Clinical Toxicology

Delayed sudden death after ingestion of MCPP and ioxynil: an unusual presentation of hormonal weedkiller intoxication

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Summary: A patient who died in asystole less than 18 h after ingestion of 'Clovercide Extra', a combination hormonal weedkiller containing ioxynil and 4-chloro-2-methyl phenoxypropionic acid, is described. Previous reports describe coma as an early event following ingestion of these herbicides. In contrast our patient, although showing other characteristic features, including metabolic acidosis, tachycardia, pupillary constriction and pyrexia, remained conscious until the terminal event. Absence of coma does not appear to be related to a more favourable outcome.

Introduction

Hormonal weedkiller poisoning is usually associated with early coma.^{1–3} We describe a patient who remained conscious for over 17 hours before sudden fatal deterioration.

Case report

A 37 year old housewife presented 8 hours after the deliberate ingestion of 190 ml of 'Clovercide Extra' (Synchemicals Ltd), containing 35 g/l of ioxynil and 105 g/l of 4-chloro-2-methyl phenoxypropionic acid (MCPP) in a hydrocarbon solvent. She was alert and orientated. Pulse was 100/min, regular, blood pressure 130/80 mm Hg and respiratory rate 25/min. Examination was otherwise normal. Serum sodium, chloride and urea were normal but potassium was moderately elevated at 5.9 mmol/l (normal range 3.5–5.0). Liver enzyme activities and arterial blood gas analysis were normal. Creatine kinase was 3901 U/l (normal range 30–140). The electrocardiogram showed sinus tachycardia only. Oily liquid was obtained on gastric aspiration and lavage. A chest X-ray film taken 1 hour later was normal.

Ten hours after ingestion she suddenly became flushed and agitated. Her pulse was 130/min, sinus rhythm, blood pressure unchanged and respiratory

rate 30/min. Pupils were constricted but reacting and examination was otherwise normal. Arterial blood gas analysis showed a compensated metabolic acidosis: pH 7.34, P_{aCO_2} 3.5 kPa, base excess –9.3 mmol/l, standard bicarbonate 17.6 mmol/l and P_{aO_2} 9.7 kPa. Her agitation settled with oral diazepam.

Seventeen hours after ingestion her temperature suddenly rose to 39°C. She was again treated symptomatically but rapidly developed generalized muscle rigidity and cardiac asystole. Immediate resuscitation was attempted. Laryngeal spasm necessitated cricothyroid puncture for airway insertion and there was considerable resistance to chest compression and inflation. She did not respond to intercardiac stimulants or transthoracic pacing.

Blood levels of MCPP were 515 and 451 mg/l at 8 hours and post-mortem respectively. Corresponding ioxynil levels were 317 and 299 mg/l. Autopsy showed moderate pulmonary and cerebral oedema with early necrosis of the centrilobular liver parenchyma and renal tubules on microscopy. There was no obvious abnormality of skeletal or cardiac muscle on gross or microscopic examination.

Discussion

Although hormonal weedkillers are widely used, self-poisoning is rare. Four cases of ingestion of

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combined MCPP and dichlorophenoxyacetic acid (2,4D) have been reported. Two patients developed coma within 2 hours, with tachycardia, pyrexia, meiosis and muscle rigidity.^{1,2}

Investigations showed hyperkalaemia, raised serum creatine kinase and metabolic acidosis. One died in asystole, and post-mortem examination showed pulmonary oedema and liver necrosis.¹ The other recovered after forced alkaline diuresis.² Two other patients presented in coma, but without rigidity or pyrexia.³ Both had mild hypoxia and metabolic acidosis, but no elevation of creatine kinase, and both recovered with rehydration. MCPP levels in all cases were similar to those we report. We found no cases in the literature of MCPP poisoning alone, without 2,4D. It is possible that the early development of coma in all these cases was due to ingestion of the latter.

We are aware of one reported case of fatal ioxynil ingestion. Death occurred 45 minutes after admission to hospital, and autopsy showed oedema of brain, liver and gut, with upper gastrointestinal erosions.⁴ These weedkillers cause uncoupling of

oxidative phosphorylation, and consequently hypercatabolic signs, including pyrexia, tachycardia, acidosis and sympathetic overactivity, would be expected to dominate the initial clinical picture, with subsequent evidence of skeletal muscle damage, including rigidity and raised serum potassium and muscle enzymes.

Forced alkaline diuresis may be beneficial.² The clinical presentation is similar to that of malignant hyperthermia,⁵ which may suggest more specific therapy; unfortunately, the pathophysiology of the changes due to hormonal weedkiller ingestion has not been well defined. We suggest that patients who have taken hormonal weedkillers should be monitored under intensive care conditions regardless of level of consciousness.

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