

CASE REPORT

PATHOLOGY/BIOLOGY

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Complex Suicide: An Unusual Case with Six Methods Applied

ABSTRACT: Complex suicides (CSs) are committed by using more than one method. They account for 1.5–5% of all suicides. We present a case of CSs of a 44-year-old man, found dead in the vicinity of his car, in a deserted frozen field. Police investigation excluded homicide, and no medical data confirmed mental illnesses. Autopsy revealed wrist cuts, neck cuts, acid burns in the GI tract, multiple stab wounds to the head by a screwdriver, and several uncertain signs of hypothermia. Toxicology analysis (gas chromatography–mass spectrometry) confirmed ingestion of insecticide. We concluded that stab wounds to the head were the cause of death, while external hemorrhage and hypothermia were contributing factors. This is the first case of CSs reviewed in the literature where six suicide methods were applied. This particular case is interesting because the victim used a screwdriver as a tool for inflicting stab wounds to the head, which is a rare suicidal method.

KEYWORDS: forensic science, complex suicide, screwdriver, traumatic brain injury, insecticide, hypothermia

Complex suicides (CSs) are committed by using more than one method. Depending on the time delay between the employed suicidal mechanisms they can be defined as “primary CSs” if the mechanisms are applied simultaneously and “secondary CSs” if the mechanisms are applied in quick chronological sequence. According to Marcinkowski et al. (1), CSs can be divided into “planned” CSs and “unplanned” CSs. The suicide is categorized as “planned” if a combination of more previously planned suicidal methods are applied, while in an unplanned CS, a second method is used only after the first one has failed (1–3).

The term “complicated suicide” exists in the literature as well. This entity is distinguished from CSs by the fact that death results from an accidental secondary event and is not caused by the initially applied suicide method (4). Whether planned or unplanned, CSs account for 1.5–5% of all suicides (5).

Case Report

Case History

In the night between 23rd and 24th of January 2010 (observed temperature that night was -8°C), a 44-year-old man was found dead, lying on his back in the vicinity of his car (Fig. 1). The car was parked with stopped engine in a deserted frozen field, a few kilometers away from the nearest town. The doors of the car were opened, and victim’s head and clothes were soaked in blood. Blood spots were found on both front car seats. Neither weapons nor any tools were found around his body outside the car. A farewell letter was hand-written on two sheets of paper and was found on the

dashboard of the car. The motive for committing suicide was not given in this letter. There were only expressions of love toward his family members (wife and daughters). In the letter, he also asked his wife to tell everyone that he had died in a car crash. On the right front car seat, there were blood spots, a screwdriver handle, an automobile crane (jack), one razor blade, one cell phone, car keys, a pencil, and a woolen hat (Fig. 2). In front of this seat, there were two half-emptied red plastic bottles with hydrochloric acid, and one almost empty transparent plastic bottle with traces of a liquid of unknown origin.

A single receipt from the nearby town supermarket was found in the car. One screwdriver, a pack of razor blades, and two bottles of concentrated hydrochloric acid were listed in the receipt.

Police investigation was focused primarily on the exclusion of third-person involvement (homicide), without further attempts to establish the real motive for suicide. However, the investigation revealed no medical data indicating that this person had been suffering from any form of mental illness. There were no recorded suicide attempts nor had there been any mental illnesses in his family. The subject in question was under no drug treatment prior to his death.

Autopsy Report

Autopsy was performed 24 h later, at the Institute of Forensic Medicine.

On external examination, we noticed frozen clothes, cherry red postmortem lividity scattered on the back side of the body, frozen skin, but other “soft” signs of hypothermia were not noticed (reddish discoloration of knees, elbows, etc.). During the examination, we found six superficial incisions on the palmar side of the left wrist (Fig. 3), two similar incisions on the right hand wrist, and one incision on the inner side of the left thigh. No arteries were

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FIG. 1—Scene—position of the body.



FIG. 2—Right front car seat. Dark spots are the blood spots. Screwdriver handle, automobile crane (jack), one razor blade, one cell phone, car keys, a pencil, and a woolen hat are also visible. The white arrow points to the razor blade and screwdriver handle.



FIG. 3—Incisions on the palmar side of left wrist.

transected. On the left side of the neck, we found one superficial incision, 7 cm in length, while on the front side of neck, there was one horizontal incision measuring 19 cm in length and 2 cm in width (Fig. 4), which penetrated the right lamina of thyroid cartilage.

