hours of external cardiac massage.

Hypotension unresponsive to intravenous fluids should be treated with sodium bicarbonate. Glucagon can also be used to treat refractory hypotension.

The large volume of distribution of tricyclic compounds means that they are not amenable to removal by extracorporeal means.

Poisoning by monoamine oxidase inhibitors is uncommon following a decline in their use. In overdose they produce anticholinergic effects, excessive central nervous stimulation, convulsions, hyperpyrexia, and rhabdomyolysis. Activated charcoal should be administered following ingestion. Treatment is supportive. Dantrolene may be required to treat hyperpyrexia.

Selective serotonin reuptake inhibitor usage has increased in recent years because of their efficacy and more tolerable side effect profile when compared with tricyclic antidepressants. While these compounds are much safer in overdose than tricyclic antidepressants adverse effects have been documented. Adverse effects include vomiting, agitation, tremor, nystagmus, and drowsiness. Convulsions and arrhythmias have also been reported.

A “serotonin syndrome” has been described. This most commonly occurs in adults receiving combinations of drugs, two or more of which inhibit the reuptake or metabolism of serotonin or enhance its release. Examples of such drugs include selective serotonin reuptake inhibitors, tricyclic antidepressants, monoamine oxidase inhibitors, and amphetamines. Symptoms include autonomic dysfunction, hyperpyrexia, circulatory collapse, convulsions, and rhabdomyolysis. Reports suggest that this constellation of symptoms may also occur following the ingestion of a single agent. Treatment is supportive.

IRON

Early features of iron poisoning include vomiting, diarrhoea, and abdominal pain. Direct mucosal irritation by adherent tablets can cause gastrointestinal haemorrhage. These effects usually settle within six hours.

Absorbed iron is rapidly cleared from the circulation by cellular uptake. High concentrations of intracellular iron disrupt mitochondrial function and result in cell death. Signs of multiorgan failure present at 12–48 hours post-ingestion. The liver is particularly prone to damage and symptoms of fulminant hepatic failure predominate.

A careful history must be taken as to the iron preparation consumed and the maximum quantity taken. Different iron salts contain differing quantities of elemental iron: for example, 200 mg of ferrous sulphate contains 65 mg of elemental iron; 300 mg of ferrous gluconate contains 35 mg.

Asymptomatic children, with a definite history of consuming less than 30 mg/kg of elemental iron, do not require further investigation. Activated charcoal does not bind iron.

Children who may have consumed more than 30 mg/kg of elemental iron require hospital admission and further investigation. An abdominal x-ray examination should be performed. If undissolved iron tablets are visible on the abdominal film, whole bowel irrigation should be undertaken. Irrigation should continue until abdominal films are clear of undissolved tablets. In patients with tablets confined to the stomach, repeated gastric lavage or endoscopic removal are alternative strategies. The absence of iron tablets on abdominal x ray does not preclude the presence of a significant ingestion. Vitamin tablets containing iron...
may not be demonstrable radiologically. If large quantities have been consumed, whole bowel irrigation should be undertaken.

In asymptomatic patients, a serum iron level should be determined at four hours post-ingestion. This level should be repeated at eight hours if a sustained release preparation has been consumed. Patients with a serum iron level less than 55 µmol/l should receive treatment with intravenous desferrioxamine. Expert advice should be sought if therapy and urine discolouration clears. Specialists in the United Kingdom via the National Poisons Information Service (NPIS). The regional centres that make up this service have recently introduced a single national enquiry number: 0870 600 6266.

A wide range of easily accessible and highly practical advice is available through the NPIS website.2 This free service is restricted to medical professionals. On line registration is available at http://www.splib.axl.co.uk/toxbase/.

Gastrointestinal stricture formation, caused by the corrosive effects of iron, can occur as a late complication of iron poisoning.

INGESTIONS OF LOW TOXICITY

A wide range of medicines are accidentally ingested by children. Many are of very low toxicity (see table 1).

SEEKING FURTHER ADVICE

Specific, expert advice on all aspects of poisoning is available to medical professionals in the United Kingdom via the National Poisons Information Service.

REFERENCES