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Case Report

An Autopsy Case of Misdiagnosis based on Postmortem Computed Tomography Findings

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Abstract A middle-aged man was found lying beside his bicycle on an early winter morning. The cause of death was diagnosed by clinicians as traumatic intracerebral hemorrhage and cerebral contusion with frontal bone fracture based on the findings of Computed Tomography (CT) of the head. However, forensic autopsy revealed that there were no evidences of intracerebral hemorrhage and left frontal bone fracture but the defect of golf ball size on the frontal lobe which was considered to be a complication from the old cerebral contusion and old bone fracture. The bleeding and pooling blood from subarachnoid hemorrhage (SAH) to the frontal lobe defect had the appearance of an intracerebral hemorrhage. Disruption of left renal artery was found and the cause of death was diagnosed as massive hemorrhage due to this rupture. Although postmortem CT is a useful tool for obtaining information on the body prior to conducting an autopsy, it should be used with extreme caution.

Key words : postmortem CT, intracerebral hemorrhage, cause of death

Introduction

Computed tomography (CT) has continued to develop and plays an important role when a clinical diagnosis is made. In a similar way, postmortem CT (PM-CT) is employed in forensic pathology for obtaining information on the body prior to autopsy and for determining the cause of death[1]. However, PM-CT is not always perfect and several reports about discordant autopsy and PM-CT findings have been published[2)3)]. We present a case where the cause of death as diagnosed by clinicians based on PM-CT findings was different from that diagnosed according to autopsy findings.

Case report

A middle-aged man was found lying beside his bicycle in a park on an early winter morning. When an emergency medical team arrived, he was unconscious and could not be identified. The victim was carried to a hospital and died about 2 hours after having been found. Upon arrival at the hospital, head, chest and abdominal CT were examined. Head CT revealed that his left zygomatic bone, nasal bone, and left frontal bone were fractured (Fig. 1A, B, C). Left frontal intracerebral hemorrhage, subarachnoid hemorrhage (SAH), subdural hemorrhage and cerebral contusion were also identified (Fig. 1D). The cause of death was thus diagnosed as traumatic intracerebral hemorrhage and cerebral contusion with frontal bone fracture. An autopsy was carried out 6 hours after death.

Autopsy findings

The victim was 161 cm tall and 61 kg weighed. There were two lacerations with surrounding abrasions of the forehead and subcutaneous hemorrhages at the left elbow. There were no

