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ABSTRACTS

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1. Deltamethrin poisoning in two children following treatment of head lice with a veterinary product

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Objective: Using chemicals, including veterinary drugs not intended for human therapy, can be a serious health risk. We present two cases of severe acute deltamethrin poisoning in children following intentional treatment with a veterinary product.
Case report: The mother of two girls aged 6 (patient 1) and 12 years (patient 2) washed their hair with a veterinary ectoparasitic product for cattle and sheep containing 5% deltamethrin (Butox®) for pediculosis capitis (head lice). The product was left on for 15 minutes and on washing off it got into the eyes and mouths of the children. Within a few minutes both developed vomiting and dizziness, and on admission to hospital they had mental confusion, anxiety, excitation, pallor, acrocyanosis, cold extremities and dilated pupils. Patient 1 also had uncontrolled vomiting. Both had arterial hypertension (arterial BP 140/90 mmHg) and tachycardia (140 bpm patient 1; 120 bpm patient 2). Within a few hours superficial coma, divergent squint, upper deviation of eyeballs, reduced muscle tension, muscle spasm in distal sections of extremities and absence of tendon reflexes were noted. Clinical and biochemical blood and urine analyses were normal, except for moderate changes of acid–base balance indices: pH 7.140, pCO_2 60.5 mmHg, pO_2 29.3 mmHg, bicarbonate 20.6 mmol/L, base excess −8.5 mmol/L, oxygen saturation 38.1%, which later resolved to pH 7.396, pCO_2 39.1 mmHg, pO_2 104.7 mmHg, bicarbonate 24.0 mmol/L, base excess 0.9 mmol/L, oxygen saturation 98.0%. Radiographs showed bilateral focal-confluent shadows along all pulmonary fields. They were intubated with artificial ventilation for 10–12 hours. Local therapists consulted both the Astana Toxicological Center in Kazakhstan and Moscow Poison Information Center specialists for advice on management. Therapy was symptomatic, which also included gastric lavage, administration of activated charcoal and forced diuresis. Consciousness improved and neurologic symptoms resolved on the second hospital day in patient 2. In patient 1 neurologic symptoms resolved after 4 days. Both children recovered without complications and were discharged from hospital on the 8th day.
Conclusion: This case demonstrates the risks of using veterinary drugs not intended for human use, and the favorable prognosis in deltamethrin poisoning. It is also a good example of international collaboration of toxicological centers.

2. Polyneuropathy following fenitrothion poisoning

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Objective: Organophosphorus insecticide-induced neurotoxicity includes acute cholinergic crisis, intermediate syndrome, and delayed neurotoxicity [1]. We report a case of severe fenitrothion poisoning with an unusual polyneuropathy.
Case report: A 60-year-old female with a history of hypertension and depression, ingested approximately 100 mL of 40% fenitrothion (O,O-dimethyl-O-4-nitro-*m*-tolyl phosphorothioate) solution with 400 mL of 8% ethanol in a suicide attempt. Following an acute mild cholinergic phase for 55 hours after ingestion treated with atropine (2.0–4.0 mg/day) and pralidoxime (12 g/day), she developed respiratory muscle weakness and decreased level of consciousness, which combined with aspiration pneumonia, necessitated intubation and mechanical ventilation. Glycopyrronium (1.2–2.4 mg/day), and pralidoxime (12 g/day, every other day) were given until hospital day 36. By hospital day 16, her pneumonia was much improved. She became fully alert and maintained neck flexion against gravity. She could not, however, be weaned off the mechanical ventilator, and had reduced deep tendon reflexes, sensory change on distal upper extremities and motor weakness on upper and lower extremities. Electrophysiological studies on hospital day 21 showed polyneuropathy with the absence of a decremental response on repetitive stimulation, and a decreased amplitude of sensory (digital nerve 9.0–9.7 microvoltage) and motor action potential (median nerve 3.4–4.6 millivoltage, ulnar nerve 3.8–4.2 millivoltage, common peroneal nerve 2.3–2.9 millivoltage), which had dramatically improved by hospital day 35 with antidote therapy and conservative care. On hospital day 42, the patient was discharged in good medical condition.
Conclusion: Our patient showed organophosphorus insecticide-induced neurotoxicity with acute cholinergic crisis, intermediate syndrome, and delayed neurotoxicity. Although it was uncertain, electrophysiological findings and no progression of weakness in our patient seemed to be consistent with critical illness polyneuropathy [1,2]. One study found that prognosis of fenitrothion poisoning is related to time to presentation after ingestion, initial serum concentration, and acute lung injury [3], which was consistent with our patient. Clinicians should pay careful attention to patients with fenitrothion poisoning as delayed intermediate syndrome and acute lung injury might frequently occur, and are related to high morbidity and mortality.

Abstract 238 was originally published with errors. This version has been corrected. Please see Corrigendum (http://dx.doi.org/10.1080/15563650.2017.1322791).

