MacConnachie '97

Ecstasy poisoning

The substance Ecstasy, which has become synonymous with the rave culture, has received much attention in recent times as a result of several well-publicized deaths among young 'users'. What is Ecstasy and what is the management of its toxicity in patients admitted to hospital?

INTRODUCTION

Ecstasy is 3,4,-methylenedioxymethamphetamine (MDMA), a derivative of amphetamine and hence related to the class of drugs known as the sympathomimetics, so called because their action mimics stimulation of the adrenergic, sympathetic nervous system. Much publicity has surrounded the popularity of Ecstasy among young adults who use it as a recreational drug and several sudden and unexpected deaths have been reported. Ecstasy is a 'designer' drug which is taken for its overall stimulant properties. In fact, the misuse of stimulants of this type is not new. The amphetamines and related appetite suppressants were subject to widespread abuse until their restriction for specific indications during the 1960s. These drugs have profound effects in the CNS producing elevation of mood and heightened awareness associated with hallucinations. They enable periods of prolonged physical activity without the desire for rest, sleep or sustenance and common among users is the tendency to develop dehydration and eventual exhaustion, which may itself pose risk to health. Of further concern is the possibility that mental health may be affected during chronic use over many years.

The following account is confined to the acute reaction which increasingly has been reported in Ecstasy users during the 1990s and which may occur unexpectedly in a subject who previously tolerated the drug at the 'dosage' in question. Although a therapeutic dose does not exist (Ecstasy has no clinical application), it is frequently taken in amounts up to 150 mg and invariably in tablet form. Users will often refer to it by its various street names including E, XTC, Adam and White Dove or Burger. Early symptoms of toxicity appear to be related to the sympathomimetic action of Ecstasy, especially on the cardiovascular system, and later symptoms to a condition resembling the 'neuroleptic malignant syndrome'. The latter is a rare but serious side effect of antipsychotic medication and is associated with hyperpyrexia and muscular rigidity.

TOXICITY OF ECSTASY

Early reactions which may be seen at usual 'dosage' are typical of the side effects attributed to sympathomimetic drugs. These include CNS effects (anxiety, ataxia, restlessness, tremor, anorexia, nausea and vomiting) and effects on cardiovascular function (tachycardia, mild hypotension and possible chest pain). The pupils appear dilated, and subjects may complain of blurred vision, dry mouth and abdominal pain. There may be increased muscle tone associated with muscle pain and weakness.

More severe toxicity is associated with hypotension *but also* hypertension, hypotonia, hyperreflexia and tachypnoea. Rigidity, hyperpyrexia (body temperature > 39°), delirium, coma, convulsions and cardiac arrhythmias require urgent intervention. Persistent hyperpyrexia may lead to rhabdomyolysis, metabolic acidosis, disseminated intravascular coagulation (DIC) and acute renal and hepatic failure. There may be respiratory distress and ultimately cardiovascular collapse. Deaths from intracerebral haemorrhage have occurred.

MANAGEMENT OF ECSTASY POISONING

- Symptoms of toxicity are many and varied and there is considerable scope for supportive care.
- Gastric lavage is unlikely to remove drug from the gut at the time which patients present but administration of oral activated charcoal slurry may reduce systemic levels.
- An anxiolytic (tranquillizer) such as diazepam (i.v. or oral) in doses of up to 20 mg may control acute anxiety and agitation and will contribute a useful anticonvulsant action. Major tranquillizers such as chloropromazine, on the other hand, may lower seizure threshold, aggravate hypotension and predispose to cardiac arrhythmias and *must not be used.*
- Tachycardia is managed by intravenous beta-blocker therapy and hypertension, if present, by oral nifedipine capsules 5–10 mg. The onset of action of nifedipine is increased by instructing the patient to bite the capsules so releasing drug on to the

buccal mucosa from which rapid absorption follows. If necessary, intravenous vasodilators may be used to control hypertension.

- Hypotension may require treatment with intravenous dopamine (a positive inotrope) if the systemic circulation is severely compromised.
- Rectal temperature must be closely monitored. Any rise above 39°C requires prompt cooling measures and treatment with dantrolene sodium injection (Box).
- Renal function must be carefully monitored throughout and renal failure managed when it arises. Similarly, electrolyte changes are treated appropriately.
- Metabolic acidosis is corrected using intravenous sodium bicarbonate injection.

Dantrolene is a skeletal muscle relaxant drug which acts directly on muscle cells to block the release of intracellular calcium which is necessary for contraction to take place. It counters the damaging effect of elevated body temperature on muscle tissue in hyperpyrexia associated with muscle rigidity and the metabolic consequences of tissue catabolism. Note that it is only effective in this situation by the intravenous route.

Available as 20 mg vial for reconstitution with 60 ml water for injections.

DO NOT MIX WITH OTHER INTRAVENOUS DRUGS.

Dose: 1 mg/kg body weight by rapid iv injection repeated, if necessary, up to a maximum of 10 doses.

Side effects are unlikely with short term administration.

Caution: irritant to veins and surrounding tissue – AVOID EXTRAVASATION.

SUMMARY

Ecstasy, an amphetaine analogue, has become increasingly popular among young users during the 1990s and several well publicized fatalities have been reported in the media during this period. Ecstasy toxicity is not clearly understood, is complex and may prove difficult to treat. The effects of the drug are manifest within 1 hour of oral dosing and usually last for around 6 hours with 'normal doses' but excessive dosage may result in symptoms for much longer, e.g. 24 hours or more. Toxicity can develop relatively quickly and unexpectedly and prompt treatment of fluctuating blood pressure and cardiac rhythm disturbances is often required. More serious is the development of hyperthermia associated with muscle rigidity and metabolic changes which require urgent administration of intravenous dantrolene sodium. Ultimately, however, it may be necessary to ventilate the poisoned patient who fails to respond to such measures.

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