In the right temporal region, we found one end of the screwdriver shaft, 1.5 cm in length protruding through wedge-shaped



FIG. 4—Incision on the front side of neck.

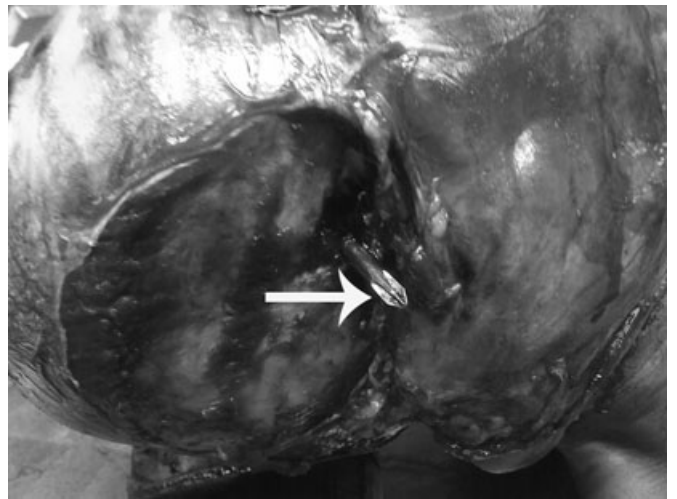


FIG. 5—White arrow indicates to the end of screwdriver shaft, protruding from right temporal bone and muscle.

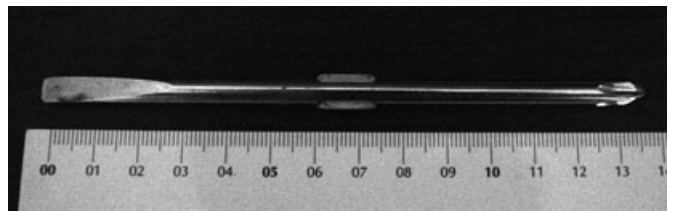


FIG. 6—Screwdriver shaft, measuring 14 cm in length, with two different ends. Note that Philips type ending was protruding from the head, while the flat one penetrated skull and brain tissue.

wound of the right temporal bone and muscle (Fig. 5). The shaft penetrated the right great wing of sphenoid bone, the right frontal and parietal lobe of cerebrum, lacerated the cerebral falx, and continued through the left parietal lobe, where we found the other end of the screwdriver's shaft. We found this to be a specific type of shaft (detachable) as it could be inserted both ways into the handle, with the length of 14 cm (Fig. 6). The end of the shaft that was protruding from the right temporal region was Philips type, while the end that penetrated through the bone and

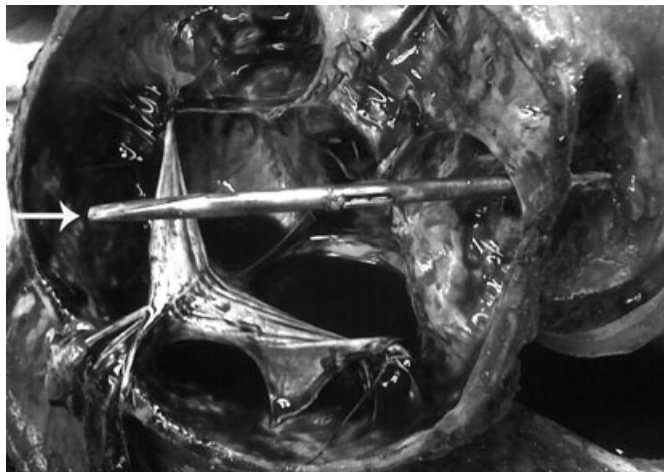


FIG. 7—Position and direction of the screwdriver after opening the skull and removal of the brain.

