

CASE REPORT

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Death due to knee-elbow position in a restricted area: positional - traumatic asphyxia? case report

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Abstract

Positional asphyxia which evolves out of a body's staying in an unusual posture, is a kind of hypoxia and anoxia that occurs as a result of -partially or completely- narrowing of respiratory passage. Crime scene investigation provides significant evidences and clues to enlighten on positional asphyxial deaths. This study aims to discuss the cause of death for the case which was found stuck in knee-elbow position in a restricted area due to external factor exposure. The victim was a 37-year-old male worker. It was thought that he had left on the slaughter house at the end of the shift in the evening but he was found in the following morning as restricted in a cattle knocking box. In the examination of the case, there was no traumatic or pathologic findings to explain the cause of death, except for the apparent finding of asphyxia. It was considered that the death in the case occurred due to positional asphyxia caused by external factor exposure related to restriction in knee-elbow position. As a conclusion, in order to elucidate the death reason and the manner of death, in addition to the findings of internal and external medical examination, evaluation of crime scene investigation and history are also important.

Keywords: Positional asphyxia, knee-elbow position, asphyxial deaths, crime scene investigation, cause of death, forensic Medicine

Introduction

Positional asphyxia is a clinical condition that respiration is obstructed by the position of a victim's body. Various mechanisms may cause limitation of respiration resulting from acute hyperflexion of the neck or preventing movement of the chest wall and diaphragm [1]. Deaths occur in such situations as reverse hanging, staying in the knee elbow position etc. [2]. Occupationally forced positions by police officers, guardians and medical personnels to the people (Trendelenburg position, custody position) may rarely be resulted in death [3]. The decrease can be seen in total pulmonary volume, functional residual capacity and pulmonary compliance especially for elderly, almsman and obese people. The venous return to the heart decreases as a result of hydrostatic pressure increase in upper parts of the body and blood stasis. Transmural venous pressure increase in brain, carotid sinus static pressure increase and pressure decrease in arteries are other hemodynamic disorders [4].

Sedation, intoxication, organic diseases, chronic injuries/quadriplegia and accidents are the incidents predisposed to

positional asphyxia. The reasons such as loss of consciousness, squeezing due to external factors prevent people from escaping off their own bats from the actual position [1].

Deaths reach peak because of inappropriate sleeping positions especially in infant and early childhood periods. The deaths of young adults and adolescents with serious cerebral palsy depending on bed layout are available on literature [5-7].

It may be hard to differentiate traumatic and positional asphyxia in circumstances such as limitation or block of respirational activities due to restriction in a narrow area. Diagnose may not be made and the reason of the death may be both of them. It should be investigated whether the reason of the death is traumatic (external mechanic factors) or positional (staying in certain positions) [1,4]. Crime scene investigation and evaluating the story of the case altogether include important findings and clues to clarify the deaths of positional asphyxia. This study aims to discuss the cause of death for the case which was found stuck in knee-elbow position in a restricted area due to external factor exposure.

Case Report

The case who is 37 years old, male, married, worker, no known chronic disease / disability presented in this study was reported

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to be found in the morning hours as stuck in a restricted area due to closure of the entrance lid of cattle stunning box in a slaughterhouse as private sector. According the story taken from colleagues, when they noticed the case, they lifted the entrance lid immediately and checked whether the case was dead or not, they did not move him when they realized that he was dead but waited for the scene investigation teams. It was learned that the case was the last person to remain at the slaughterhouse after the working hours the previous day and there was no other person. If we are to describe the cattle stunning box working mechanism, animals from outside are transferred into the cattle stunning box through the sliding entrance gate in a single row and, after closing the entrance gate, the animal is tilted down by adjusting the slope of the stunning box floor. The animals' feet remain fixed out of the box. The animals' feet are attached to the hook and raised by a crane to be cut. During the crime scene investigation, it was determined that the cattle stunning box was located immediately at the entrance of the facility. It was observed that there were no work clothes but civilian clothes on the case. The victim was seen to be in knee-elbow position. According to the anatomical position, the anterior of the distal half of both arms, knees, elbows, palmar surfaces of the hands and the front part of his beanie were contaminated with puddle dirt due to contact with the floor and cigarette butt was seen in his left hand. The original position of his body was photographed at far and near distances from his front, rear, top views (Fig. 1,2). The position of the body was examined and it was determined that when the entrance lid was fully lowered, a distance of 50 cm was left between the ground and the inside of the facility was slightly sloped from the top to the bottom about 15 cm. It was calculated that the entrance gate fell down in five seconds.



Figure 1. Front view of the victim



Figure 2. Upper side view of the victim

External Examination

The case was 172 cm in length, weighing 93 kg. Petechial hemorrhages and disseminate cyanosis were seen on the victim's face, auricles, lips, neck, front part of the chest and fingernails (Fig. 3). There were bilateral subconjunctival hemorrhage. In formed line with the trauma caused by the cattle stunning box entrance gate, 17×5 cm and 13×0,5 cm abrasion and ecchymosis were detected horizontally on the skin at the level of the thoracic 12th vertebra and lumbar 1st vertebra (Fig. 4). It was seen that the case had abrasion and ecchymosis in the sizes of 31×0.5 cm and 27×5 cm in the inferior portion of the umbilicus, 5×2.5 cm in the five cm inferior of the right knee cap and 3×2 cm in the three cm inferior of the left knee cap which all contacted with the floor. Rigor mortis was seen prominently.

