TOXICOLOGY: AN AUSTRALIAN PERSPECTIVE

Toxicology case of the month: ingestion of two unidentified tablets by a toddler

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Emerg Med J 2006;23:718–720. doi: 10.1136/emj.2006.034926

An asymptomatic 18 month old child presents to the emergency department of a small district hospital shortly after ingesting two unidentified tablets. A small number of pharmaceuticals and illicit drugs may produce life threatening toxicity in a small child if ingested even in one or two dose units and the onset of toxicity may be delayed for some agents. Following risk assessment, a rational management plan is devised and the child is carefully monitored. The patient is observed overnight and discharged home the following day.

lists the agents of concern in Australasia with the nature and onset of their life threatening effects. Of importance, the onset of toxicity may be delayed for some of the listed agents. This is the case for controlled delivery calcium channel blockers (potential delay 12 h), controlled release oral morphine preparations (potential delay 12 h), and sulfonylurea agents (potential delay 8 h).⁷

Our patient is currently asymptomatic. The ingestion is most likely benign. Should she have ingested chloroquine, dothiepin, propranolol, or an amphetamine compound, toxicity will be evident within the next hour or two. However, if she has ingested a calcium channel blocker, sulfonylurea, or oral morphine preparation, onset of life threatening toxicity may be delayed many hours.

Armed with this individualised risk assessment, we can now construct a rational management plan for our patient.

This is a further case in a series presented by the Western Australian Toxicology Service. The cases are selected for their relevance to emergency medicine practice and emphasise the importance of risk assessment in formulating a coherent management plan for the acutely poisoned patient (boxes 1 and 2). These principles were discussed in depth in the introductory article for this series.¹

PATIENT DETAILS

A concerned mother brings her 18 month old daughter into the emergency department of a small district hospital late in the afternoon. About 30 min ago, the child was observed to pick up and swallow two white pills left sitting on the seat of a café. The child is currently well with normal observations. The treating doctor wants to know whether it is acceptable for the child to be discharged home.

RESUSCITATION

There are no immediate resuscitation issues.

RISK ASSESSMENT

If the ingested tablets cannot be identified then this must be considered a potentially fatal ingestion. Although it is far more likely that the ingestion poses little or no risk, there are a small number of pharmaceuticals and illicit drugs that if ingested even in one or two dose units may produce life threatening toxicity in a small child. The agents considered potentially fatal at this dose range are based on reports of paediatric poisoning or extrapolation from adult dose response data, and include tricyclic antidepressants, chloroquine, calcium channel blockers, opioids, amphetamines, propranolol, and theophylline.^{2–6} The exact list varies between countries depending on the available agents and their pharmaceutical presentation. Table 1

SUPPORTIVE CARE AND MONITORING

While ongoing attempts to identify the ingested pill are being made, the child must be admitted and observed for any evidence of developing toxicity related to any one of the pharmaceuticals of concern. For the majority of these agents, early recognition of the toxic effects and timely institution of appropriate supportive care measures will ensure a good outcome. Regular observations should include level of consciousness, vital signs (pulse, blood pressure, and respiratory rate), and early clinical features of hypoglycaemia. Cardiac monitoring may be instituted if there is any abnormality of conscious state or vital signs. Establishment of IV access can be deferred until early evidence of toxicity is apparent.

INVESTIGATIONS

An initial 12 lead ECG and bedside glucose estimation are useful screening tests for cardiotoxicity and hypoglycaemia, respectively. The ECG should be repeated at 2 h intervals for the first 8 h, or if there is a change in the child's clinical condition at any time. Repetitive glucose estimations are not required unless there is clinical evidence of hypoglycaemia. However, another glucose estimation should be performed to demonstrate normal serum glucose just before discharge. A screening paracetamol level is not necessary as the scenario is not one of deliberate self poisoning and the possible ingested dose of paracetamol is well below the threshold for testing of 200 mg/kg. No other investigations

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Accepted for publication 9 May 2006

Box 1 General approach to acute poisoning**1. Resuscitation**

- Airway
- Breathing
- Circulation
- Seizure control
- Correct hypoglycaemia
- Correct hyperthermia
- Resuscitation antidotes

2. Risk assessment**3. Supportive care and monitoring****4. Investigations**

- Screening – ECG, paracetamol
- Specific

5. Decontamination**6. Enhanced elimination****7. Antidotes****8. Disposition****Box 2 Risk assessment**

- A distinct cognitive step
- Quantitative
- Takes into account:

1. Agent(s)**2. Dose(s)****3. Time since ingestion****4. Current clinical status****5. Patient factors**

indicated. Even in this scenario, where the risk assessment indicates that a life threatening ingestion may have occurred, a good outcome is still anticipated with appropriate use of supportive care and antidotal treatment. Administration of activated charcoal (or any other method of gastrointestinal decontamination) could result in serious adverse effects should toxic coma or seizures subsequently develop. Overall, the potential benefits do not outweigh the potential risks and gastrointestinal decontamination is contraindicated.

are indicated unless there is a change in the child's clinical condition.

