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CASE REPORT

PATHOLOGY/BIOLOGY

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Planned Complex Occupation-related Suicide by Captive-bolt Gunshot and Hanging*

ABSTRACT: Planned complex suicides are committed by using two or more previously planned methods simultaneously to make sure that death will occur even if one method fails. Herein, we presented a case of occupation-related planned complex suicide, committed by captive-bolt gunshot and hanging. A 29-year-old man, who worked as a butcher, was found dead in the stable, hanging by the neck with a captive-bolt gun embedded in the forehead region of his head. The hanging was complete. Along the bolt canal were bone fragments, and at the end of the path was the punched-out fragment of the skin and soft tissue. There were no fractures of the hyoid bone and laryngeal cartilages, and a superficial hemorrhage was present in the right sternocleidomastoid muscle. Our case underlines the utility of forensic autopsy and death scene investigation in reconstructing the mechanism of death, as well as the dynamics of the event.

KEYWORDS: forensic science, forensic pathology, occupational suicide, planned complex suicide, captive-bolt gun, hanging

Planned complex suicides are committed by using two or more previously planned methods simultaneously to make sure that death will occur even if one method fails (1,2). Complex suicides have been reported to account for about 1–5% of all suicides (2–4). The most frequent combination of methods in victims of planned complex suicides consisted of hanging, along with firearm use (2,3). However, sometimes the used methods are quite bizarre (5–10).

Suicides with occupation-related features were observed as well. Several common characteristic features related to the respective occupational backgrounds can be noticed: availability of and easy access to the used tools, or special knowledge and skills provided by the suicidal individual's occupational background are applied (11).

Herein, we presented a case of occupation-related planned complex suicide committed by captive-bolt gunshot and hanging.

Case Report

Case Circumstances

A 29-year-old man was found dead in the stable, hanging by the neck with a captive-bolt gun embedded in the forehead region of his head (Figs. 1 and 2). The hanging was complete—the feet were about 10 cm above the ground, with the knot of the ligature in the right part of the occipital region (Fig. 3). The ligature was made of triple synthetic string fixed to a butcher-hook from the ceiling. Near the feet, there was an overturned plastic barrel, about 70 cm in height (Fig. 4). In the stable, there was an improvised table with a collection of butcher-knives and tools, as well as the box with the ammunition for the captive-bolt gun. During the death scene investigation, one empty captive-bolt gun cartridge was found on the ground near the table. No suicide notes or bloodstain tracks on the ground were found. There was live calf in the stable.

The young man lived with his wife and parents. They lived in the countryside on a farm. He was a butcher, as his father was, and they worked together for the people in the surrounding area. He suffered from recurrent episodes of depression since childhood but he had never attempted suicide before. At the time, he was not under pharmacological treatment for depression. On that very day, he was supposed to slaughter a calf. His hanging body was found by his father, who came into the stable to help him with the butchering, about 1 h after the young man went into the stable.

Autopsy Findings

The deceased was 183.5 cm tall and weighed approximately 75 kg.

At the external examination, after removing the captive-bolt gun, in the center of the forehead, about 5 cm above the eyebrows, a central round entrance wound with a diameter of about 12 mm was found, with the skin and underlying soft tissue damaged. The edges of the wound were regular, flat, smooth, and soft. Surrounding an almost regular oval zone on the forehead, with a diameter of about 40–45 mm, were powder soot deposits that were more distinct on the upper-right and lower-left parts of the surrounding undamaged skin (Fig. 5). A slight amount of blood was present, running from the wound. The captive-bolt gun perforated the skull, in a circular area, about 12 mm in diameter in the outer table plate of the frontal bone, the same diameter as the bolt. The inner table of the

