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Hong Kong Journal of Emergency Medicine

A paediatric case of acute respiratory distress syndrome following toxicity due to ecstasy

搖頭丸毒性引發急性呼吸窘迫綜合徵的兒科案例

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Ecstasy, the street name for 3,4-methylenedioxyamphetamine, is a derivative of amphetamine with sympathomimetic effects and may cause life-threatening sudden cardiac arrhythmias, severe hyponatraemia, seizures and multiple organ failures. A three-year-old male child had been intubated after a seizure due to accidental intake of ecstasy when he presented to our paediatric emergency unit. On physical examination, the patient had poor health status and was unconscious and his pupils were mydriatic, his body temperature was 37.6 degree Celsius, his heart rate was 148/min, his blood pressure was 120/80 mmHg, his PaO_2/FiO_2 was 72 mmHg and his oxygen index was 18. Toxicological analyses showed 3,4-methylenedioxyamphetamine. The patient was diagnosed as acute respiratory distress syndrome. Appropriate ventilation strategies were used. On the ninth day after his admission, the patient had stabile vital signs and he was discharged. In this report, this three-year-old paediatric case of acute respiratory distress syndrome due to ecstasy intake will be presented. (Hong Kong j.emerg.med. 2016;23:238-241)

搖頭丸是苯丙胺的衍生物3,4-亞甲苯丙胺的俗稱，具有擬交感神經效應，並可能導致危及生命的突然心律失常，嚴重低鈉血症、癲癇發作和多器官衰竭。一名三歲男孩誤服搖頭丸後驚厥發作，送到兒科急診室時氣管已插管。體格檢查發現，男童健康狀況不佳，不省人事，瞳孔散大，體溫為攝氏37.6度，心率為148/分鐘，血壓 120/80 毫米汞柱，動脈血氧分壓 / 氧濃度為 72 毫米汞柱，而氧指數為 18 。毒理學分析顯示3,4-亞甲苯丙胺。病人被診斷為急性呼吸窘迫綜合徵。使用了適當的通氣策略。他在入院後的第九天生命體徵趨於平穩，可以出院。在這份報告中，我們將介紹這名三歲小兒因攝入搖頭丸導致急性呼吸窘迫綜合徵的病例。

Keywords: Amphetamine, child, hallucinations, human, seizure

關鍵詞：苯丙胺、兒童、幻覺、人、驚厥

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Introduction

3,4-methylenedioxyamphetamine (MDMA) is a derivative of amphetamine.[1] All derivatives of amphetamine except for methylphenidate are forbidden in Turkey. MDMA, illegally purchased, is informally called ecstasy by its users. It has such other street names as X, white doves and fly.[2] MDMA inhibits reuptake of or increases releases of presynaptic serotonin (5-HT), dopamine and norepinephrine. That is, it has sympathomimetic effects. MDMA causes

symptoms 20-30 minutes after its oral intake[3] and it reaches its maximum concentrations in blood 1.5-3.0 hours after its intake.[4] Acute symptoms of MDMA intake are agitation, delirium, ventricular arrhythmia, tachycardia, hyperthermia, severe hyponatraemia due to inappropriate secretion of antidiuretic hormone (ADH), seizures, hypoglycaemia, hypertension, intracranial haemorrhage secondary to hypertension, rhabdomyolysis, acute respiratory distress syndrome (ARDS), widespread intravascular coagulation, multiple organ failure, coma and death.[5,6]

There have been paediatric cases of toxicity due to accidental intake of ecstasy. These children have been reported to have hypertension, hyperthermia, generalised seizures, tachycardia and arrhythmia.[7,8] ARDS due to ecstasy intake rarely appears. There have been few adult cases of ARDS due to ecstasy intake.[9,10] However, there have not been any child cases of ARDS due to ecstasy. A three-year-old child case of ARDS resulting from ecstasy intake will be presented here.

Case report

A three-year-old boy with no health problems diagnosed before was taken to an emergency unit of a hospital by his father when he had a generalised tonic-clonic seizure following accidental intake of one pill of ecstasy with unknown time of ingestion. The patient underwent gastric irrigation and was administered activated charcoal. He was also injected four times 0.1 mg/kg midazolam for his seizure. Since his seizure continued, he was administered 10 mg/kg phenytoin and intubated. Then, he was referred to our paediatric emergency unit. On admission to the paediatric emergency unit, the patient was unconscious and his pupils were mydriatic, but examinations of the other organ systems did not show remarkable features. His body temperature was 37.6 degree Celsius, his heart rate was 148/min and his blood pressure was 120/80 mmHg. Results of the laboratory investigations were as follows: Haemoglobin: 11.1 g/dl, white blood cell (WBC) count: 13.2 x 10^9/L, platelet count: 352 x 10^9/L, glucose: 273 mg/dl, blood urea nitrogen (BUN): 5 mg/dl, creatinine (Cr): 0.42 mg/dl, Na: 129 mmol/L, K: 3.2 mmol/L, aspartate aminotransferase (AST): 30 IU/L, alanine aminotransferase (ALT):18 IU/L, LDH: 228 IU/L, creatinine kinase (CK):86 IU/L, creatinine kinase-MB (CK-MB) isoenzyme: 7.5 ng/ml and troponin I: 0.01 μg/L; blood gases pH: 7.3, PaO_2: 55 mmHg, $PaCO_2$: 45 mmHg, HCO_3: 20.6 mmol/L, base excess (BE): -3.9 mmol/L, PaO_2/FiO_2=72 mmHg and oxygen index: 18. CT brain showed no intracranial haemorrhage. Toxicological analyses showed MDMA. On electrocardiogram (ECG), there was sinus tachycardia and QTc was 0.46 msec. X-ray of the lungs demonstrated infiltrations in the parenchyma of the both lungs (Figure 1). The patient was admitted to the paediatric intensive care unit. The patient was supported with mechanical ventilation and he was initiated 0.1 mg/kg/hour infusion of midazolam and remifentanyl for sedation and analgesia and 5 mg/kg maintenance of phenytoin, initiated before, was continued and 5 mg/kg phenobarbital was added for convulsions. Echocardiography revealed that the ejection fraction was 68%, fractional shortening was 37% and other cardiac functions were normal. The patient was followed on mechanical ventilation at the pressure controlled SIMV mode (synchronized intermittent mechanical ventilation) with PIP (peak inspiratory pressure) of 25, PEEP (positive end expiratory pressure)

