

CASE REPORT

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Excited delirium syndrome from psychostimulant abuse can mimic a violent scene of death

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Abstract

Background: Previous reported cases on excited delirium syndrome studied on the common clinical manifestations of the syndrome. The usual forensics implication for the syndrome is that death commonly is associated with restraint procedures by law enforcement agencies; however, not many cases reported highlights the difficulties in attributing a violent scene of death to the syndrome.

Case presentation: We present a case of a partially naked body found in an apartment unit under suspicious circumstances with multiple injuries. The scene of death was violent, and the body was found with blood wiped all over the floor and walls. Investigators believed a violent crime had occurred, and a suspect was reprimanded. However, upon autopsy, it was found that all injuries were superficially inflicted and were unlikely to have been part of an act of commission or caused his death. Internal examination found no remarkable pathology. Toxicology revealed a presence of psychostimulants, that is, methamphetamine, MDMA, and ethyl alcohol. Reconstruction of events by the witness, who was initially suspected of the 'murder', revealed that the injuries and his death could likely be explained by an episode of excited delirium.

Conclusion: The case highlights the challenges faced when attributing excited delirium syndrome as a cause of death. The syndrome can present with injuries from aggressive or bizarre behaviour, coupled with the destruction of property, which may confuse investigators on the possible manner of death.

Keywords: Excited delirium syndrome, Scene of death, Non-fatal injuries, Methamphetamine, MDMA

Highlights

- Excited delirium syndrome may mimic a violent scene of death, which should be treated as homicide until proven otherwise.
- Non-fatal injuries may occur in excited delirium.
- Methamphetamine and MDMA have been implicated in excited delirium syndrome.

Background

Investigators of crime scenes are trained to recognize a violent scene of death. The presence of a body with multiple injuries, lying in coalesced, continuous blood smears, with a scene in a mess, is suggestive that a

struggle had ensued between a victim and an assailant. In such scenes, it is imperative that investigators treat the case as if a homicide had occurred, and strict protocols are followed (Julian et al. 2012). Subsequently, an autopsy performed by a trained pathologist should answer the cause and manner of death.

However, a scene that appeared to be 'homicide' may be refuted after a thorough autopsy. We present one such case in which investigators were baffled when autopsy findings showed no fatal injury in a suspected homicide. Reconstruction of events indicated that excited delirium syndrome (ExDS) due to psychostimulant abuse may have led to the demise of the victim.

Case presentation

Investigators responded to an emergency call alerting them of a person acting aggressively in his apartment.

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Fig. 1 The deceased was almost naked and lay in coalesced, continuous, blood smears that appeared to be wiped by his movements on the floor. Blood was seen on the entire floor of the unit and lower parts of the wall and furniture

On arrival, they found a scantily clad adult male lying dead in a pool of blood at the living room area of his apartment unit (Fig. 1). There were suspicious injuries on his body. The apartment was in a mess, with presence of blood-stained objects, a broken sliding glass door (Fig. 2), scattered glass pieces with a blood-stained knife (Fig. 3) and a fork next to the body. The initial findings

were highly suspicious that a possible struggle had occurred between the deceased and the assailant.

A good practice by investigators when a crime was suspected to have occurred is to narrow down the list of possible perpetrators. To make matters easy for investigators, the apartment unit had a closed-circuit television (CCTV) installed at the entrance, and a video recording



Fig. 2 Heavy dumbbells were used to break the sliding glass door and other mirrors in the unit. Broken glass pieces were scattered on the floor, where the body was found



Fig. 3 A blood-stained kitchen knife was found next to the body

of those who entered the unit was available. An hour after the deceased was seen entering the unit in an unsteady gait, his roommate had entered the unit and left about half an hour later in a rush. No other persons had access to the unit besides the two of them prior to the arrival of the police.