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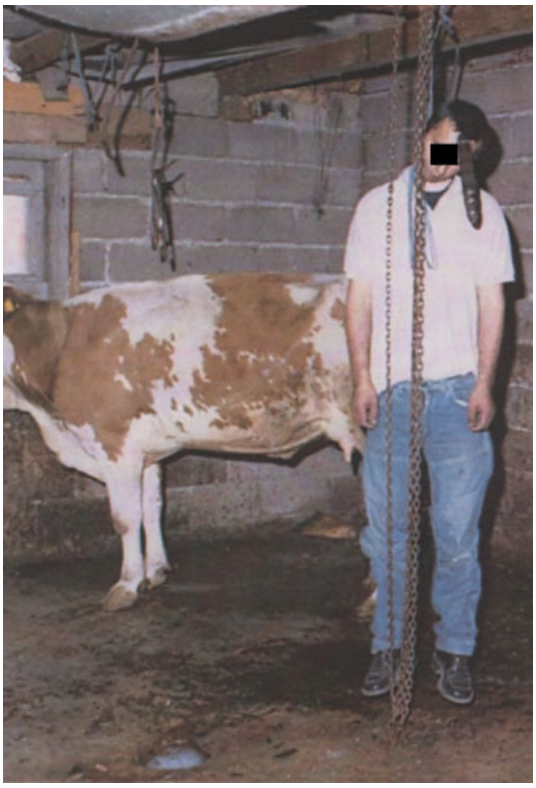

FIG. 1—*The stable where a man was found dead.*

FIG. 2—*The captive-bolt gun embedded in the forehead region of deceased.*

frontal bone was more damaged, and the diameter was greater—about 15 mm. In the same place, the dura was damaged. A cylindrical wound track with a diameter of about 15 mm of the cerebrum was found, involving the right frontal lobe and right lateral brain ventricle. The lateral ventricle brain system was filled with blood. The direction of the channel in the brain tissue produced by the bolt was from left to right and downward. Along the bolt canal were bone fragments, and at the end of the path was the punched-out fragment of the skin and soft tissue. The brain showed a diffuse subarachnoidal hemorrhage on both frontal lobes, as well as slight edema. The great arterial vessels of the brain were undamaged.

At the examination of the neck, a triple furrow was present, each strand about 10 mm wide, which did not completely encircle the neck, indicating that the knot of the noose was in the right posterior part of the neck. Focal cutaneous hemorrhages above and below the furrow, in the anterior and lateral cervical regions, were present.

FIG. 3—*The triple synthetic-stripe ligature, and the knot in the right side of the occipital region.*

FIG. 4—*The overturned plastic barrel, near by the feet of the deceased.*

The skin and underlying fat and soft tissue in the place of the ligature mark were dark brown, dry, and rigid because of desiccation. At the point of attachment of the right sternocleidomastoid muscle, a superficial hemorrhage was present. There were no fractures of the hyoid bone and laryngeal cartilages.

Other major autopsy findings were subpleural petechial hemorrhages and acute lung emphysema, as well as liquid blood in all the organs and vessels consistent with general autopsy signs of asphyxia. The total weight of the lungs was 750 g. There was no alcohol in the blood sample taken.

Discussion

Captive-bolt guns (slaughterer's guns, livestock stunners) are devices used in the meat industry and private farmer households for slaughtering domestic animals in a painless manner, a so-called humane form of killing. By shooting the head, one can daze the animal and then in the second act, without resistance, finish the killing by a different method—usually exsanguination by slaughtering (12,13). The captive-bolt gun is a metal device of cylindrical shape, about 30-cm long. Powder filling fires out the bolt. The tip of the bolt is concave and conically grooved with very sharp edges. After discharging, the bolt is pulled back into the barrel by a withdrawal spring (12). On the market, there are two kinds of captive-bolt gun: Kerner—the caliber and length of the bolt are 10.5 mm and 9 cm, respectively; and Schermer—the caliber and length of the bolt are 12 mm and 7.5 cm, respectively. Maximal firing velocity is 50 m⁄sec (13). The powder filling is a 9-mm caliber cartridge without a bullet. Powder gases escape through two or four openings on the frontal side of the device. In cases in which the slaughterer's gun is pressed to the surface of the head, the skin injury is flanked

FIG. 5—*The round entrance captive-bolt gun wound in the forehead, surrounded with powder soot deposits.*

by two or more symmetrically localized, circular, regular areas of powder soot deposits, which correspond with the openings on the distal end of the gun (12,13).

