

Accidental ecstasy poisoning in a five-year-old boy

一名 5 歲男孩意外的搖頭丸中毒

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We report a 5-year-old child with fever and confusion after ingestion of a tablet of methylenedioxymethamphetamine (MDMA). He was treated successfully with supportive measures and titrated doses of benzodiazepine. In children with unexplained fever, sympathetic hyperactivity, confusion or convulsion, MDMA poisoning should be considered. (*Hong Kong j.emerg.med.* 2008;15:111-114)

本文報告一名 5 歲大的孩子服食一粒亞甲基二氧甲基苯丙胺後發燒及精神錯亂。支援性措施及苯二氮草劑量滴定成功治療病者。如兒童出現原因不明的發燒、交感神經性過度活躍、精神錯亂或痙攣，應考慮亞甲基二氧甲基苯丙胺中毒。

Keywords: Benzodiazepines, confusion, N-methyl-3,4-methylenedioxyamphetamine, poisoning, preschool child

關鍵詞： 苯二氮草、精神錯亂、N-甲基-3,4-亞甲基二氧苯丙胺、中毒、學前兒童

Introduction

Ecstasy (3,4-methylenedioxymethamphetamine, MDMA) is a commonly abused soft drug in Hong Kong. It is the second most commonly abused drug in persons aged less than 21 and the 4th most commonly abused drug in all ages from 2001 to 2006.¹ Unintentional poisoning to children may occur in the

drug abuser's home environment. However, paediatric MDMA poisoning has not been reported locally.

Case report

A 5-year-old boy was noticed to be agitated with elated mood by his sister. The child had uneventful birth history and enjoyed good past health. He had no fever or recent injury. The child admitted taking a white pill found on his sister's bed in the morning. Symptoms started about 1 to 2 hours after the ingestion. His sister gave him 0.5 litre of water to drink. After which, he was brought to the emergency department.

He was assessed 4 hours after the ingestion. His blood pressure was 148/109 mmHg with pulse rate 153 beats per minute. His temperature was 38.1°C. His respiratory rate was 28 breaths per minute. His oxygen saturation was 98% on room air. He was orientated but restless. He had dilated pupils of 7 mm with sluggish light responses. His skin was dry initially. His

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bowel sound was decreased. He had no urinary retention. The tentative diagnosis was sympathomimetic poisoning. Titrated doses of diazepam, starting with 2.5 mg, were given intravenously to control the agitation and facilitate examination and 150 ml of 0.9% normal saline was infused over 1 hour. The electrocardiogram showed sinus tachycardia with normal QRS and QT duration. Bedside urine immunoassay kit test (ACON[®]) was positive for methamphetamine and MDMA. A further 20 mg of valium was given in divided doses over 20 minutes. The child was under close observation and monitoring. He improved clinically with lowered respiratory rate and heart rate of 16 breaths per minute and 120 to 130 beats per minute respectively. The computed tomography of brain was normal. He was admitted to the paediatric intensive care unit (ICU) for further care.

On arrival at the ICU, his temperature was 37.5°C. His blood pressure was 114/85 mmHg. His pulse rate was 92 beats per minute. His respiratory rate was 25 breaths per minute. Hydration was improved with intravenous fluid infusion. The complete blood count and liver and renal function tests were normal. The peak blood creatine kinase, which was performed 8.5 hours after the ingestion, was 651 IU/L (normal 18 - 158 IU/L). He had good urine output. The urine myoglobin was negative. Blood paracetamol and salicylate were not detectable. He was transferred to the general ward the next day. Urine drug screening by high performance liquid chromatography detected MDMA, methylenedioxyethylamphetamine (MDEA) and methylenedioxyamphetamine (MDA). MDEA was likely present in the ecstasy tablet. MDA could be present in the tablet or formed by the metabolism of MDMA or MDEA. His complicated social background was investigated and managed accordingly. He was discharged uneventfully on day 4.

Discussion

MDMA is an amphetamine derivative. It releases endogenous catecholamines such as noradrenaline, serotonin and dopamine, resulting in sympathomimetic

poisoning.² In a tablet of ecstasy, the amount of MDMA varies from 30 to 150 mg.³ MDEA, MDA or methamphetamine may also be found. A study in Hong Kong in 2006 showed that the average MDMA content in an ecstasy tablet was 43 mg.⁴

The clinical features of reported paediatric MDMA poisoning were summarised in Table 1.⁵⁻¹³ They usually had early onset of symptoms (30 to 50 minutes), hyperthermia, tachycardia and convulsion. Intubations were performed for half of the patients. All patients recovered with supportive care. In children with unexplained fever, sympathetic hyperactivity, confusion or convulsion, MDMA poisoning should be considered.

