LESSONS FROM THE MUSEUM

A train-related fatality—old dilemmas: accident, suicide, or homicide? Premortem or postmortem decapitation?

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Introduction

The Institute of Forensic Medicine was founded by Professor Milovan Milovanović (1884–1948) in 1923 as a part of the School of Medicine at the University of Belgrade. He also established a small forensic collection that has slowly grown into a museum.

Remarkable autopsy material has been preserved in the museum, revealing the story behind one of his cases. This story illustrates the way Prof. Milovanović dealt with issues of identification, determination of the manner of death, and the time of injury, more than 80 years ago.

Case outline

Museum Reference: Museum specimen M-541 is a jar containing an embalmed head of a man (Fig. 1).

In the third edition of his textbook, published in 1947, Prof. Milovanović used a black and white photograph of this specimen to illustrate the chapter on identification. He used it to point out the role of embalming as an identification aid. Interestingly, he used Piëtri method of embalming. Description of the method can be found in a book published by the American Chemical Society [1]: “Piëtri… 1930. Preservation and embalming of bodies by the penetration of anti-putrefying gases into the organism without the introduction of liquid into the blood vessels… The corpse is placed onto linen over a down mattress, which contains 5 kg of sawdust with 500 g of vegetable charcoal, KMnO₄, camphor, and naphthalene, sprinkled with 2.5 l of a mixture of equal parts of thymol, formalin, alcohol, and benzoic acid. The coffin is then hermetically sealed. Not only is putrefaction prevented, but even if it has reached an advanced stage, after 3 days all signs of putrefaction will have disappeared and the body will recover its normal appearance.”

A partially preserved label is attached to the jar, with the following text: “L No. 93, M No. 541, Run over by a train. Suicide.” The case has been identified in the record-keeping journal for the year 1931 as forensic case No. 21.

Case history

The autopsy record contains lines hand-written in ink by Prof. Milovanović (Fig. 2), as he would commonly collect data from the police and family. For this case he noted: “The corpse was found by linemen about 6 km from the Belgrade railway station at night. The head, completely separated from the body, was found away from the track, while the body was lying between the tracks in a diagonal position. The deceased was photographed at the time of autopsy and the photograph was published in a daily newspaper.”

A day after the autopsy was performed, “Politika,” the most popular daily newspaper in Serbia at the time, published an article with a photograph of the deceased and some intriguing text about the beheaded man found on the rail-way tracks: “Did he jump onto the railway or was he thrown to the tracks by someone else?” (Fig. 3) [2]. The article reported that the young man was dressed nicely, and had no identity card on his person. That night, witnesses
saw a mysterious, luxurious car, driving very slowly near the accident site. Was it a homicide?

Autopsy findings

Prof. Milovanović performed the autopsy after which the report was typed (Fig. 2). The body was found on the 30th of January 1931 and the autopsy was performed the following day. The identity of the deceased was unknown. External Findings: “The hair is dark-brown, 9 cm long... The eyebrows are dark-brown... The head is completely separated from the trunk... The third and fourth cervical vertebrae are detached... The arms are amputated at the shoulder level... At the area of amputation, the skin has been partially peeled away from the muscles and bone. The skin and shirt are covered in dirt and grease...” Internal Findings: “The lungs are lacerated... Around the small bronchi, the lung tissue is consolidated and contains reddish areas of aspirated blood... A few pinpointed hemorrhagic areas are noted on the endocardium... There is an aortic rupture 5 cm above the valve... The stomach is filled with food and contains multiple perforations... The upper thoracic spine, as well as the ribs and sternum, are all fractured.” All internal organs were anemic due to exsanguinations.

The autopsy record also includes two diagrams of the anterior and posterior body. Prof. Milovanović marked the wounds in red (Fig. 4).

Another section of the autopsy record was obviously added later: “...3.45 pro mille of ethanol in the gastric contents and 0.6 pro mille in the urine... Microscopical findings: lung vessels embolized with fat droplets.”