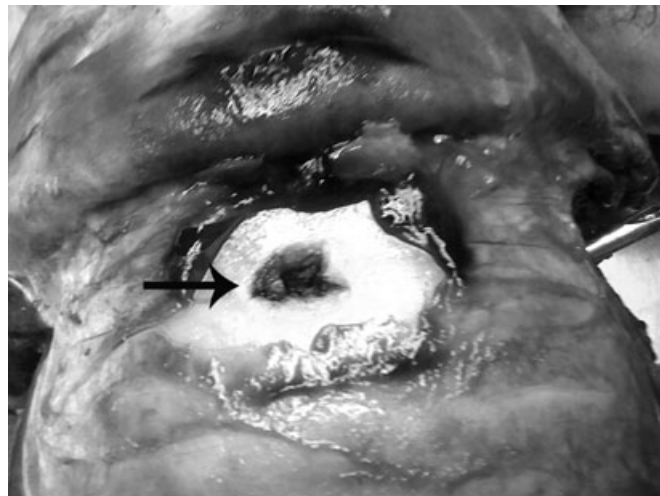


FIG. 9—Black arrow indicates wedge-shaped stab wound on the frontal bone of the skull.



FIG. 8—Arrow points to the stab wound located on the forehead.

the brain tissue was flat. The direction of the wound was toward the left, backward and upward, measuring 11 cm in length (Fig. 7).

Three wedge-shaped stab wounds were found on the head as well, two of them located in the midline parietal region and one in the midline of the forehead (Fig. 8). Both wounds in the parietal region were directed downward, and lacerated the superior sagittal sinus with subsequent epidural hematoma. One of the wounds penetrated the brain in the right parietal lobe, ending in white matter and measuring 4 cm in length. The wound in the frontal region was directed horizontally inward and slightly to the left, through the frontal bone (Fig. 9), lacerating the meninges, and penetrating the left frontal lobe to 5 cm in depth.

In the parietal region, along the midline, there was an epidural hematoma measuring 5 × 1 cm in diameter. The brain was swollen, with flattened gyri and narrowed sulci, measuring 1.64 kg. We

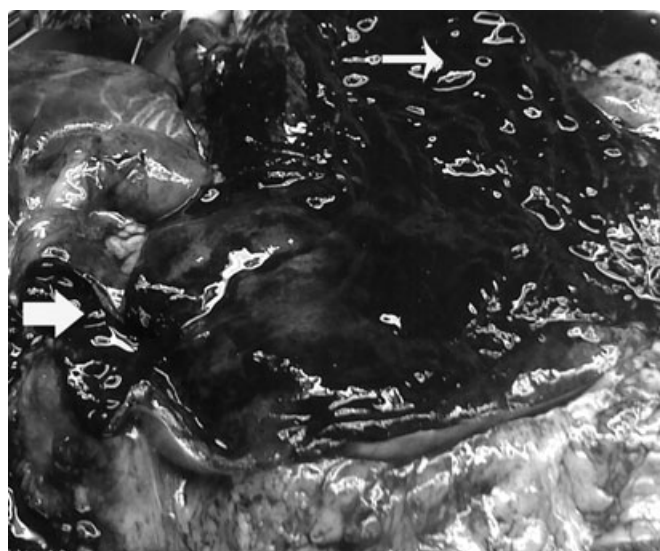


FIG. 10—Acid burns in gastric and duodenal mucosa. Thin arrow points to the cardia, and the thick one to the duodenum.

found marked indentations on the ventral surface of cerebellum, indicating tonsillar herniation.

The brain tissue along all wound tracks was destroyed, but there were no diffuse injuries in the white matter, nor did we notice concentric zones of necrosis around the tracks.

We found acid burns in gastroduodenal mucosa (Fig. 10) and the first couple of inches of ileum, without perforation. These burns masked potential presence of Wischnewski ulcers. Unusual signs of hypothermia, such as focal hemorrhages and/or necrosis of the pancreas, were not present.

During the autopsy, we checked the pH of the gastric content with semi-quantitative method, using *pH-Indikatorstabchen Universal-indikator* paper sticks by Merck (Darmstadt, Germany). The measured pH was around 2.

Toxicology Report

Alcohol was quantified by gas chromatography with flame ionization. Concentration was negligible. Blood, urine, bile, and

intestine contents were tested using gas chromatography–mass spectrometry. Toxicology analysis of gastric and intestinal contents revealed Cypermethrin (synthetic pyrethroid used as an insecticide in commercial agricultural applications), while analysis of blood, urine, and bile was negative. The same substance was identified in the liquid from the transparent plastic bottle, taken from the scene. Concentrated hydrochloric acid was identified in two remaining red plastic bottles.

