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CASE REPORT

Acute pulmonary thromboembolism in a case of fatal child abuse

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Abstract

Child abuse is a worldwide problem. The four major types of abuse include physical abuse, child neglect, psychological maltreatment and sexual violence. We describe a fatal case of child abuse which presented with numerous old and recent soft tissue injuries all over the body. The injuries on the legs have immobilized the victim for quite some time, giving rise to deep vein thrombosis, leading to death as a result of acute pulmonary thromboembolism. This case demonstrates presence of both elements of abuse and neglect in one victim. As this category of crime involves a helpless child, we would also like to reiterate that the community has an obligation to prevent such tragedies and educating the public to recognize the signs and symptoms of abuse would be of utmost important. Ultimately, the community must also be responsible for reporting such offences and the act of silence is akin to condoning a crime witnessed.

Keywords: child abuse, physical abuse, acute pulmonary thromboembolism, autopsy

INTRODUCTION

Child abuse is a widespread social problem, spanning across the globe and hiding in almost every community. Child maltreatment comprises of a spectrum of acts of commission and omission that result in morbidity or death[1]. The four major types of abuse are physical abuse, child neglect, psychological maltreatment and sexual violence[1,2]. Other forms of child maltreatment include, but are not limited to: safety neglect, Munchausen syndrome by proxy, intentional drugging or poisoning[1].

In the United States, for the year 2010, 9.2 children per 1000 were identified as being abused or neglected, with the majority of cases (78.3%) were due to neglect, contrasting with common perception that physical and sexual abuse are the common forms of maltreatment[3]. Child abuse in Malaysia had increased more than 100% from year 1981 to 1991. In 1981, only 93 cases of child abuse were reported, whilst in 1991, the figure had escalated to 9704[4]. Since then, a yearly increment of 10-15% of cases was estimated[4]. In 2006, the Malaysian Welfare Department reported 1999 cases of child abuse; the figure rose to 2780 in 2008[5]. The reported cases of child abuse are increasing despite the perceived notion that the society is being more aware and vigilant in protecting children. Sadly, the unreported cases are probably much higher.

In this report, we describe a fatal case of child abuse due to acute pulmonary thromboembolism secondary to deep vein thrombosis of the lower limbs attributed to prolonged immobilization attributed to leg injury and pneumonia. Pulmonary thromboembolism is a rare event in the paediatric age group. Embolism associated with non-accidental injury is an even rarer cause of death. This case also demonstrates the difficult social issues surrounding child abuse.

CASE REPORT

A five-year-old girl was brought unconscious to the Emergency Department, Hospital Sungai Buloh, Selangor, Malaysia by her uncle and aunt whom she had been staying with for the past two

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months. According to the uncle, she developed a sudden-onset of shortness of breath after eating a piece of cake. She was pronounced dead shortly after arrival. The physician in-charge noticed numerous scars and fresh injuries on her body. The parents and relatives claimed that the scars were due to scratching as the child allegedly had skin problems. Due to the nature of the wounds, non-accidental injury was suspected, and a postmortem order was issued after a police report was lodged by hospital authorities.

Autopsy findings

The body was that of a 5-year-old girl weighing 15kg, measuring 105 cm in length. The dimensions were proportionate for age and she was slightly undernourished. External examination showed numerous old and new injuries all over the body (Figs. 1A & B). The face showed a large healing laceration on the forehead, patchy bruises over the cheeks and the upper frenulum was torn. A healed laceration was noted at the top of the head. The torso showed a 'tram line' abrasion with multiple 'tram line' scars. There were also round to oval-shaped white healing wounds of various sizes, ranging from 2 mm to 1.5 cm in diameter. Numerous old and recent linear scars were noted on the torso and limbs. The back showed multiple 'tram line', tear-shaped and unspecified patterned abrasions, with multiple recent linear scars.

The right arm and hand were swollen. The left hand and wrist showed healing scald injury. Both the lower limbs were swollen. The left leg showed a few sinuses discharging pus (Fig. 1C). The external genitalia were normal with no evidence of injury.

Internal examination showed patchy fronto-temporal scalp contusions. A resolving subarachnoid haemorrhage was seen at the area corresponding to the external injury. There was no retinal haemorrhage. A saddle embolus was lodged at the bifurcation of the pulmonary artery (Fig. 2C), with concurrent thromboemboli detected in the main braches of the pulmonary arteries. The lungs showed pneumonic changes. Mural thrombi were noted in the right ventricle and atrium of the heart. Examination of the abdomen showed a contusion at the ileocaecal area (Fig. 2). Extensive subcutaneous bruising was seen on the upper and lower limbs. Deep vein thrombosis was noted upon sectioning of the left calf muscles. There was no fracture seen.

