THE BOY WHO LIVED:
SURVIVING AN OUT-OF-HOSPITAL CARDIAC ARREST (OOHC) WITH EARLY BYSTANDER RESCUE BREATHS POST AUTOMOBILE WINDOW STRANGULATION

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ABSTRACT

INTRODUCTION:

Asphyxia caused by strangulation ranks fourth among the causes of unintentional injuries in children following road accidents, drowning and burns. Cribs, ropes and cords are the leading causes of accidental asphyxia and strangulation of children left unattended in motor vehicles is still poorly reported especially in Malaysia.

CASE REPORT:

A 2-year-old boy was brought to emergency room post accidental strangulation by automatic closing of a car window. His head was found hanged between the window and the frame of the car while his father left him unaccompanied inside. He was later found unresponsive, not breathing, with central and peripheral cyanosis. Bystander rescue breaths was performed immediately and continued throughout journey to the hospital. Upon assessment, the child is not arousable, tachypneic with decorticates position. He was promptly intubated for airway protection and admitted to Pediatric Intensive Care Unit for close observation and ventilatory support. Physical examination revealed semi circumferential bruises over the anterior neck and computed tomography of brain and cervical imaging showed unremarkable study. Upon hospitalization, he showed unremarkable improvement, weaned off his oxygen supplementation and subsequently was discharged well without neurological or pulmonary sequelae.

DISCUSSION:

The severity of complications following asphyxia is influenced by initial interventions**.** Bystander resuscitation gives the greatest impact for out-of-hospital cardiac arrest (OHCA), accounting > 70 % survival rates with intact neurologic outcome and less undesirable sequelae. Even though in this case, the bystander only gives rescue breaths alone to the child instead of the conventional chest compression with ventilation technique, it still helps in reducing the risk of mortality and its associated complications.

CONCLUSION:

Asphyxia cardiac arrest is the end result of progressive respiratory failure in children and ventilation is extremely important in pediatric resuscitation. Early resuscitation initiated by the bystander improves the outcome of the survivor and avoid many unfavorable complications.

INTRODUCTION

- Strangulation is a potentially fatal injury, and its occurrence in children is usually accidental. In Western countries, about 17% of deaths are related to strangulation.
- There are several forms of strangulation, such as suspension and hanging on sleeping hammocks, ropes, cables and many more.
- Accidental strangulation by automatic closing of a car window reported as a rare occurrence of strangulation with high morbidity and mortality due to its associated complications mainly potential respiratory, circulation and neurological failure.
- First aid interventions following asphyxia post strangulation is at paramount importance in saving life and avoids many unwanted complications.
- In the following reported case, heroic action of bystander by initiating rescue breathing following an out-of hospital cardiac arrest due to asphyxia revived an innocent life by reducing the risk of mortality and undesirable adverse sequele.

CASE REPORT

HISTORY

- A 2 year-old healthy boy was brought to Emergency Department of Hospital Sultanah Nur Zahirah post accidental strangulation by automatic closing of a car window.
- The boy was left unattended in the car while his father went to the nearby grocery store. He later was found by a bystander, hanged between the window and the frame of the car.
- It took approximately 10 minutes to evacuate him from the entrapment. The boy was found unresponsive, not breathing, with cyanosis of the extremities and oral mucosa.

HISTORY (cont.)

- The bystander immediately gave 5 rescue breaths to the child while waiting for help and subsequently the child showed signs of life.
- Paramedic arrived and took over the resuscitation. Upon assessment at red zone, the child was not fully arousable, tachypneic and in decorticates posture in which he was suspected to have a hypoxic fit. His airway then was secured with orotracheal intubation and was supported by ventilatory machine.
- He then was referred to Pediatrics team and then admitted to Pediatric Intensive Care Unit for close observation and ventilatory support.
- Upon hospitalization, he is able to wean down his oxygenation and subsequently was discharged well without neurological or pulmonary sequelae.

PHYSICAL EXAMINATION

- On primary assessment, his airway was not patent and was secured by orotracheal intubation while his neck was put on collar.
- Upon breathing assessment, there are no open or closed injuries towards the chest with equal chest expansion post intubation. Lung auscultation revealed normal breath sound with good air entry.
- His initial blood pressure recorded post intubation was 105 mmHg systolic and 60 mmHg diastolic with pulse rate of 90 beats per minute with good pulse volume and capillary refill time is less than two minute.
- There were no sign of mottled skin and the cyanosis over central and peripheral improved post intubation.
- His initial oxygen saturation was 88 under room air and climbing up to 100% post intubation.
- His abdominal and pelvic examination was normal and he had reactive and equal pupil bilaterally, measured 2 mm respectively.
- On secondary assessment, we did not found any abnormality except for semi circumferential bruises over the anterior neck.