Our patient developed confusion, fever and agitation 1 to 2 hours after the ingestion, which was not typical comparing with the reported cases. The difference in age and the variable MDMA content in ecstasy tablets may contribute. Other possible reasons include racial genetic polymorphism and inability of the sister to detect the early features.

Supportive management includes rapid cooling, sedation with benzodiazepine and treatment for complications, including convulsion, hypertensive emergency and rhabdomyolysis. Gastrointestinal decontamination is considered when the patient presents early. Activated charcoal is easier, more feasible and practical comparing with gastric lavage in paediatric patients.

Benzodiazepine is the preferred drug to control agitation. However, the optimal dose is not well defined. In paediatric convulsion management, the initial doses of diazepam and lorazepam are 0.2 mg/kg and 0.1 mg/kg respectively. In paediatric chemical restraint, lorazepam 0.05 to 0.1 mg/kg per dose was suggested.¹⁴ According to a case series of acute methamphetamine paediatric toxicity, initial doses of lorazepam given were 0.04 to 0.8 mg/kg. The total doses of lorazepam given were 0.04 to 2.45 mg/kg.¹⁵ The dosing of benzodiazepines in metamphetamine poisoning cannot be applied directly in MDMA poisoning. Diazepam 1.5 mg/kg was given in our

Table 1. Summary of the clinical features of reported paediatric MDMA poisoning

Authors	Year of publication	Age (month)	Ecstasy ingested (tablet)	Onset (min)	Convulsion (Y/N)*	Temp (°C)	Pulse (per min)	Blood pressure (mmHg)	Peak creatine kinase (U/L)	Intubation (Y/N)*	Drug treatment (iv, pr)†
Kung SW (present report)	2008	60	1	60-120	N	38.1	153	148/109	651	N	Diazepam 22.5 mg iv
Feldman KW	2007	28 ‡	Unknown	? 120	N	Afebrile	Normal	115/61	2854	N	Not mentioned
van Rijswijk CW	2007	8	? 1	<120	Y	38.9	210	125/70	1681	N	Diazepam 10 mg pr
Corien WE	2006	8	2-3	30	N	38.6	140-180	130/80	4014	Y	NaHCO ₃ iv
Duffy MR	2006	17	<1	5	Y	38.5	150	130/70	288	Y	Diazepam 5 mg pr, Lorazepam 2 mg iv, Midazolam infusion, Atracurium 10 mg iv
Chang YJ	2005	20	1	50	Y	38.3	163	108/82	142	N	–
Campbell S	2005	15	1	–	Y	–	200	97/60	–	Y	Diazepam pr, Paraldehyde pr, Lorazepam iv, Phenytoin infusion
Abian MM	2004	14	<1	40	Y	38	130	120/60	–	N	Benzodiazepine iv
Cooper AJ	1997	24	?	–	Y	39	207	120/60	–	Y	Diazepam iv
Bedford Russell AR	1992	13	1	30	Y	–	170	180/70	–	N	Diazepam 2.5 mg/kg iv, Haloperidol 0.4 mg/kg iv, Chlormethiazole infusion 10 mg/kg/hr

* Y and N stand for yes and no respectively

† iv and pr stand for intravenous and rectal respectively

‡ The child had heatstroke-like multi-organ injury, right adrenal haemorrhage and ascites

patient, which was much higher than the usual dose used in the management of convulsion. Higher than usual but titrated doses of benzodiazepines seem to be necessary in MDMA toxicity. In adults, up to 100 mg diazepam or its equivalent has been used in the treatment of delirium with amphetamine poisoning.²

MDMA is a weak base, and its renal clearance is reduced with urine alkalization. However, urine alkalization is considered in acute MDMA poisoning with significant rhabdomyolysis.¹⁶

Prompt diagnosis, adequate supportive care, or perhaps more importantly education on safe home environment and prevention of drug abuse can help preventing morbidity and possible mortality in paediatric MDMA poisoning.

Conclusion

Unintentional MDMA poisoning may occur in children. It should be considered in children with unexplained fever, sympathetic hyperactivity, confusion or convulsion. Supportive measures with titrated benzodiazepine use are the main stage of treatment.

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