It was concluded that cause of death was decapitation, and the “existing bruising, blood aspiration, and lung fat emboli” were consistent with antemortem decapitation. It was also concluded that “the death was suicidal in manner” and that “at the moment of death, the deceased was mildly intoxicated.”

In the heading of the autopsy record, Prof. Milovanović wrote about the problems with identification. The deceased remained unidentified for days following the publication of the picture in the newspaper. Ultimately, victim’s brother identified him and gave his age as 22. After carrying out his military service, he had moved to Belgrade and become a tailor’s apprentice. Apparently, however, he was not skilled at his work and was often drunk. Two days prior to the day his decapitated body was found, he had a quarreled with his employer and landlord, and abandoned his job and apartment.

Discussion

Railway-related trauma is typically severe, instantly fatal, and extremely mutilating. The cause of death is frequently evident [3]. In the absence of history, determining the manner of death can be quite challenging. The most common dilemma in such cases is whether the death was an accident or a suicide [4, 5].

**Fig. 1** a Museum specimen M No. 541, forensic case No. 21 from 1931: a jar containing the embalmed head of a young man. b A closer view of the head

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The wounds caused by train wheels have clean, straight margins with parallel lines of bruising [6, 7]. In the presented case, the head was completely separated from the trunk and the wound had clean, straight margins. The skin and shirt were stained with dirt and grease. The shoulder wounds had similar characteristics.

In his forensic medicine textbooks published throughout the 1920s and 1930s Prof. Milovanović noted: “suicidal or accidental railway collisions with a person in an upright position are quite similar. However, injuries in individuals lying across the rails are overly characteristic: they are found at the neck, head, legs, and the pelvis; the wounds are parallel, with the scissors-effect of the train wheels and the rails on the body lying across the track. Bound legs, covered eyes, and hands covering the ears all indicate suicide. Covering the ears with the hands results in arm injuries that are contiguous with neck injuries, which may also be typical for suicides” [8, 9].
Individuals who lie across railroad tracks in order to commit suicide hold the palms of their hands against their ears in an effort to avoid the noise produced by the oncoming train. In such cases the arms and shoulders are abducted with the elbows flexed, resulting in contiguous injuries of the neck and arms, as marked in red by Prof. Milovanović on the autopsy diagrams (Fig. 3).

The extensive mutilation seen in most train-related fatalities provides an opportunity to conceal a homicide by deliberately placing a body onto railway tracks following a...
homicide. Therefore, determination of the time of the injuries relative to the time of death is of great importance.

In the case presented here, several facts indicated that the wounds were sustained ante mortem. Exsanguination and consequent subendocardial hemorrhages, as well as blood aspiration, can be considered to be definitive signs. Also, Prof. Milovanović had already been researching fat embolism [10, 11], and considered lung fat embolism in cases of severely mutilated bodies to represent vital reactions. The incidence of a post-traumatic fat embolism in
autopsy reports is approximately 96–100% [12–14]. Only a few expulsive heartbeats are required to move a droplet of fat from a fractured bone into the pulmonary circulation. Finally, it is unclear why blood samples were not sent with other fluid samples for further toxicological analysis, but this might be because insufficient blood was available due to exsanguination.

In order to make the identification more reliable, Prof. Milovanović embalmed the head of the deceased using the Piétri method, published a year earlier. Following identification, the embalmed head was kept as a museum specimen. The head is still in good condition, having been preserved for more than 80 years.

**Postscript**

Hidden among the autopsy record and diagrams, attached to them by a rusty metal paper clip, there was a small black-and-white photograph of the deceased in a royal military uniform, taken a few years prior to his death (Fig. 5). This picture provides a rare opportunity to compare this photograph and the police photograph of the deceased from the early 1930s with the present-day images of the embalmed head; if viewed and compared carefully, it can be seen that this is the same person.

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**References**