According to these findings, we designated multiple stab wounds to the head with subsequent epidural hemorrhage as the cause of death, while severe brain swelling with consequent tonsillar herniation were designated as mechanism of death. External hemorrhage from wrist cuts, neck cuts, and head wounds along with hypothermia were defined as contributing factors. Toxicology findings and acid burns in intestinal mucosa along with an absence of perforations in digestive tract excluded poisoning as the cause of death, but at the same time these findings served as the proof of ingestion of hydrochloric acid and insecticide. The manner of death was suicide.

Discussion

Planned CSs are rare. CSs have been reported to account for 1.5–5.0% of all suicide cases (5). In general, the methods used in CSs most commonly involve hanging, use of firearms, wrist cuts, neck cuts, insecticide ingestion, drowning and falls from height (5). There are also cases describing self-immolation (2,6), electrocution (7), and use of captive-bolt guns (8). There are a few references in the literature regarding screwdriver related head trauma, both homicidal and suicidal. In lethal cases, death occurred because of brain ischemia and the resulting edema secondary to arterial injury (9,10). As for ingestion of insecticides, one study in Turkey revealed that this method, along with hanging and firearms, was one of the most frequently used suicide methods (11). One retrospective 15-year cohort study in Israel showed that 33% of admitted patients attempted suicide with a caustic agent, and that in 32% the caustic agent was acidic (12). Furthermore, ingestion of HCl in cases of planned CSs is described in one report (13). Suicidal hypothermia seems to be rare, but we found an article describing suicide initiated by incisions in the skin and the subsequent hypovolemia resulted in the fatal hypothermia (14).

In most CSs, two or three methods are utilized (6,15). The use of up to five suicidal methods applied one after another has been described in the literature (5). Bohnert (15) reported that planned CSs often differ from unplanned CSs in the number of methods used: victims of planned CSs rarely use more than two methods. Victims use methods of lesser lethality before opting to use more lethal techniques. Self-inflicted injuries by sharp force, especially cuts of the wrists, are often found as the primary act of suicide in CSs (15).

Our case is specific primarily because of the number and the type of methods applied in order to commit a suicide. In this case, we found six of them—wrist cuts, neck cuts, ingestion of insecticide, ingestion of HCl, stab wounds to the head by screwdriver shaft, and exposure to cold. It is difficult to state with certainty whether or not the victim planned for hypothermia to play a role in death. If, in fact hypothermia did play a role in death, but was not planned, this could be an example of a combined complex/complicated suicide, as previously defined.

Nevertheless, according to the facts from the scene, there were signs indicating this intention: opened front doors of the car; stopped engine; light clothing; and the position of the body, some 1.5 m away from the car, which excluded a fall to the ground from the front seat.

Taking into account the number and the type of head injuries in our case, the forensic pathologist must ask himself whether or not an individual could actually perform this kind of behavior from a neurological standpoint. The pathological consequences of penetrating head wounds depend on the circumstances of the injury, including the properties of the weapon or a missile, the energy of the impact, and the location and characteristics of the intracranial trajectory. The mechanisms of neuronal and vascular injury caused by cranial stab wounds differ from those caused by other types of head trauma. Unlike missile injuries, no concentric zone of coagulative necrosis caused by dissipated energy is present. Unlike in motor vehicle accidents, no diffuse shearing injury to the brain occurs. Unless an associated hematoma or infarct is present, cerebral damage caused by stabbing is largely restricted to the wound tract. However, in cases of brainstem lesions, there is a great propensity for vascular damage, and some researches showed that survivors were left incapacitated by severe and fixed neurological deficits (16,17). In a series of stab wounds, de Villiers reported a mortality of 17%, mostly related to vascular injury and massive intracerebral hematomas (18).

In our case, along the wound tracts there was neither evidence of diffuse brain injury (shearing), nor were there concentric zones of necrosis caused by dissipated energy (like in missile wounds).

As the cerebral damage caused by stabbing was largely restricted to the wound track, and it took some time for the blood to accumulate in the epidural space and to produce tonsillar cerebellar herniation, it is our opinion that these stab wounds to the head could have been performed in a self-injurious manner.

Irrespective of whether or not all the methods applied in this suicide were planned, this is, to the best of our knowledge, the first case of CSs with six methods applied. Furthermore, we found very little data available in the literature about usage of a screwdriver as a tool for infliction of suicidal stab wounds to the head.

Acknowledgments

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