Death from a special mechanical asphyxia during suspect restraint: A case report

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Abstract: We report a case of custody death caused by a special mechanical asphyxia. The criminal suspect, who was later found to be unconscious and died, underwent a physical conflict during his arrest. In this case, the suspect exhibited a hemorrhage at the base of the tongue (4 cm × 2 cm × 0.3 cm) caused by neck over-stretching. We reviewed this case with respect to the autopsy findings, pathological changes, the specific scene where the death took place and circumstantial correlations of the investigation.

Key Words: mechanical asphyxia, custody restraint position, prone position, autopsy, forensic pathology.

A 23-year-old male, who was later found to be unconscious, was arrested for extortion and underwent a physical conflict during his arrest. The individual was pronounced dead after emergency treatment at a hospital. After investigation, it was confirmed that the decedent was placed in prone position with the forearms and hands bound behind the back for about five minutes during the physical conflict that occurred during the arrest. Reproduced scene of physical conflict was shown in Fig. 1.

Figure 1. Scene reconstruction of physical conflict. A The decedent was placed in a prone position while the forearms and hands were bound behind the back during the physical conflict. B The black arrows represent the position and direction of external force.

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External examination revealed that the external auditory canal, mouth, and nasal cavity were normal. A large amount of spotting caused by bleeding was found bilaterally in the eyelid conjunctiva, and many small rub contusions were found on the facial skin. Two submandibular skin contusions measuring 1.5 cm × 0.5 cm and 1.2 cm × 1 cm were recorded. Both sides of the acromion and clavicle exhibited skin contusions that were symmetrically distributed: a left acromion skin contusion (2 cm × 0.7 cm), right acromion skin contusion (1 cm × 0.7 cm), left middle clavicle skin contusion (5 cm × 3.5 cm), and right middle clavicle skin contusion (6 cm × 3.5 cm) (Fig. 2A-C). The skin on the two wrists exhibited circular rub contusions. The fingernails and toenails showed a high degree of cyanosis.

Autopsy revealed a hemorrhage at the base of the tongue that exhibited purple protrusions, a soft texture, and a clear boundary measuring 4 cm × 2 cm × 0.3 cm (Fig. 2D). Edema of the mucosa of the throat, the epiglottis and surrounding tissue was detected, and hemorrhage of the epiglottic cartilage surface and both sides of the piriform recess mucosa was observed. Spotting was observed in the left ventricular heart wall near the bottom of the outer membrane. Focal hemorrhage was noted bilaterally on
the lungs and pleura.

Microscopic investigation demonstrated hemorrhage among the tongue muscle fibers and the lymphoid tissue of the tongue base submucosa (Fig. 2E). Tongue interstitial edema was also observed. The lymph nodes around the tongue base were markedly congested and focal hemorrhage was observed (Fig. 2F). Small amounts of hemorrhage were found in the myocardial interstitial. The lungs were extensively congested and exhibited edema and focal hemorrhage. Diffused hemorrhage was observed in the pancreatic interstitial cells. The exudation of inflammatory cells and fat necrosis were not observed. There was evidence of brain-cells welling. The cause of death was deemed positional asphyxia due to over-stretching of the neck caused by a powerful external force.

DISCUSSION

Asphyxia deaths are common in forensic practice, and the incidence of death by asphyxia is second only to death following mechanical injury. In a 21-year study, Azmak (2006) reported that these deaths represented 15.7% of forensic autopsies in Turkey 1. A retrospective study by Zhang (1988) revealed that asphyxia was the cause of death in approximately 28% of medico-legal postmortems in China 2.

Normal respiration depends on three critical components: the patency of the respiratory tract, the lung where pulmonary gas exchange occurs, and a ventilator apparatus to promote gaseous exchange between the external environment and the lungs. Gaseous exchange depends on the synergistic movement of the chest wall, rib cage, diaphragm, abdominal wall, and other auxiliary respiratory muscles, which results in intrathoracic pressure that promotes the movement of the gas through the respiratory tract and out of the lungs. Anomalies in any of the three crucial components of respiration can lead to respiratory failure.

Asphyxia deaths can occur in the home, vehicle, or even during outdoor entertainment 3, 4. To date, there have been no reports of asphyxia deaths caused by special positions used during the process of an arrest where a struggle or physical conflict has ensued, such as described in this case. Law enforcement personnel use a number of common positions to tie up suspects, such as the suspension of bound upper limbs, the horizontal suspension of an individual bound at the thorax, or the hog-tying of an individual who is then laid face-down on a suffocating object 5, 6. These three positions are used frequently in law enforcement. The positions used to restrain the individuals in the case reported in this paper, have an impact on normal breathing. In this case, the external examination revealed a mandibular contusion and bilateral symmetric contusions on both sides of the acromion and mid-clavicle, which were caused by the head, chest, and abdomen being pressed against a plane with extreme force. After investigation, it was confirmed that the decedent was placed in prone position with the forearms and hands bound behind the back during the physical conflict that occurred during the arrest. This position caused head-neck over-extension and the tongue base was squeezed against the pharyngeal wall causing hemorrhage of the tongue base that resulted in airway obstruction. Thus, law enforcement departments and law enforcement personnel should be alerted to the fact that a body placed in certain positions for a long time could develop serious complications or result in death. Many law enforcement and health personnel are now taught to avoid restraining people face down or to do so only for a very short period of time.

In all cases of positional asphyxia, the individuals are subjected to limited chest and abdominal movement, neck hyper extension, airway obstruction, and high venous pressure, which lead to pulmonary congestion, hemodynamic malfunction, and finally, death. The signs of asphyxia are manifested in the corpse.

In the special position described in this case, the tongue base hemorrhage was a clear sign of suffocation. In addition, the exclusion of death by injury or disease indicated that the mechanism of death was due to external forces stretching the neck so that the tongue and pharynx were squeezed causing respiratory obstruction, ventilator dysfunction, and death from respiratory failure. In addition, neck hyper flexion can stimulate the carotid sinus due to reflex cardiac arrest, which may contribute to death.

We agree that the custody restraint position by itself does not always compromise the respiratory system to the point of asphyxiation. Each case of death in custody after an aggressively and violently resisted legal arrest has its own specific characteristics. In many cases, agitation and the fierce struggle during physical restraint contribute to the death. In general, law enforcement personnel are not aware of the serious physiological consequences of physical restraint and do not recognize the appearance of early symptoms or signs of asphyxiation in a prisoner, which is often used as an excuse to escape punishment.

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References

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