Fatal xylénol self-poisoning

I.D. Watson, D. McBride and K.R. Paterson¹

Drug Investigation Unit, Department of Biochemistry, and ¹Department of Medicine, Royal Infirmary, Glasgow G4 0SF, UK.

Summary: A case of fatal xylénol ingestion by a long-stay mental hospital patient is described. The clinical course was similar to that observed in other phenolic poisonings with active bowel sounds, nausea and vomiting, severe metabolic acidosis, hypotension and cardiac and renal failure.

The formulation of xylénol ingested contains alcohol which would facilitate absorption; due to the dangers of such poisonings care must be exercised as to access and exposure to xylénol sterilising agents.

Introduction

Xylénol-containing disinfectants are widely used in hospitals for routine cleaning of floors and surfaces and are therefore frequently stored in or near wards. To date, no report of any self-poisoning with these agents has been reported.

Case report

A 59 year old male was an in-patient in a long-stay psychiatric hospital. He had evidence of cerebral damage secondary to prolonged excessive alcohol consumption and had a history of alcohol-related seizures. He often helped the domestic staff with routine duties and thus had access to areas where cleaning equipment was stored. A disposable cup containing approximately 250 ml of stericol hospital disinfectant (Sterling Industrial, Sheffield) was left unattended on a work surface pending dilution and the patient consumed this, allegedly accidentally, believing it to be tea.

He was transferred to the nearest acute medical unit in less than one hour. On admission he was barely rousable with constricted pupils, active bowel sounds, nausea and vomiting. Gastric lavage was undertaken, a quantity of disinfectant being recovered. Supportive therapy was undertaken including administration of intravenous fluids and bladder catheterization, the conscious level improved a little though he remained drowsy. Four hours after admission there was evidence of a severe metabolic acidosis which had progressed from admission and continued to worsen

despite the administration of 250 mmol of bicarbonate; the blood pH after 14 hours was 6.97. Urine output fell almost to nil within 8 hours of admission; latterly the urine was almost black in colour – no haemoglobin or methaemoglobin was detected in blood or urine. Hypotension with reduced cardiac output developed after about 15 hours; echocardiography showed a dilated and poorly contracting left ventricle; there was a mitral systolic murmur which was probably secondary to impaired ventricular function. Despite intravenous dobutamine the patient died 16 hours after ingestion of the stericol.

Post-mortem revealed only minor burns in the oesophagus and stomach and congestion of both liver and lungs, non-specific features in keeping with poisoning by a phenolic agent. The gross pathology of the heart and kidneys was normal.

Analytical

Stericol is a mixture of 6 isomeric xylénols in an alcoholic, anionic detergent base. Assay was performed using liquid chromatography with a 100 mm × 5 mm (i.d.) column packed with 5 μ ODS; the eluant was methanol/water (50:50) at a flow rate of 1 ml/min with detection at 254 nm at 0.005 AUFS. The isomers were contained in two peaks, the larger peak comprising 80% of the total had a k' of 5.7. The equivalence between an accurately prepared solution of phenol and stericol was determined on the basis of peak area, and urine and plasma samples were analysed and reported as phenol equivalents (1 mg phenol = 11.3 mg stericol solution).

Serum stericol levels as phenol equivalents (to obtain stericol solution concentrations multiply by

Correspondence: I.D. Watson, Ph.D., M.Sc., F.I.M.L.S., Dip.Med. Tech.

Accepted: 29 October 1985

11.3) were 17.6, 16.7, 32.8 and 9.5 mg/l at 3.7, 5.3, 11.2 and 16.0 hours post-ingestion and a urine level of 355 mg/litre 6–8 hours post-poisoning.

Comment

Phenol poisonings, once relatively common, are now rare, but occasionally reported (Stajduhar-Caric, 1968; Lewin & Cleary, 1982; Soares & Tift, 1982). Xylenol poisoning has not previously been reported although experience with less toxic chloroxylenol has been published (Joubert *et al.*, 1978). Xylenols are said to be less toxic than phenol following oral ingestion (Edinburgh Poisons Unit, PRESTEL Information Service), the fatal quantity of stericol being about 40 g.

References

- JOUBERT, P., HUNDT, H. & DU TOIT, P. (1978). Severe Dettol (chloroxylenol and terpineol) poisoning. *British Medical Journal*, **1**, 890.
- LEWIN, J.F. & CLEARY, W.T. (1982). An accidental death caused by the absorption of phenol through skin. A case report. *Forensic Science International*, **19**, 177.

The clinical course and post-mortem findings are similar to phenol, though the time between ingestion and death are longer than that usually seen with phenol, perhaps reflecting the lower toxicity of the xylenols. The cardiac and renal failure is probably due to its direct action as a coagulant of cellular protein; this mechanism of action is general and affects all body proteins. Alcohol is known to enhance the absorption of phenol and the alcoholic detergent base of stericol may therefore increase its toxicity.

Xylenol poisoning is similar to poisoning with phenol and should be managed in the same way; the very rapid absorption of these agents makes a fatal outcome after any significant ingestion almost inevitable. Consideration should be given to the use of less toxic agents for general cleaning purposes, especially in hospitals caring for confused or elderly patients.

- SOARES, E.R. & TIFT, P.J. (1982). Phenol poisoning: three fatal cases. *Journal of Forensic Science*, **27**, 729.
- STAJDUHAR-CARIC, Z. (1968). Acute phenol poisoning. Singular findings in a lethal case. *Journal of Forensic Medicine*, **5**, 41.