

Case Report

Sudden Death Misidentified to Choking: A Case Report on Fatal Subarachnoid Haemorrhage

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Abstract:

Agonal artefacts represent physiological and anatomical changes occurring during the terminal phase of life, specifically within the agonal period immediately preceding death. Proper recognition of these artefacts—including aspiration of gastric contents, cardiovascular collapse, and pulmonary congestion—is essential to distinguish natural dying processes from indicators of trauma or underlying disease pathology. This case report presents a detailed examination of a 49-year-old woman who arrived at the hospital deceased, with an initial history suggesting food aspiration followed by sudden unresponsiveness. Comprehensive autopsy examination revealed the presence of both subarachnoid and subdural haemorrhage within the cranial cavity, notably without any documented history of head trauma as confirmed through careful correlation with the clinical history provided by family members. The accurate interpretation of agonal artefacts versus true pathological findings carries profound medico-legal implications, as misidentification can result in an incorrect cause-of-death determination, inappropriate criminal investigations, and failure to identify underlying natural disease processes. This case underscores the critical importance of meticulous autopsy technique, comprehensive histopathological examination, and careful consideration of all clinical and circumstantial information in reaching accurate conclusions regarding cause and manner of death.

Keywords: Agonal artefacts; Subarachnoid haemorrhage; Choking; Sudden death.

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Introduction:

A death which is not caused by any trauma, poisoning or violent asphyxia where death occurs all of a sudden or within 24 hours of the onset of terminal symptoms is generally termed as sudden death. Post-mortem artefact is any change or new feature introduced into the body after death, and such a feature or change poses difficulty in interpreting the autopsy

findings and thereby inhibits proper delivery of justice¹.

Nontraumatic brain haemorrhages, such as intracerebral haemorrhage (ICH) and subarachnoid haemorrhage (SAH), are significant contributors to sudden and unexpected deaths as depicted in this case. This case focuses on exploring non-traumatic brain haemorrhage as a cause of death in the autopsy of an individual without any prior illness or comorbidities.¹

In recent times, there has been a sudden increase in unexpected deaths in India^[1]. The individuals showed the same pattern of death when they were involved in normal and daily activities^[1]. Due to the abrupt nature of their death, it was not

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possible to investigate or reach a proper diagnosis.^[1]

This study and case are to identify nontraumatic brain haemorrhage in sudden and unexpected death, and to investigate the patterns, prevalence, and possible risk factors and to prevent its reoccurrence.

A case report describes the clinical, radiological, and autopsy findings of a previously otherwise healthy 57-year-old Hispanic woman who died suddenly in the emergency department of a hospital in the USA and on post-mortem examination, it was found that subarachnoid haemorrhage was observed with rupture of a berry aneurysm³.

Aneurysmal subarachnoid haemorrhage (SAH) is a life-threatening emergency, classically presenting with sudden onset, severe headache and then followed by sudden collapse. However, in some cases, SAH may trigger abrupt cardiac arrest through neurogenic mechanisms, mediated by a massive catecholamine surge leading to myocardial dysfunction and arrhythmias and then by abrupt collapse and fatality of the patient.⁴ The cause and mechanism of in-hospital death after SAH in the modern era of neurocritical care remain incompletely understood. SAH is a devastating acute neurological disease that affects more than 30,000 people in the US alone.⁴

Case Details:

A 49-year-old woman was brought to the hospital mortuary for a comprehensive medicolegal autopsy examination. According to the detailed history provided by her husband, the deceased had been in her usual state of health and was having dinner with family members when she suddenly began gasping for air, exhibited signs of respiratory distress, collapsed, and became completely unresponsive. Family members immediately shifted her to the nearest emergency medical facility, where attending physicians pronounced her dead-on arrival. Given the sudden and

unexplained nature of the death, hospital authorities appropriately notified law enforcement, and the case was registered as a medicolegal death requiring thorough investigation. The body was subsequently shifted to the mortuary facility for complete autopsy examination to determine the cause and manner of death.