The roommate was apprehended as a suspect, but what had baffled the investigators was that it was the roommate who made the distress call to the police. The roommate informed the police upon questioning that the deceased had been acting 'bizarre' and had tried to attack him with a knife before he fled the scene to alert authorities. However, not believing his testimony, the police apprehended him pending the result of autopsy to confirm if an act of commission had occurred. The roommate was not found to have any injuries on him.

On arrival to the forensic unit of the UKM Medical Centre, the deceased has a subhepatic temperature of 34 °C, despite more than 6 h since he was found dead (Fig. 4). Using the Hessge normogram technique and taking into consideration the time when the body was found, the interval between the time of death and the time of examination, the near-naked condition of the body, and the environmental temperature (23 °C), it was determined that the deceased had likely suffered from hyperpyrexia around the time of death.

A total of 69 injuries were found on the body upon external examination. These injuries were mostly abrasions, bruises and lacerations, which were attributed to blunt trauma (Fig. 5). However, three of them

appeared to be incised wounds with faint marginal bruises indicating both sharp and blunt components. These wounds were found at the back of the body and were determined to have been caused by glass cuts (Fig. 6). Groups of linear abrasions found on the accessible regions of the body were consistent with non-fatal, injuries sustained from blunted knife or fork found next to the body (Fig. 7). Knuckle bruises were consistent with history of self-inflicted punching against blunt surfaces (Fig. 8). Though there were blunt and sharp trauma, the pattern of injuries did not fit a homicidal attack. Most of the injuries were found on the back and peripheral limbs.

Despite the vast number of external injuries, all of them were superficially inflicted. There were no injuries to the internal organs or vital structures (Fig. 9), and no extensive subcutaneous bruises were seen. There was no damage to major vessels of the peripheral limbs. The organs were not pale to suggest exsanguination from superficial wounds. Biochemical and histological findings ruled out rhabdomyolysis. No natural pathology or complications from injuries were found on gross or histological examination.

Toxicology revealed ethyl alcohol, methamphetamine and 3,4-methylenedioxymethamphetamine (MDMA) along with its metabolites in the stomach content, blood, urine and bile, which indicated that he was under the influence of these substances around the time of his death. Individually, these substances were not of fatal levels. The blood concentration for the substances were 153 mg/100 mL (ethyl alcohol), 0.02 µg/mL (methamphetamine),



Fig. 4 The subhepatic temperature taken 6 h after death revealed a warm body with a temperature of 34°C, suggestive of possible hyperpyrexia around the time of death

0.13 µg/mL (methylenedioxyamphetamine) and 3.18 µg/mL (3,4-methylenedioxyamphetamine).

Given the circumstances in which the body was found, the pathological findings and the toxicology results, ExDs was suspected. Reconstruction of events was done with his roommate, who was now an important witness and is no longer a suspect. According to him, the deceased was sweating and bleeding profusely from the scalp and leg. He had broken a sliding glass door with heavy dumbbells, injured himself with a knife, and tried to wipe the blood on the floor with a cloth. He grunted continuously whilst lying supine on glass pieces on the floor. The deceased became more irrational and acted bizarrely. His roommate immediately left the scene to call the

police when he was threatened by the deceased with a knife. He denied any history of attempts to restrain the deceased.

Blood spatter analysis was consistent with blood being wiped by the movement of the body on the floor. Blood spatters were venous drops with no arterial or swing splatter. DNA analysis traced all the scene blood to the deceased, and no foreign DNA was found.

After reviewing all evidence and circumstances, the cause of death was determined to be ExDS consistent with abuse of psychostimulants, methamphetamine and MDMA.

Discussion

The United Nations Office on Drugs and Crime had released their 2019 World Drug Report, in which they



Fig. 5 Numerous superficial injuries were found on the body, consistent with blunt and sharp trauma

found that there had been a global increase in the trend of use of controlled and novel psychoactive substances. Between 1998 and 2017 alone saw a tenfold increase in global seizures of amphetamine-type stimulants (ATS), which include methamphetamine and MDMA or 'ecstasy'. Southeast Asia alone has seen a worrying fivefold rise in methamphetamine seizure within a short span of

2013 to 2018 (World Drug Report 2019: Pre-release to Member States 2019).

