

CASE REPORT

Homicide by Blunt Trauma Causing Basilar Skull Fracture in Drowned-suspected Corpse: A Case Report

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ABSTRACT

Drowning is one of the hardest homicides to prove. Proof, such as bodies, can be decomposed and washed away, and gathering forensics can be very challenging. Since it is common, police may assume drowning as an accident. Drowning and blunt force injuries are more extremely combined in complex homicide. We report a difficult case of complex homicide by blunt trauma causing basilar skull fracture in a drowned-suspected corpse. A decomposing body was found in the river with no identifiable injuries visible as the body had decomposed on external examination. In an autopsy is also difficult to identify the cause of death because the internal organs are so badly decomposed. Further autopsy, we obtained the accidental finding that there was a fracture to the base of the skull which was suspected to be due to blunt force trauma. It is hard to know how to search for clues in homicide involving drowning as there is no definitive test to determine that a death was caused by drowning. We concluded that a complex homicide by blunt trauma and drowning that confuses between homicide and accidental death should be thoroughly investigated by autopsy. Even though the internal organs had already decayed and liquefied.

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INTRODUCTION

Homicide, which accounts for around 400,000 fatalities yearly, is one of the top causes of premature mortality in the globe. Since the beginning of the twenty-first century, homicides have claimed nearly as many lives as wars [1]. A significant public health concern, drowning—which mainly occurs in a watery environment—continues to kill an estimated 362,000 deaths annually worldwide. A sizable portion of drowning-related deaths are thought to be accidental, while a rare portion are thought to be suicidal or homicidal drowning. Others involve a combination of drowning brought on by trauma, alcoholism, or harsh environmental conditions [2].

When a case of drowning is established, a forensic pathology method presents several difficulties in ascertaining the cause and manner of the corpse's death. Coordination of the factors thought to have contributed to the death is necessary for identifying the way of death.

External examination can be used to find the available objective medical evidence and some confirmatory data, although this is not very specific. The remains of drowning victims can be examined internally and at the crime scene to assist in identifying the manner of death [3].

Complex homicide more rarely combines drowning and blunt force injury. Moreover, the apparent decomposed and liquefied internal organs at autopsy made matters more difficult. This frequent finding causes the potential assumption that drowning is accidental [4]. In this article, we report a challenging case of homicide in a drowned-suspected corpse with an unexpected autopsy finding of blunt trauma causing a basilar skull fracture.

CASE REPORT

Police found a body in the river on 16 July 2022 at 22:00 (GMT+7). According to the police statement, at first glance, there were no visible signs of violence on the body or evidence at the crime scene. The initial suspected cause of death was accidental drowning. The police only found evidence of an identity card with gender information for a 40-year-old male. The victim's

family then filed a report on alleged violence and the police submitted an application letter for an autopsy examination to us at the Forensic Medicine department of Dr. Moewardi Public Hospital, Surakarta, Indonesia. This case article is reported by a certified forensic expert based on Visum et Repertum (No. 034/IKF&ML/VII/LL/2022).

External post-mortem examination

The condition of the body when it was on the autopsy table was decomposed with a real systemic edema process (Figure 1-A). The body has a body length of 159 cm. No cadaveric spasm was found in all joints of the body. We also found no postmortem lividity (Figure 1-B). The decomposition process has occurred throughout the body and there are maggots with a size of ± 1.7 cm (Figure 1-C). Examination of the head obtained the following data: no hair, no bone crepitation was found in all areas of the neurocranium and viscerocranium, evaluation of signs of violence in the form of wounds could not be assessed due to the process of decay in all areas of the scalp, face, nose, eyes, ears, and mouth (Figure 1-D). The same results were also observed on examination of the neck, chest, and abdomen that signs of violent injuries could not be assessed because the corpse had decomposed, and no bone crepitation as well was found. Genital examination showed that male sex, circumcised prepuce, black curly pubic hair (± 8 cm), intact scrotum and palpable two testicles, external urethral orifice no discharge (Figure 1-B).

Examination of the right upper extremity showed that the wound could not be assessed because of the decay process and there was no palpable bone crepitation, the tissue in the nail bed was pale. The left counterpart showed that the left humeral (18 cm from the acromion) had an open wound with exposure in the form of a 12 cm bone base, no bone crepitation was palpable, and the tissue in the nail bed was pale as well (Figure 1-E). Examination of both sides of the lower extremities showed that there were no injuries that could be assessed due to putrefactive processes, no bone-crunching was palpable, and the tissue in the nail bed was pale. The back and buttocks area yielded the same results that there were no injuries that could be assessed due to decay (Figure 1-F). Furthermore, neither stool nor wound were visible in the anal region as well. These inconclusive results had not been able to find out the cause of death, so further autopsies are needed.



Figure 1: (A) Initial corpse body condition prior to external examination, this showed significant edema; (B) Corpse in supine position, this showed decomposition process without postmortem lividity; (C) The maggots ± 1.7 cm was found in the corpse; (D) Decomposition in front head region; (E) Significant open wound with right humeral bone exposure; (F) Back-to-buttocks examination showed no injuries that could be investigated because of decay.

Internal autopsy examination

The chest skin was opened showing that there was a fracture at the level of the 5th left and right ribs. The sternum is opened to show that there is no dilation of blood vessels, the heart is visible at the top (5 cm) and the bottom (10 cm) (Figure 2-A). The pericardium is opened showing that the heart is red in color with a springy consistency not covered by fatty tissue, there is no fluid, the size of the heart is 14 x 11 x 2 cm in length, and weighs 171 g.