Internal Examination

There were petechial hemorrhages on the inside of hairy skin surface. The vault and base of the skull are intact and there is no intracranial hemorrhage and hematoma. No pathology was detected in cervical vertebrae and neck structures. There were extensive petechial hemorrhages between chest's soft and muscle tissues. The anterior and posterior parts of the rib cage were intact. The lungs were extensive edematous and congestive. In trachea lumen, there was foamy secretion. Free hemorrhage or liquid were not detected on both hemithorax (Fig. 5). On both lungs' visceral pleura and heart's epicardium there were petechial hemorrhages. No macroscopic and microscobic pathology was seen in myocardium, endocardium and vascular structures of the heart and intraabdominal organs. There were no free hemorrhage or fluid in the abdomen (Fig. 6). There was a small amount of semi-digested food in the stomach. The urinary bladder was full and the sample of urine was taken. In the toxicological examination of the blood and urine samples taken from the victim, no toxic material was detected.



Figure 3. Petechial hemorrhages and disseminate cyanosis



Figure 4. Ecchymosis on the thoracic 12th and lumbar 1st vertebra levels

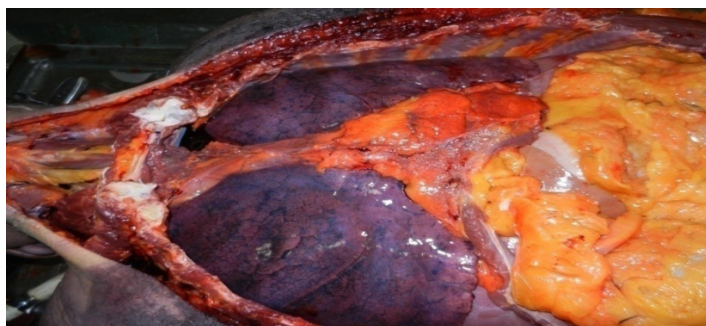


Figure 5. Cervical and intrathoracic view of the victim



Figure 6. Intraabdominal view of the victim

Discussion

For getting the diagnosis of positional asphyxia, there shouldn't be such reasons that may cause obstruction of respiratory tracts due to internal reasons and should not be exposed to gas inhalation. The victim should not have cardiac illness. After evaluating the

story, it should be understood that the incident is originated from an accident [1,8]. The specific findings which enable to diagnose positional asphyxia are mostly found in postmortem examination. Hemorrhagical petechiae can be seen clearly in conjunctiva, epicardium, larynx, epiglottis and muscles [4].

Sudden mechanic pressure on torax and abdomen restrains respiratory muscles' function. Traumatic asphyxia; is a clinical situation which occurs after that and it causes respiration and circulation deficiency. Fracture of rib cage or vertebrae, laceration in visceral organs and because of that internal hemorrhaging, flail chest, pneumotorax can be seen in traumatic asphyxia depending on the severity of the trauma [9,10]. Neurological findings include agitation, loss of consciousness, disorientation, quadriplegia and coma. There are some studies which indicate that those findings occur with anoxia originating from cerebral edema and cerebral hemorrhage and clinical period is depending on anoxia period [11,12].

After crime scene investigation and evaluating the story of the incident, it was understood that the original position of the case was stuck in knee-elbow position in a restricted area due to close of entrance gate, he was unable to move to another position and let himself free, there was nobody else who can affect the incident and the incident occurred accidentally. The external and internal examination of the case reveal no traumatic or pathologic findings to explain the cause of death, except for the apparent symptoms of asphyxia. In toxicological examination, no toxic material was encountered.

In Benomran's and Hassan's presentation of the case study, it is indicated that due to alcohol intoxication impaired consciousness and depression on reflexes were detected and as a result of that the victim who was in knee elbow position couldn't set himself free and die because of positional asphyxia [2]. In the study on six cases, R.W. Byard and his friends showed deaths resulting from positional asphyxia as a result of predisposition of intoxication in one case, organic diseases in four cases and quadriplegia in one case [1]. In our study, it was considered that the death occurred due to positional asphyxia caused by external factor exposure related restriction in knee-elbow position in a confined area.

Conclusion

When the story of the incident is told, it should be learned whether the victim has any chronic illnesses or injuries, toxic material addiction, any drugs used regularly or if there is somebody else who plays a role in the incident. The most important task in crime scene investigation, taking detailed and suitable photos of the scene. It should be investigated the presence of traumatic factors, how the body position of the victim is, whether he can move into another position or not. It is resulted that in revealing the origin and the reason of the death, apart from findings from external and internal examinations, crime scene investigation and the story of the incident should be evaluated altogether.

Competing interests

The authors declare that they have no competing interest.

Financial Disclosure

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