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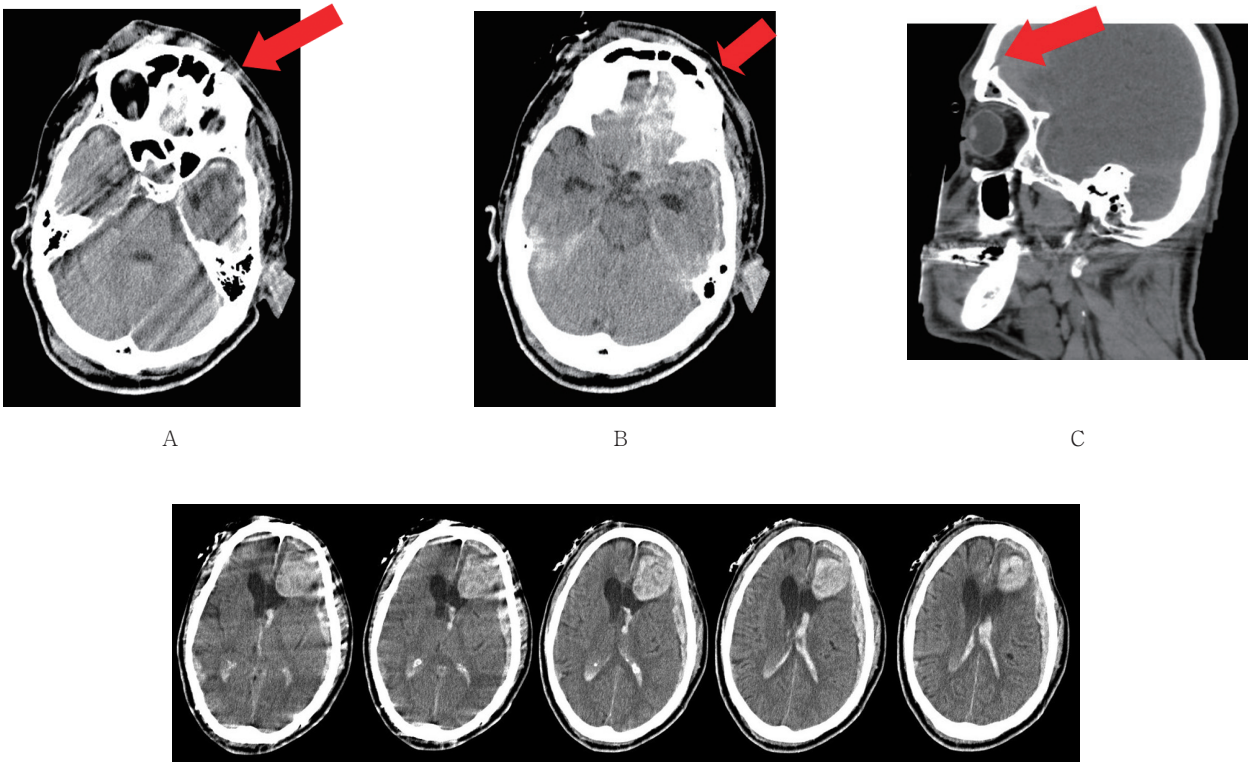
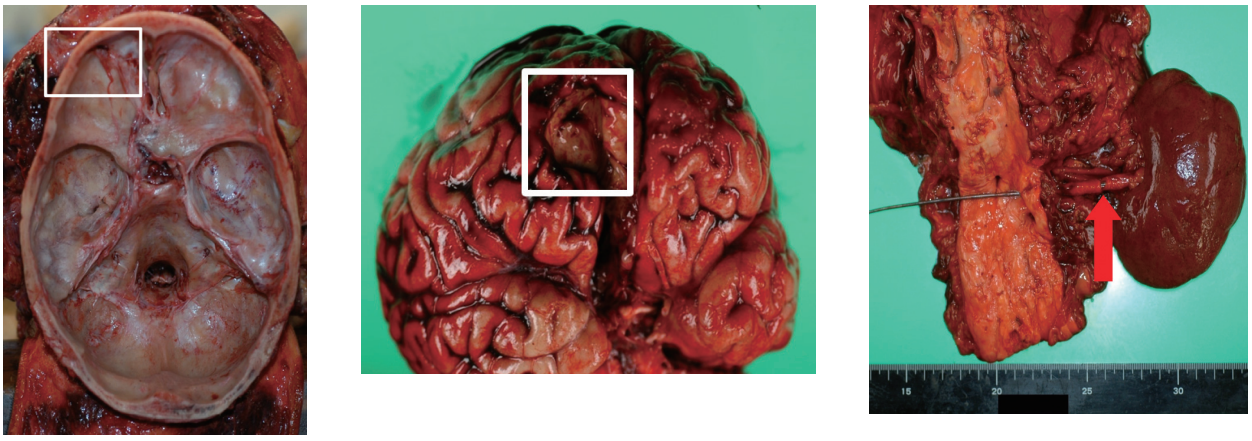


A B C D

Fig. 1 Head CT : (A) Left zygomatic bone fracture (arrow). (B) Left frontal bone fracture (axial view, arrow). (C) Left frontal bone fracture (sagittal view, arrow). (D) Left frontal intracerebral hemorrhage, subarachnoid hemorrhage (SAH) and subdural hemorrhage.



A B C

Fig. 2 Internal examinations. (A) A depressed area on the frontal bone. (B) A defect of golf ball size on left frontal lobe. (C) Left renal artery disruption (arrow).

other severe injuries on his body.

