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Case Report

Two cases of overdose of trichlofos

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Introduction

There is a great deal of experience with chloral hydrate as an oral sedative/hypnotic in children.¹ However, similar literature about trichlofos which is closely related is relatively scarce. Because of its wide usage and low incidence of side effects, trichlofos is frequently given without proper supervision and this may lead to unforeseen complications as elucidated by following two cases.

Case 1

A 4-year-old female patient was brought to the emergency department for non-arousal from sleep, four hours after a CT scan for a suspected seizure episode. There was no neurological anomaly besides this. Clinically, she was found to be comatose with GCS 6/15. She weighed 9 kg and had microcephaly (46 cm), mild tachycardia with maintained blood pressure and moderate dehydration. Pupils were of

normal size with sluggish reaction to light. She had generalised hypotonia and planters were absent. However, corneal and gag reflexes were present. Deep tendon jerks showed no asymmetry. Parents and CT scan centre technical staff were interviewed regarding the sedation administered to the patient. There being no in-house facility, CT scan was outsourced and the usual practice was to give parents a bottle of syrup trichlofos and they were told to give 5 ml by marked cap and repeat the dose if the patient does not sleep in 15 min. In this case, parents gave the doses themselves but they kept repeating it as the patient was not sleeping and one dose of syrup diazepam was given by staff in CT centre as the patient was still not sedated despite “adequate” dose of trichlofos. On retrospective calculations based on parent's interview, she received trichlofos – 3750 mg (=416.7 mg/kg) and diazepam – 10 mg (1.1 mg/kg). With the supportive care, she made a slow steady improvement in sensorium whereby she was arousable to pain stimulus after five hours since the time of her admission. After seven hours, she was cranky, irritable, and ataxic. By twenty-five hours post admission, she limped back to her normal neurological status.

Case 2

A two-year-old male patient, a known case of seizure disorder and microcephaly, was referred for EEG evaluation to a private facility. He was sedated with Syrup trichlofos – 3550 mg (507.15 mg/kg). Reason for oversedation was similar to previous case, that is, unsupervised administration by parents and repeating the dose till the patient was asleep. The patient was brought to the hospital for non-arousal from sleep two hours after the procedure. He was found to have tachyarrhythmia. On ECG monitoring, it was found to be narrow complex

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tachycardia with no P wave discernable; however, the patient remained hemodynamically stable. Arrhythmia was monitored and improved after 30 min of observation. With appropriate supportive care, he recovered back to his normal neurological status after ten hours of sedation with Syrup trichlofos. He was later evaluated for any pre-existing structural or functional cardiac defect and was found to have no anomaly.

Discussion

For decades, chloral hydrate has been widely used for short-term sedation of children. Trichloroethanol is the active metabolite of chloral hydrate. Trichlofos is monophosphate sodium salt of trichloroethanol. Trichlofos is preferred over chloral hydrate because of unpleasant taste of chloral hydrate.² One gram of trichlofos is equivalent to 600 mg of chloral hydrate. Therapeutic dose of trichlofos is 25–30 mg/kg although doses as high as 75 mg/kg have also been tried but it was found that for children weighing more than 15 kg, higher doses of chloral hydrate (and presumably also of trichlofos) are not effective.³ It is metabolised to active component trichloroethanol and onset of action is within 30 min and lasts up to 8–12 h.⁴ Common adverse effects include gastric irritation, flatulence, abdominal distension, rashes, headache, delirium, dizziness, dependence, nausea and vomiting. Excessive or repetitive doses have been associated with cardiac arrhythmias. ECG monitoring is must while monitoring cases of trichlofos overdosage to look for potentially fatal arrhythmias like torsades de pointes⁵ or ventricular fibrillations apart from a narrow complex supra ventricular tachycardia as was observed in one of our cases. Seizures and microcephaly were present in both of our cases, but it could be coincidental as literature search did not reveal any correlation with head circumference but seizure disorder when associated with cerebral palsy has been associated with susceptibility to trichlofos over dosage.⁶ Trichlofos in repetitive doses to maintain prolonged sedation in infants and children during mechanical ventilation leads to accumulation of active metabolites, namely trichloroethanol and trichloroacetic acid.⁷ In one study, concentration of its active metabolite, especially trichloroethanol, did not decline in infants for 6 days after a single 50 mg/kg dose of chloral hydrate.⁸ There is evidence that trichloroethanol may increase the risk of both direct and indirect hyperbilirubinemia in newborns.⁹ Besides newborns, other high-risk groups include patients with hepatic and renal impairment, and combination with other sedatives as what happened in our first case. In their retrospective study on adverse effects of oral sedatives, Charles et al. have reported 20 cases of adverse effects with chloral hydrate, with 15 resulting in fatality. Cerebral palsy with seizure was a risk factor in their series besides tracheomalacia, tracheostomy, congenital heart disease, Mobius' syndrome, pulmonary artery hypertension and neonatal apnea.⁶ Because of its long half life, habitual intake of trichlofos to induce sleep can also lead to dangerously high levels of its active metabolite namely trichloroethanol. Combination with other sedative, as in our first case, is also known to prolong the sedation. Combining

trichlofos with benzodiazepine is not an uncommon practice for sedation.¹⁰ High concentrations of trichloroacetic acid may contribute to metabolic acidosis. This drug should not be used for continuous sedation. In a reported case of an infant who developed respiratory depression and hypotonia following multiple doses of chloral hydrate administered for maintaining sedation while on mechanical ventilation, serum levels of trichloroethanol were elevated seven fold than that associated with sedation in adults.¹¹ Management of acute poisoning is essentially conservative. As it is rapidly absorbed, gastric lavage has no role. Intubation may be required to protect airway due to altered sensorium or if unstable dysrhythmias develop. The lethal dose of chloral hydrate and presumably of trichlofos in humans is about 10 g; however, a fatal outcome was reported after ingestion of 4 g, and recovery has been seen after a dose of 30 g.¹²

Conclusion

The aim of this case report is to highlight the abuse potential of trichlofos in medical facilities where the drug is administered by a paramedical staff with the casual approach and inappropriate monitoring post-sedation, in the absence of a trained paediatric resuscitator.

Conflicts of interest

The authors have none to declare.

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