The surge in traffic for ATS could only mean that there is a global demand for their use. It was estimated that about 3.5 to 20.9 million people use ATS in East Asia and Southeast Asia alone (Dargan and Wood 2012). Crackdowns on trafficking and drug

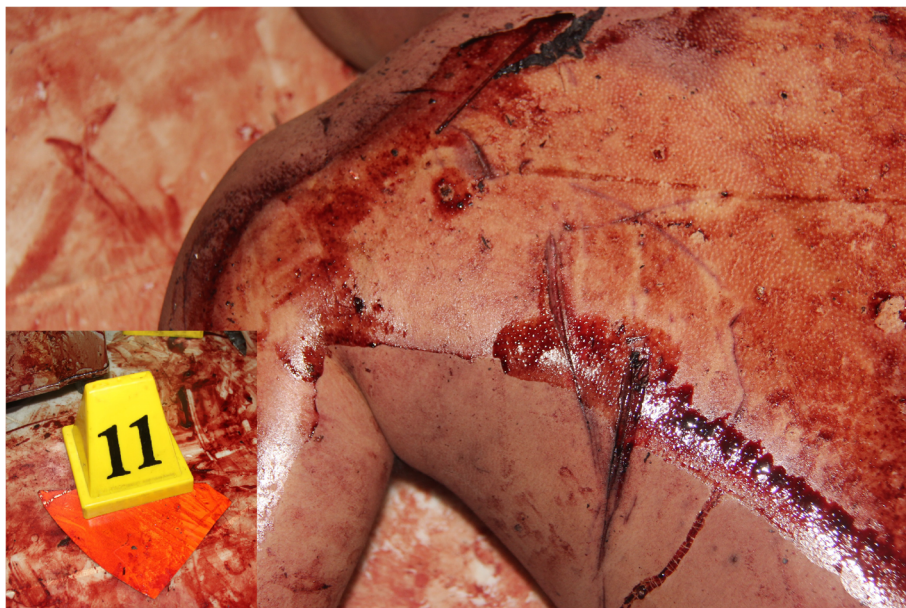


Fig. 6 Deep incised wounds on the back with marginal bruises were consistent with glass cuts. Inset: broken glass pieces were found on the floor beneath the body



Fig. 7 Multiple groups of shallow abrasions were found on the right shoulder

control legislation on plant-based narcotics such as opioids, cocaine and marijuana were postulated to have caused an increase in the production of synthetic-based psychostimulants such as ATS, which can be produced anywhere (Stoneberg et al. 2018). While snorting, smoking and ingestion remained as popular routes of administration for these drugs, injectable forms were found on intravenous drug users (Chomchai and Chomchai 2015).

With the increasing trends in ATS use, there had been a growing clinical report with regard to its adverse effects. A study on an inner-city hospital in Australia found that 1.2% of Emergency Department presentations was due to amphetamine-related illnesses, with its burden on clinicians expected to rise in the future (Gray et al. 2007). A wide range of clinical manifestations associated with amphetamine toxicity had been reported (Greene et al. 2008). These primarily affect the cardiovascular and central nervous systems, owing to its sympathomimetic actions.

Besides being associated with amphetamine-type stimulants, ExDS had also been implicated in certain psychiatric illnesses and its pharmacological treatment, as well as other stimulant drug abuse such as cocaine, phencyclidine (PCP) and lysergic acid diethylamide (LSD) (ACEP Excited Delirium Task Force 2009). These drugs may cause ExDS at levels lower than the expected toxic threshold (ACEP Excited Delirium Task Force 2009).

The lack of specific aetiology and anatomical features made defining excited delirium a great challenge.