Upon firing, the sharp edge of the bolt—muzzle cuts the skin and takes it into the depth of the wound, with hair and all the skin's elements. Defects on the outer table of the skull are almost identical to the caliber of the bolt. The defect of the inner table is considerably larger because of bone fragments punched out by the bolt and dispersed around the firing canal as secondary projectiles (14). Thus, the length of the wound canal is usually longer than the penetrating bolt (13,15). The damage resulting from the bone fragments to the brain parenchyma is greater than the direct destructive effect of the bolt. Such an injury usually causes loss of consciousness and does not cause rapid death, but the prognosis is poor (13).

In our presented case, the diameter of the wound, and the hole in the frontal bone, caused by the bolt, strongly corresponded with the diameter of the bolt.

In many European countries, such as ours, captive-bolt guns are considered a tool, and a firearms license is not required. Like in our presented case, the captive-bolt guns are often home-remodeled: the openings on the frontal side of the device were widened. That is why in our presented case, the area of the powder soot deposit around the wound was not quite symmetrically localized as regular circular areas: the powder soot deposit was almost a regular oval zone on the forehead, although the upper-right and lower-left parts of the undamaged skin around the entrance wound were more distinctly sooted than other parts.

Most violent deaths inflicted by captive-bolt guns are reported in medical forensic practice as predominantly suicidal, while accidents and homicides are considered unusual events (12,16,17). In 1937, Czursidel was the first author who reported a suicide with a slaughterer's gun, type Kerner (18).

In cases of complex suicides, where usually two previously planned methods are employed simultaneously, hanging is frequently used (2,3). Internal injuries are absent in many hangings, but there was a higher frequency of trauma in complete compared with incomplete suspensions.

Some form of hyoid bone and laryngeal cartilages fracture was significantly more often present in persons older than 30–40 years. This could be explained by the ossification of these structures by aging (19,20). In our presented case, there were no fractures of the throat-skeleton structures. The superficial hemorrhage at the point of attachment of the right sternocleidomastoid muscle, on the same side as the highest point of the ligature mark, was produced by the extension of this part of the neck because of hanging (21,22). The overturned plastic barrel, found near the feet of the deceased, indicated hanging with a drop effect. After taking out the empty shell from the captive-bolt gun, putting the new cartridge into the gun, and preparing the string ligature and the noose, the young man climbed onto the barrel, put the ligature over his head, around his neck, shot the captive-bolt gun into his forehead, lost consciousness, fell from the barrel, and hanged himself. As the cardiac and respiratory centers were not damaged by the captive-bolt gun (midbrain, medulla, and pons), this means that after the shot, the victim was still alive, and that the death was caused by strangulation. This scenario could be supported by vital signs of hanging: focal cutaneous hemorrhages above and below the strangulation mark, a superficial hemorrhage at the point of attachment of the right sternocleidomastoid muscle, as well as the general autopsy signs of asphyxia, such as petechial subpleural hemorrhages, acute lung emphysema, as well as liquid blood in all the organs and vessels (21,22). The furrow on the neck and condensation of the subcutaneous fat tissue were postmortem in origin.

Regarding the suicidal usage of bolt guns, it is controversial if they are occupational related. Such devices are used predominantly by men at their workplace: butchers, veterinarians, and farmers. In such cases of occupational-related suicides, the entry wound is usually found in the center of the forehead because handling of bolt guns requires both hands (11). However, persons who are not professionally related to such devices often treat and use captive-bolt guns as ordinary firearms, so the suicidal entrance wounds caused with slaughterer's gun are usually located in the temporal region of the head (12,13).

Our case study, analyzing an unusual occupational-related planned complex suicide by captive-bolt gun and hanging, underlines the utility of forensic autopsy and death scene investigation in reconstructing the mechanism of death, as well as the dynamics of the event.

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