INVESTIGATION

- All his blood test showed no significant abnormality.
- Bedside Focused Assessment with Sonography in Trauma (FAST) revealed negative result
- Computed tomography (CT) of the brain and cervical was performed and the result came back as normal study.
- Chest X-ray revealed no obvious abnormality detected.

Figure 1 (a)

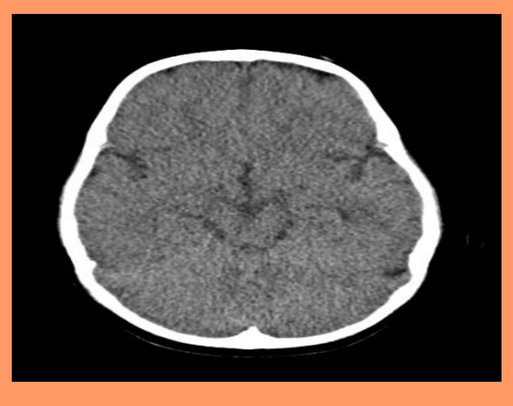

Figure 1 (b)

Figure 1(a), (b): Computed tomography (CT) of the brain revealed normal study

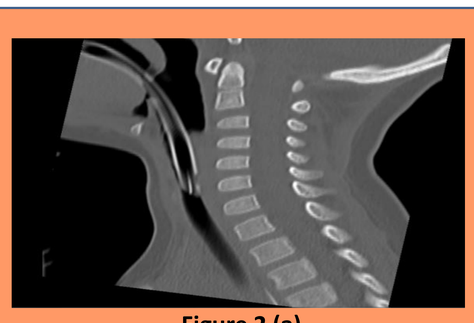

Figure 2 (a)

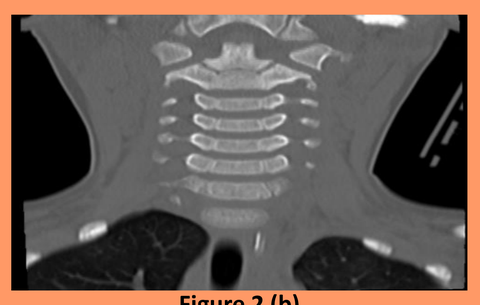

Figure 2 (b)

Figure 2 (a), (b): Computed tomography (CT) of the cervical showed no fracture, no soft tissue edema

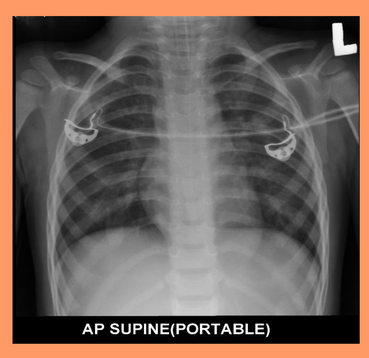

Figure 3: Chest radiograph with normal finding

DISCUSSION:

- Cardiac arrest due to respiratory failure remain the leading top battle in resuscitating pediatric patient as they are more susceptible to develop cardiac arrest due to hypoxia compared to cardiac problem in origin. This is due to the developmental variations and anatomical differences in pediatric patient compared to adult. In addition to external compression to airway anatomy as in strangulation, with airway obstruction, the risks are higher.
- As in this clinical scenario, the bystander performs rescue breathing with assisted ventilation alone without any conventional chest compression. There are no supported data that approved this technique despite the fact that respiratory failure due to asphyxia is more common in children. However, there was a study conducted objectively to determine whether the chest compression and ventilation technique can independently improve the outcome of patient in asphyxia cardiac arrest.
- Based on the collected data, the study proposed that some children in asphyxia cardiac arrest respond to bystander cardiopulmonary resuscitation with chest compression alone or rescue breathing alone in early phase of asphyxia cardiac arrest. However, in complete asphyxia cardiac arrest, the conventional technique chest compression with ventilation is more superior to the chest compression and ventilation technique independently.

CONCLUSION

- Early bystander resuscitation improves the outcome of out-of-hospital cardiac arrest (OOHC) by increase the survival rate and escapes many unfavorable adverse sequele. The conventional chest compression with ventilation technique remains the choice of treatment however either alone is better than no resuscitation attempt.

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