Histopathology findings

The presence of thromboemboli within the pulmonary vessels was confirmed microscopically. In addition, bronchopneumonia was also detected, with patchy neutrophilic infiltration and exudate seen in the pulmonary alveolar spaces. Colonies of bacteria were also noted within the exudates. They composed of Gram positive diplococci, most probably *Streptococcus pneumoniae* (Fig. 3).

Social history

At the time of the event, the child was staying with her uncle, aunt, and their three children. The uncle was unemployed after losing his job as a taxi driver. The aunt worked at a factory and was the breadwinner of the family. Initially, the whole family including the biological parents strongly denied child abuse. However, the truth began to unfold when their 5-year-old son spoke of the kicking, spanking and beating which the victim and other children were subjected to at home. The aunt herself was once treated at a hospital due to sharp force injury on the head. Another important finding in this case was that a neighbour came forth with some medication to treat the victim's wound. However, the neighbours did not notify the relevant authority even though they observed signs of abuse and neglect.

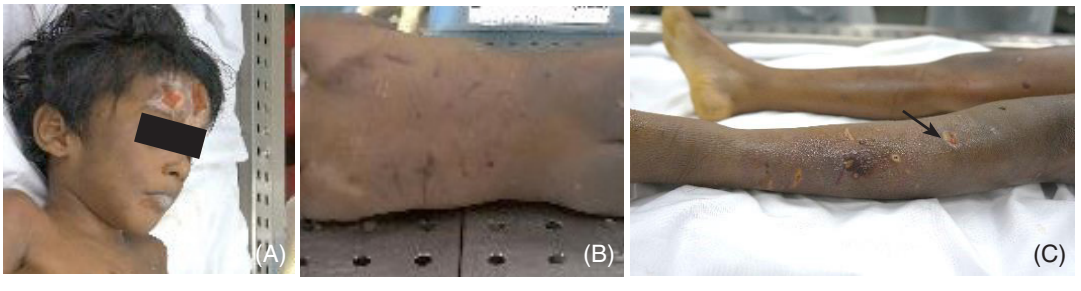

FIG. 1: (A) Large, healing, lacerations are seen on the forehead, with patchy bruises over the cheek. (B) The back of the child, with multiple 'tram-line' abrasions and scars, among other scars of various shapes. (C) Multiple scars are also seen on the legs and a few sinuses discharging pus (arrow)

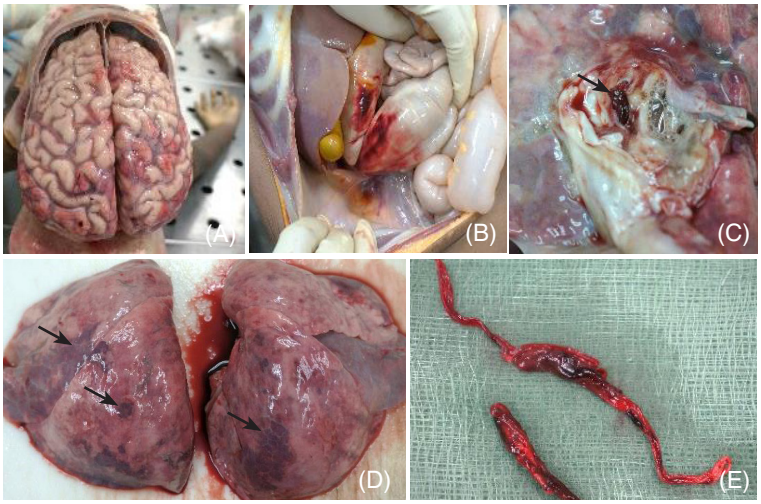

FIG. 2: (A) Subarachnoid haemorrhage; (B) contusion of the bowel at the ileocaecal junction; (C) Saddle embolus seen at the bifurcation of the pulmonary artery (arrow), (D) multiple pulmonary haemorrhagic areas seen on the surface of the lungs (arrows) and (E) saddle embolus removed from the pulmonary artery

DISCUSSION

This case presented with the typical features of extreme physical violence and neglect. Fatal child abuse defined as the death of a child resulting from an act of physical violence on or neglect of a child[6], is usually intra-familial and associated with the use of bodily force and poorly-defined precipitating events[7]. In contrast, homicide of older children (> 12 years old) are mostly extra-familial, involving weapons and occurs during arguments or a criminal act of the assailant[7]. A staggering 80% of all maltreatment is perpetrated by parents or parental guardians[8]. A study shows that 45% of fatalities in child abuse were due to head trauma, followed by asphyxia including drowning accounting for 25% of cases[9]. In child maltreatment cases, soft tissue lesions are the most common presentations, followed by fractures[9].