GASTROINTESTINAL DECONTAMINATION

The vast majority of paediatric ingestions follow a benign clinical course and gastrointestinal decontamination is not

ENHANCED ELIMINATION

Techniques of enhanced elimination are not clinically useful in poisoning by any of the agents in table 1, with the exception of theophylline poisoning. Urgent haemodialysis would need to be considered if clinical features of theophylline toxicity developed (vomiting, tachycardia, seizures) and the diagnosis was confirmed with serum levels.

Table 1 Two tablets potentially lethal if ingested by a 10 kg toddler

Agent	Principal features of severe toxicity
Amphetamines Amphetamine Metamphetamine MDMA (Ecstasy)	Agitation, confusion, hypertension, hyperthermia
Calcium channel blockers Diltiazem CD 180, 240, or 360 mg Verapamil SR 160, 180, or 240 mg	Delayed onset of bradycardia, hypotension, conduction defects, refractory shock
Chloroquine 155 mg Hydroxychloroquine 200 mg	Rapid onset of coma, seizures, and cardiovascular collapse
Doloxene 100 mg	Ventricular tachycardia
Opioids Oxycodone 5 mg Methadone 10 mg Morphine sulphate 5, 10, 15, 30, 60, 100, 200 mg (controlled release) Diphenoxylate/atropine 2.5/25 mg	Coma, respiratory arrest. May be delayed with diphenoxylate/atropine and controlled release morphine
Propranolol 160 mg	Coma, seizures, ventricular tachycardia, hypoglycaemia
Sulfonylureas Glibenclamide 5 mg Glibenclamide/metformin 1.25/250 mg, 2.5/500 mg, 5/500 mg Gliclazide 80 mg Gliclazide modified release 30 mg Glimepiride 1, 2, 3, 4 mg Glipizide 5 mg	Hypoglycaemia. Onset may be delayed up to 8 h.
Theophylline SR 200, 250, 300 mg	Seizures, supraventricular tachycardia, vomiting
Tricyclic antidepressants Dothiepin 75 mg	Coma, seizures, hypotension, ventricular tachycardia

Box 3 Poisoning by unidentified tablets in toddlers

- A small group of medications are potentially lethal when ingested by a toddler in amounts of only one or two tablets.
- Ingestion of one to two unidentified tablets by a toddler mandates 12 h of focused observation at a suitable hospital, with discharge only occurring during daylight hours.

ANTIDOTES

Antidotes could potentially play an important role in the management of this case if clinical evidence of poisoning from an opioid, sulfonylurea, or tricyclic antidepressant develops during the observation period. The relevant antidotes are naloxone, octreotide, and sodium bicarbonate. These agents should be readily available at the treating hospital and the treating staff should be familiar with the indications and contraindications, methods of administration, adverse effects, and clinical endpoints of their use. Alternatively, they should be able to rapidly access this information should it be required.

DISPOSITION

This child requires admission and close observation for a minimum of 12 h, and should not be discharged during the night. All staff must be briefed on the clinical features of the poisoning for which the child is being observed. The admitting institution must have the equipment and personnel necessary to manage the initial resuscitation of the sick

child. It should also have available the antidotes that may be required, plus a plan for safe transfer to a larger centre if clinical deterioration occurs. If these conditions cannot be met, early transfer of the stable child is preferable.

CLINICAL PROGRESS

As the hospital staff felt they were unable to provide a suitable level of care overnight for this child, she was transferred to a regional centre and observed overnight. She remained asymptomatic and was discharged home with her parents the following day. The ingested tablets were never identified.

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REFERENCES

- 1 **Daly FFS**, Little M, Murray L. A risk assessment based approach to the management of acute poisoning. *Emerg Med J* 2006;**23**:396–9.
- 2 **Bar-Oz B**, Levichek Z, Koren G. Medications that can be fatal for a toddler with one tablet or teaspoonful. *Paediatric Drugs* 2004;**6**:123–6.
- 3 **Sachdeva DK**, Stadnyk JM. Are one or two dangerous? Opioid exposure in toddlers. *J Emerg Med* 2005;**29**:77–84.
- 4 **Rosenbaum TG**, Kou M. Are one or two dangerous? Tricyclic antidepressant exposure in toddlers. *J Emerg Med* 2005;**28**:169–74.
- 5 **Smith ER**, Klein-Schwartz WK. Are 1–2 dangerous? Chloroquine and hydroxychloroquine exposure in toddlers. *J Emerg Med* 2005;**28**:437–43.
- 6 **Little GL**, Boniface KS. Are 1–2 dangerous? Sulfonylurea exposure in toddlers. *J Emerg Med* 2005;**28**:437–43.
- 7 **Quadrani DA**, Spiller HA, Widder P. Five-year retrospective evaluation of sulfonylurea ingestion in children. *J Toxicol Clin Toxicol* 1996;**34**:267–70.