Examination of the right and left lungs consisted of three and two sections without attachments, respectively, easily removed, red-black in color, soft in consistency, blunt edges, smooth surface, 25x12 cm in size, 105 grams in weight (Figure 2-B). On slicing the tissue color is dark red and on massage, it is not frothy. Both diatom and lung float tests showed negative results. These confirmed that the victim died prior to drowning. Further visceral organ examination of both kidneys, liver, and gall bladder showed no significant clues to determine the cause of death. The neck autopsy showed no significant clues as well.

Autopsy of the head yielded the following results: scalp was opened and bruises were found in the frontal-occipital region without palpable bone crepitation (Figure 2-C); the neurocranium was opened and there were no wounds or fractures; the brain parenchyma and leptomeningeal layer are difficult to evaluate because they are already liquefied and decomposed (Figure 2-D); definitive findings include bone fracture and bleeding

in the clivus of the basilar skull posterior fossa near foramen magnum (Figure 2-E). Further pathological anatomy examination of the fronto-occipital part of the neurocranium showed that there were no signs of inflammatory cells indicating no bruises that reached the bone, only visible blood seepage on the surface of the bone.



Figure 2: (A) Chest and heart autopsy examination; (B) The right lung consisted of three and two sections easily removed, red-black in color, soft in consistency; (C) Scalp is removed and revealed bruises in the frontal-occipital region; (D) Decomposed and liquefied brain and leptomeninges; (E) Bone fracture and bleeding in the basilar skull close to clivus and foramen magnum indicating strong clue as the cause of death.

DISCUSSION

Decomposition is a late post-mortem change indicating death has occurred within 24-48 hours. The lower abdominal wall decomposes the fastest because there is a lot of fluid. Then the decomposition can spread from the liver, transverse colon, to the entire body through the blood vessels. It can also cause color changes and odor changes. Therefore, if there is an intravital wound where decay has occurred, it will be difficult to identify [5].

Examination of this case generally did not reveal any violent injuries and on external examination, the body had decomposed. Autopsy internal inspection is also difficult to identify because of the decomposition process of the corpse. The cause of the victim's death was a basilar skull fracture, precisely in the clivus of the posterior fossa. The violence that caused that injury is believed to be from homicide blunt trauma. However, the brain was liquefied and decomposed at autopsy. Thus, the body is estimated to have died ≥ 9 days before the autopsy [1]. This is because corpses with decomposition occur between two to three days before the examination, and decomposition in water is three times slower than decomposition in free air or on land, and the discovery of maggots measuring 1.7 cm indicates death has been more than three days (when being on land) if it is in water then three-time sooner [1]. So the victim is estimated to have died since July 7, 2022, or earlier based on thanatology analysis (Figure 3). The victim's death is thought to have occurred before being in the water because no signs of drowning were found such as wrinkled skin, diatom, and lung float tests

showed negative results, and no sand or water bodies were found in the respiratory tract.

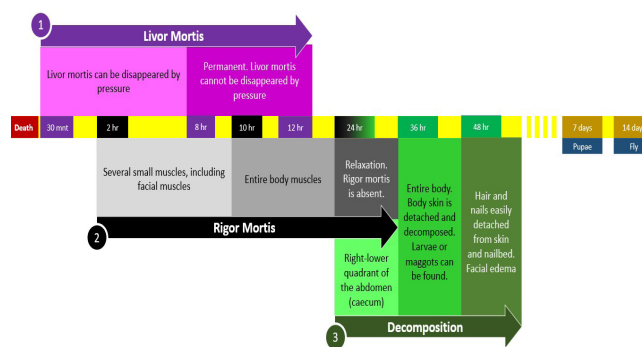


Figure 3: The schematic post-mortem changes of the thanatology sequence to determine the time of death analysis. Note: mnt, minutes; hr, hour.

An autopsy should be performed to conduct a thorough investigation for a complex homicide including blunt trauma and drowning that confounds homicide and accidental death. A basilar skull fracture can cause sudden death because it is located close to a vital part of life, the brain stem. The interest of the case report here is that the inside of the brain up to the brainstem has liquefied due to decomposition with an estimate that the corpse died 9 days before the autopsy and is believed to be a case of homicide, instead of drowning.

CONCLUSION

Patients with PPCM may rarely face thromboembolic events and cardiogenic shock. The elevated risk of thromboembolism in PPCM is attributed to factors such as left ventricular dilatation, endothelial injury, immobility, and postpartum hypercoagulability. Cardiogenic shock in PPCM results from the heart's compromised ability to pump blood effectively. Further research is necessary to accurately determine the incidence of PPCM presenting with thromboembolic events and cardiogenic shock.

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REFERENCES

1. Rennó Santos M, Testa A, Porter LC, Lynch JP. The contribution of age structure to the international homicide decline. *PLoS One* 2019;14:e0222996. <https://doi.org/10.1371/journal.pone.0222996>.
2. Armstrong EJ, Erskine KL. Investigation of Drowning Deaths: A Practical Review. *Acad Forensic Pathol* 2018;8:8–43. <https://doi.org/10.23907/2018.002>.
3. Stephenson L, Van den Heuvel C, Byard RW. The persistent problem of drowning - A difficult diagnosis with inconclusive tests. *J Forensic Leg Med* 2019;66:79–85. <https://doi.org/10.1016/j.jflm.2019.06.003>.

4. Khurshid A, Shah MU, Khurshid M, Sohail A, Ali G. Diatom-Positive Cadaver: Drowning or Homicide? *Cureus* 2021;13:e18312. <https://doi.org/10.7759/cureus.18312>.
5. Vignali G, Franceschetti L, Attisano GCL, Cattaneo C. Assessing wound vitality in decomposed bodies: a review of the literature. *Int J Legal Med* 2023;137:459–70. <https://doi.org/10.1007/s00414-022-02932-9>.