Various risk factors contributing to child abuse have been identified. They may be intrinsic to the child, the environment or the assailant[1]. Children who have an increased risk of abuse include handicapped or 'special needs' children[8]. This includes children with emotional or psychological problems and learning difficulties, hyperactivity and defiant personality[1,8]. Stressors in the home environment such as financial problems, loss of a job, marital problems and disorganized family are environmental factors linked to abuse[1,10]. Assailants characteristics associated with increased risk of abuse include:

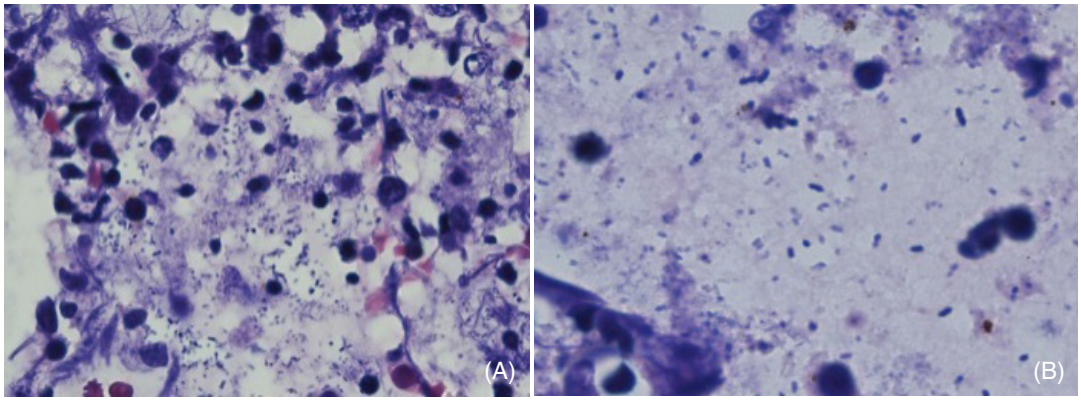

FIG. 3: (A) Gram stain showing numerous Gram positive bacteria within the exudate fluid of the pulmonary alveolar spaces (100X), (B) Another view of the field showing the bacteria to be gram positive diplococci (100X)

impulse control problems, violent behaviour, alcoholism, drug addiction, psychiatric illness, lack of social skills and lack of assertiveness[1]. Other characteristics of the perpetrator include age (younger parents below the age of 21 being more prominent), relationship of the perpetrator to the victim (whether the father is non-biological), the child's behaviour as the precipitating factor, lack of understanding of the child's behaviour, an acceptance of physical violence in child-rearing, negative perception of their own situation, lack of social and personal resources and multi-problem families[1,6,8,10,11]. Nevertheless, fatal child violence also occurs in the family context with no underlying mental problem or family breakdown. There are examples of one-off incidents which are seen as impulsive events following a deep anger or frustration of the caretaker[10].

This case exemplifies some of the above features: the abuse is by a family member, with unemployment issues as well as a probable disorganised family environment. Multiple bruises on the cheeks, upper and lower limbs were consistent with blunt trauma sustained as a result of slapping, kicking and beatings. The 'tram line' bruise and scars were in keeping with a long cylindrical object being used. Small circular scars on the body were most probably burnt cigarette marks. Healing lacerations on the forehead as well as the scald injury of the left wrist showed yellow staining, due to antiseptic betadine solution used to treat the wounds.

The cause of death was pulmonary embolism, originating from deep vein thrombosis that was probably a result of stasis due to being bed-bound because of leg injury. The head injury and resolving subdural haemorrhage also contributed to her poor state. This extrapolation was corroborated by a neighbour who gave a statement to the investigating police officer that the child was seen to be at the same position in a corner of the house, not moving, for the two weeks prior to the event.

Pulmonary thromboembolism is a rare event in paediatric patients. Embolism associated with non-accidental injury is even rarer. The most important predisposing factors to pulmonary embolism in children are the presence of a central venous line, infection and congenital heart disease[9,12]. Mortality rates for children with pulmonary embolism are reported to be around 10%. Death is usually related to the underlying disease processes.[3] According to Virchow's triad, pathological processes that contribute to development of thromboembolism are: stasis of blood flow, hypercoagulability or endothelial injury[12,13]. In children, hypercoagulability and injury to veins are the most important predisposing factors[12].

Another key issue in this case is the failure of neighbours to notify relevant authority even though the signs of abuse and neglect were witnessed by them. In this case, the reason for not reporting the suspicion to the authority is unclear. Among the postulated factor for the underreporting is the possibility of fear; the community is being fearful of making a wrong suspicion, fearful of the family or parental response, fearful of the authority revealing the source of information and their identity during investigation. The authors also failed to understand the role of her biological parents in allowing their child to stay with relatives and undeniably approved the abuse by making up a story of skin problem causing the injuries and scars. Nevertheless, some of the old scars gave us a clue that the beatings may have started long before the child came to the relative's house.

As a conclusion, fatal child abuse remains a grave concern in the country. Acute massive pulmonary embolism may be seen in abuse cases when the child is in an incumbent state for some time before the demise. A prevention and education program needs to be extended to members of the public so as to protect the children from this horrific situation.

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