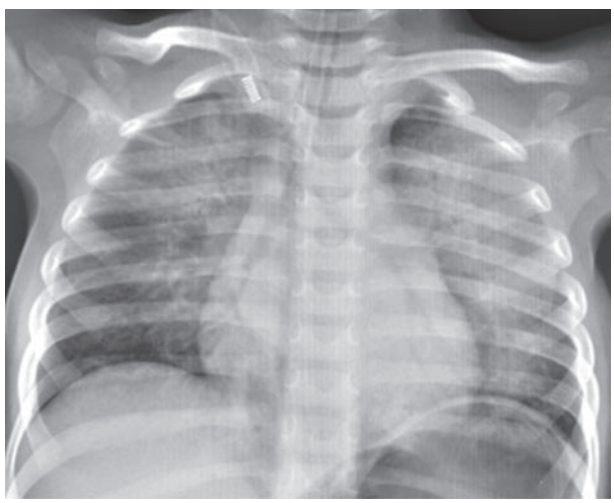


Figure 1. Increased infiltration in the parenchyma of both lungs: view of acute respiratory distress syndrome was noticed in the patient's chest X-ray.

of 8 and Fr (frequency) of 25. When oxygenation improved, mechanical ventilation was reduced gradually and the patient was extubated on day 3 of his admission to the paediatric intensive care unit. On the third day of his admission, his antiepileptic medications were discontinued since he did not have any seizures. Analyses of electrolyte concentrations and biochemistry were performed to check the clinical picture and they were normal. Chest X-ray was also normal (Figure 2). On the ninth day of his admission, his vital signs and general health status were good and he was discharged.

Discussions

3,4-methylenedioxyamphetamine, called ecstasy on the streets and forbidden by laws, is a derivative of amphetamine with sympathomimetic effects. Ecstasy, taken by adults to feel euphoria, may cause life-threatening sudden cardiac arrhythmias, severe hyponatraemia, seizures, ARDS and multiple organ failures.[5,6] There have been many paediatric cases of accidental intake of ecstasy in the literature. They have had neurological signs, the most frequent of which is convulsions, and sympathomimetic signs including tachycardia and hyperthermia. According to the literature, due to accidental intake of ecstasy, a 14-month boy had hypertension, fever and arrhythmia; an 8-month-old boy had hypertension, a seizure, tachycardia and fever; a 20-month-old boy had a seizure, hyperactivity, hypertension, hyperthermia and tachycardia; a 17-month-old girl had a tonic-clonic seizure, tachycardia, hypertension and hyperthermia; a 19-month-old child and a 20-month-old child had hyperthermia and seizures and a 28-month-old child had a seizure and multiorgan failure.[3,7,8,11,12] In the case presented here, there were generalised tonic-clonic seizures. Two adult cases of ARDS due to ecstasy intake have been reported. One case had multiple organ failure and ARDS and a 53-year-old male had ARDS, rhabdomyolysis, renal failure and disseminated intravascular coagulopathy.[9,10] However, there was no child case reporting of ARDS in the literature. The case presented in this report is the first child developing ARDS after accidental intake of ecstasy. The case was treated with appropriate mechanical ventilation. Ecstasy, taken by adults to feel euphoria, may cause life-threatening sudden cardiac arrhythmias, severe hyponatraemia, seizures, ARDS and multiple organ failures.[5,6] To conclude, it should be kept in mind that ARDS may develop following toxicities due to ecstasy, rarely encountered in childhood.

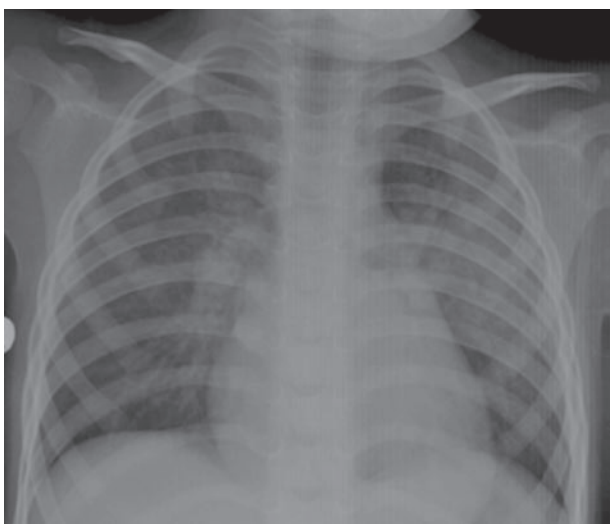


Figure 2. The patient's chest X-ray after extubation.

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