Postmortem Examination:

The comprehensive autopsy examination was conducted in accordance with standard forensic pathology protocols. External examination revealed a well-nourished adult female with no external injuries, contusions, or marks suggesting trauma. Careful examination of the neck region revealed no evidence foul play (Figure 1)



Figure 1: Postmortem examination

Systematic dissection of the complete respiratory tract, commencing from the oropharyngeal region and extending through the pharynx, larynx, trachea, and continuing to the bifurcation of the main bronchi, revealed the presence of food particles mixed with serous fluid exudate. Upon compression of both lungs, additional foreign particulate matter ranging in size from small fragments to pieces approximately two centimetres in diameter was expressed from the airways. These particles were identified as food material, consistent with the history of choking during a meal.

All internal organs exhibited varying degrees of congestion, a common



Figure 2: showing aspiration of food material

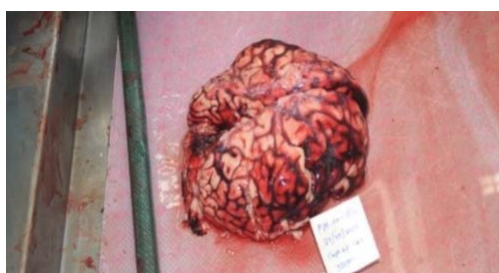


Figure 3: Showing diffuse subarachnoid haemorrhage

finding in cases of sudden death and part of the spectrum of agonal changes. Initial assessment of the respiratory findings suggested that aspiration of food material (Figure 2) with subsequent airway obstruction could represent the cause of death. However, following complete examination of the thoracic and abdominal organs, cranial examination was performed. Upon reflection of the scalp and removal of the calvarium, diffuse subarachnoid haemorrhage was evident (Figure 3), covering extensive areas of the cerebral hemispheres. Further examination after removal of the brain revealed the presence of subdural haemorrhage in addition to the subarachnoid bleeding. The combination of these findings, in the absence of any history or physical evidence of head trauma, indicated spontaneous intracranial haemorrhage as the actual cause of death.

Histopathological Findings

Microscopic examination of tissue samples from major organs provided additional important information:

1. Cardiovascular system: The aorta demonstrated fatty streaks consistent with early atherosclerotic changes. The left anterior descending coronary artery showed atheroma formation, indicating established coronary artery disease, though without evidence of acute thrombotic occlusion or recent myocardial infarction.
2. Respiratory system: Bilateral lungs exhibited pulmonary oedema with marked congestion, findings consistent with terminal cardiovascular and respiratory failure. These changes represent typical agonal phenomena occurring during the dying process.
3. Hepatic system: The liver showed congestion with mild periportal inflammation, likely representing chronic passive congestion secondary to cardiovascular compromise and terminal circulatory failure.
4. Brain tissue: Histological examination confirmed fresh haemorrhage within both subarachnoid and subdural spaces, indicating acute bleeding immediately before or at the time of death.

Toxicological Analysis

Complete toxicological screening was performed to exclude the possibility of poisoning, drug overdose, or alcohol intoxication as contributing factors to death. Tissue samples from multiple organs were collected using proper chain of custody protocols and submitted to the forensic science laboratory for comprehensive analysis. Toxicological testing was negative for common drugs of abuse, prescription medications at toxic levels, volatile substances, heavy metals, and alcohol, effectively ruling out unnatural death or suicide by poisoning.⁷

Cause of Death

Following a comprehensive evaluation of all autopsy findings, histopathological results, toxicological analysis, and correlation with the available clinical history, the cause of death was determined

to be acute diffuse subdural and subarachnoid haemorrhage. The manner of death was certified as natural, resulting from spontaneous intracranial bleeding without evidence of trauma or other external causation.

Discussion:

Nontraumatic brain haemorrhages such as Intracerebral haemorrhage and Subarachnoid haemorrhage are identified as important contributors to these sudden deaths, and the 30-day mortality rate ranges from 35 to 52%, with almost 50% of deaths occurring within the initial 24 hours after the occurrence of the symptoms^[1]. Obesity, the second leading cause of preventable death globally, has been associated with an increased risk of brain haemorrhage. On the contrary, some studies showed that it does not have any relation to ischemic or haemorrhagic stroke, as it was clearly visible in this particular case^[1].