Objective: Acetylcysteine (NAC) is an effective antidote for paracetamol poisoning. However, NAC side effects are common and may be related to the rapid initial infusion rate of the traditional 3-bag protocol, the first bag at 150 mg/kg over 1 hour. A protocol change at our institution occurred in February 2015 to a modified 2-bag infusion: 1st bag 200 mg/kg over 4 hours (50 mg/kg/h) and 2nd bag 100 mg/kg over 16 hours. We hypothesized that a modified 2-bag NAC protocol will result in fewer side effects.
Methods: A retrospective cohort study. We reviewed our service patient database from August 2010 to September 2016 for paracetamol overdose requiring NAC treatment. Data was extracted on demographics, details of paracetamol overdose and NAC infusion, as well as adverse effects. Patient cohorts before and after protocol change (3-bag versus 2-bag NAC infusions) were compared for adverse effects using chi-squared testing.
Results: Over the study period 1011 paracetamol poisonings presented to our toxicology service, of which 468 required NAC infusions (2-bag = 156 and 3-bag = 312). Demographic characteristics of the 2 groups were similar. Fewer anaphylactoid reactions (itch, rash, swelling) occurred in the 2-bag group 13.1% versus 4.5%, $p = .004$), an absolute reduction of 8.7%. Similarly, there were fewer prescriptions of anti-allergy medications in the 2-bag group (10.3% versus 3.8%, $p = .017$). No differences were found in rates of hypotension (9.3% versus 7.1%) or vomiting only after NAC (13.8% versus 12.8%) or hepatotoxicity (4.5% versus 3.8%, $p =$ NS). Hypotension was mild in only 5 patients (1%), defined as a systolic blood pressure under 90 mmHg. Post-NAC vomiting and hypotension is likely multi-factorial due to vagal stimulation and the presence of co-ingestants. There were no transfers to a liver unit or requirement for transplant.
Conclusion: Adverse reactions to NAC were reduced with the simplified 2-bag infusion protocol, with a 66% reduction in anaphylactoid reactions. Other advantages include less preparation time for nurses and potentially fewer medication errors. Our study adds to a growing body of evidence that a modified 2-bag NAC infusion protocol results in fewer adverse effects, and that reconsideration of guidelines for treating paracetamol poisoning is required.

25. Palatability of tablets and capsule forms of N-acetylcysteine and methionine and associated adverse events in healthy volunteers

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Objective: To evaluate the palatability and adverse events associated with tablets and capsule forms of N-acetylcysteine (NAC) and methionine in healthy volunteers to guide the provision of cost-effective antidotes.
Methods: Forty healthy students were enrolled in this single blind randomized control study. Each volunteer was randomly assigned to receive therapeutic doses of NAC (70 mg/kg) in capsules (NAC_cap), NAC tablets (NAC_tab), methionine (2500 mg) capsules (Meth_cap), methionine tablets (Meth_tab) and folic acid as a control over five weeks. Volunteers were kept isolated in 5 rooms of a tertiary care hospital and were asked to rate the taste, smell, ability to swallow, after taste and overall acceptability in a Visual Analog Scale (VAS) from 0 to 5 (100 mm) and any adverse events that occurred within 1 hour. VAS scores were analyzed by Friedman's non-parametric and Wilcoxon sign rank tests.
Results: Forty students were enrolled but only 33 (9 females and 24 males) completed all 5 dosage forms. Median age was 23 (IQR 23–22) years. Palatability ratings (Table 1) for taste, smell and "ease to swallow" were similar (Friedman's 4.7, $p = .19$, Friedman's 2.6, $p = 0.46$, Friedman's 6.5, $p = .09$). However, there were significant differences in after taste (Friedman's 9.8, $p = .02$) and overall acceptability (Friedman's 10.2, $p = .02$). The rank order of overall acceptability was NAC_cap, NAC_tab, Meth_tab and Meth_cap with statistically significant differences ($p < .01$) between Meth_cap and Meth_tab, NAC_cap and Meth_cap, NAC_tab and Meth_cap. NAC_cap had a more acceptable after taste than Meth_cap ($p = .001$). There were no reported adverse events with Meth_tab. Five reported mild nausea and two abdominal discomfort with Meth_cap. Mild nausea was also reported with NAC_cap ($n = 2$) and NAC_tab ($n = 2$).
Conclusion: NAC capsules were the preferred preparation, but all were palatable and tolerated sufficiently well to be used in resource poor settings. Nausea was infrequent with any preparation.

Table 1. Acceptability of N-acetylcysteine and methionine tablets and capsules with folic acid control in volunteers (using a Visual Analog Scale in millimetres).

Parameter		Folic acid	Meth_tab	Meth_cap	NAC_cap	NAC_tab
Smell	Mean	97	82	75	81	87
	SD	6	13	24	22	18
	IQR (Q3–Q1)	100–91	90–70	97.5–60	100–80	100–80
Taste	Mean	98	87	80	87	82
	SD	3	15	19	15	20
	IQR (Q3–Q1)	100–100	100–80	100–69	100–80	100–80
After taste	Mean	97	88	78	90	86
	SD	6.4	15.3	19.9	10.63	16.12
	IQR (Q3–Q1)	100–97	100–80	98–60	100–80	100–80
How easy to swallow	Mean	96	66	61	73	69
	SD	10	23	28	23	26
	IQR (Q3–Q1)	100–98	80–47	85–45	88.5–62.5	90–60
Overall acceptability	Mean	97	80	71	83	82
	SD	5	13	21	17	17
	IQR (Q3–Q1)	100–93	90–75	85–60	99–80	90–80