Therefore, the White Paper Report on ExDS (2009) suggests identifying the syndrome based on its epidemiology, clinical presentations and course of illness. A prerequisite for the consideration of the syndrome is the presence of both deliriums with psychomotor and physiological excitation (ACEP Excited Delirium Task Force 2009).

The effects of the drugs on central dopamine activity have been widely postulated to be the cause of features seen in the syndrome (Mash et al. 2009). Fatal hyperthermia, arrhythmia and acidosis have been implicated as the cause of sudden cardiac arrest in ExDS (ACEP Excited Delirium Task Force 2009). Unlike methamphetamine poisoning for which similar fatal arrhythmias may be seen (Inoue et al. 2006), the levels associated with excited delirium were described to be lower than the expected toxic thresholds (ACEP Excited Delirium Task Force 2009).

Nevertheless, diagnosing ExDS solely based on the autopsy findings may present a challenge to pathologists. Like other syndromes of forensic significance, such as the San Diego protocol for sudden infantile death syndrome (Bajanowski et al. 2007), the diagnosis of ExDS requires a review of the history, findings from the scene, features upon contact, features of clinical assessment, features at death and features at autopsy (ACEP Excited Delirium Task Force 2009). There is also a need to exclude other causes of altered mental status, psychomotor agitation and physiological excitation for the diagnosis of ExDS to be considered.



Fig. 8 Bruises on both knuckles indicated punching against several blunt objects

A conundrum faced by clinicians and pathologists are the legal implications associated with ExDS. Many reported cases involve the legal issues of excessive restraint by law enforcement officials, especially when the victim is impervious to pain stimuli (O'Halloran and Lewman 1993), as well as the relationship between electronic control (TASER®) devices and ExDS (Jauchem 2010). However, no cases have been reported that showed traumatic injuries were possibly the result of excited delirium.

In the present case, it was imperative to determine whether the injuries found had caused death and what caused those injuries. Assessment of all wounds was consistent with blunt and sharp superficial

trauma sustained during an episode of erratic behaviour, with none being fatal or fitted the pattern of homicide. No clinical features suggest immediate complications from the injuries, such as embolism and traumatic rhabdomyolysis. At autopsy, it was important to rule out other natural diseases that may cause sudden death, as well as conditions that may cause altered mental status.

With a review of the toxicology and the circumstances using the White Paper Report on diagnosing ExDS, the cause of death was finalized. Features from the history and scene of this case that suggested ExDS include the following: male gender, age of 25 that is close to the mean age of 30, sudden onset,



Fig. 9 There were no subcutaneous injuries of visceral organs. None of the external wounds were fatal in nature

history of psychostimulant abuse, psychomotor agitation and excitation, violent and belligerent, not responding to verbal commands, psychosis, yelling and guttural sounds, disrobing, destruction of inanimate objects, superhuman strengths, impervious to pain, profuse sweating, hyperthermia, drug screen positive for psychostimulants, drug levels lower than anticipated and no anatomic correlate for death.

Conclusion

The case highlights the difficulty in diagnosing excited delirium syndrome when injuries are found, and a scene of death appeared violent. Excited delirium can present with injuries sustained from aggressive and erratic behaviour. This, coupled with the tendency of destruction of property, may confuse investigators as to the possible manner of death. However, a meticulous examination of wounds, detailed autopsy, interpretation of toxicology and review of the circumstances around the death allow for the consideration of ExDS. An updated version of the White Paper report or a more systematic approach for the postmortem diagnosis of ExDS is needed as a guide for forensic pathologists.

Abbreviations

ATS: Amphetamine-type stimulants; CCTV: closed-circuit television; DNA: Deoxyribonucleic acid; ExDS: Excited delirium syndrome; LSD: Lysergic acid diethylamide; MDMA: 3,4-methylenedioxymethamphetamine; PCP: Phencyclidine (PCP); UKM: University Kebangsaan Malaysia

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