During the study period, 10 cases were identified in which nontraumatic brain haemorrhage was the cause of sudden and unexpected death. The cases exhibited various characteristics, such as sudden unconsciousness, chest pain, fever, and weakness. Autopsy findings revealed ICH and SAH as major causes of death along with myocardial infarction, pneumonia, and other pathological conditions. The findings from this study underscore the importance of heightened awareness among emergency care physicians when dealing with sudden and unexpected deaths. In the cases where individuals present with symptoms such as sudden unconsciousness, chest pain, or unexplained weakness, particularly those with no significant prior medical history, physicians should consider nontraumatic brain haemorrhage (ICH or SAH) as a differential diagnosis, as it helps to identify and then to treat it early^[1].

It has been estimated that 80% of patients with SDH have concomitant

intracranial symptoms such as headache (70%) and mental changes (22%)^[2]. When bleeding occurs in the subarachnoid space, the CSF may dilute the subarachnoid haemorrhage, and defibrillation by pulsation of the spinal cord reduces the risk of subarachnoid hematoma formation^[2].

Although a positive family history of SAH or saccular aneurysm is a risk factor for SAH, the degree of genetic penetration varies, as evident by findings from a twin-based study that did not show a significant genetic contribution.^[3]

There was a case reported by Hamza Furmli et al and Indranil Balki et al., when a female was found unresponsive at home with pulseless cardiac arrest. Return of spontaneous circulation was achieved after cardiopulmonary resuscitation. The patient did not have any comorbidities earlier like trauma, headache, or cardiac disease history. Post resuscitation, examination, revealed fixed dilated pupils and absent brain stem reflexes. On CT examination, it was confirmed that diffuse cerebral injury secondary to SAH^[4].

This case was reported by Patrick Barnes et al and John Galaznik et al. at the University of Alabama.⁵ A 4-month-old boy was brought to the emergency department after experiencing a choking incident during bottle feeding. Emergency responders discovered the infant had stopped breathing and had no detectable pulse. The child later developed a bleeding disorder (disseminated intravascular coagulopathy) and ultimately did not survive. Brain imaging studies, including CT and MRI scans, revealed bleeding beneath the brain's outer covering (subdural), bleeding in the space surrounding the brain (subarachnoid), and bleeding in the eyes (retinal), accompanied by signs of brain injury from oxygen deprivation (hypoxic-ischemic encephalopathy). Medical professionals determined that the care giver's

explanation of events did not align with the observed medical findings and imaging results, leading to a diagnosis of inflicted trauma, specifically "shaken baby syndrome." However, post-mortem examination demonstrated widespread oxygen-deprivation injury to the central nervous system with significant swelling, along with bleeding in the subarachnoid and subdural spaces, but notably revealed no signs of traumatic injury to the brain or nervous system.^[5]

According to Ripenmeet Salhotra et al SAH is a complicated disease that can involve multiple types of neurological injury and systemic organ dysfunction; it may be impossible to identify the precise contribution of each process to a patient's death⁶.

Conclusion:

This case highlights the importance of meticulous autopsy examination in sudden and unexpected deaths. Although the clinical history initially suggested fatal choking due to food aspiration, detailed post-mortem evaluation revealed diffuse subarachnoid and subdural haemorrhage as the true cause of death. The presence of food material within the airways represented an agonal phenomenon rather than the primary fatal event.

The case underscores the medico-legal significance of distinguishing agonal aspiration from true airway obstruction, as misinterpretation may lead to an incorrect determination of cause and manner of death. Careful correlation of clinical history, autopsy findings, histopathology, and toxicological analysis remains essential for accurate certification of death and the administration of justice.

Summary

In summary, this case of sudden death initially attributed to food aspiration but ultimately determined to result from spontaneous intracranial haemorrhage exemplifies the complexity and critical importance of forensic pathology in

modern medicolegal systems. The lessons learned extend beyond the individual case to inform clinical practice, public health policy, and death investigation protocols, ultimately contributing to the prevention of similar tragedies and the advancement of medical knowledge.

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