Cross section of the skull revealed a depressed area on the frontal bone caused by an old fracture (Fig. 2A). There was no evidence of left frontal intracerebral hemorrhage nor cerebral contusion. A defect of golf ball size was present on his left frontal lobe and blood was pooled there (Fig. 2B). Mild SAH was observed at the left and right frontal lobe. There was hemorrhage on his left axilla and several left lower ribs were fractured. Additionally, his left renal artery was disrupted but renal vein was intact (Fig. 2C) and there was extended hematoma around the left kidney and retroperitoneal hemorrhage was observed (left

renal trauma type Ⅳ bH3 classified according to the guidelines of the Japanese Association for the Surgery of Trauma, published in 2008).

Discussion

The autopsy revealed that intracerebral hemorrhage did not exist, however, blood was pooled to the frontal lobe defect and the left renal artery was disrupted. The cause of death was diagnosed as massive hemorrhage due to left renal artery injury. We therefore considered that the victim had fallen to the left while he was riding a bicycle and had hit his forehead and the left side of his body against the road. At that time, he hit his left arm against the road and his left elbow compressed the chest wall. This resulted in his left lower ribs being fractured and the left renal artery being ruptured.

The autopsy rate in adults has continued to decline in most developed countries during the latter half of the 20th century and beyond[4]. The reasons for this decline in autopsy rate include budgetary constraints and advances in diagnostic technology[5]. Despite intensive modern clinical investigations, autopsies continue to reveal major ante mortem diagnostic errors in some cases and they improve the completeness and reliability of national mortality data[4]. Although, many studies have shown the usefulness of CT or Magnetic Resonance Imaging (MRI) to visualize the internal body prior to autopsy[1)6)~8)], postmortem imaging techniques are still not perfect, and the disadvantages of using postmortem imaging have been reported[2)3)].

In the present case, CT pointed out a fracture of the left zygomatic bone, nasal bone and left frontal bone, while also pointing out left frontal intracerebral hemorrhage, SAH, subdural hemorrhage and cerebral contusion. However, the subsequent autopsy revealed only the depressed area on the left frontal bone and the defect of golf ball size on the frontal lobe. Shortly after the autopsy was carried out, we obtained information from the police stating that he had suffered a severe head injury in a car accident 14 years earlier. He had not the past medical history of convulsions and epilepsy. Based on this information, the depressed area was considered to be an old fracture and the defect was thought to be a complication from the old cerebral contusion. The bleeding and pooling blood from SAH due to the present injury to the frontal lobe defect had the appearance of an intracerebral hemorrhage on the CT of the head (Fig. 3). Therefore, on the CT of the head, this high density area showed well-circumscribed lesion and ununiformed structure, and was without edema and mass effect. SAH and pooled blood were not so severe that these injuries were not the cause of death.

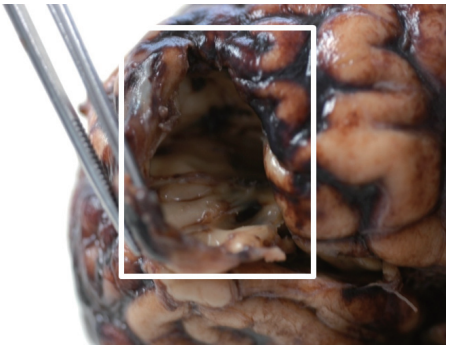


Fig. 3 Formalin-fixed brain. A defect of golf ball size on the left frontal lobe which was thought to be a complication from the old cerebral contusion.

In this case, emergency doctors were not able to obtain an accurate patient history since the unconscious patient could not be interviewed. If the clinicians had known about the victim's past history of cerebral contusion caused by a car accident, they might not have simply diagnosed him as having suffered a traumatic intracerebral hemorrhage based on a careful examination of the victim's CT.

There may be no perfect test which when used alone in able to detect all abnormalities, diseases or trauma. Postmortem CT is a useful tool prior to conducting an autopsy in order to obtain information on the body, however, it should be used with extreme caution.

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References

1) O'Donnell C and Woodford N : Post-mortem radiology-a new sub-speciality? Clin Radiol. 63 : 1189-1194, 2008.
2) Iwase H, Yamamoto S, Yajima D, Hayakawa M, Kobayashi K, Otsuka K, Sato K, Motani H, Kasahara S and Ito H : Can cervical spine injury be correctly diagnosed by postmortem computed tomography? Leg Med. 11 : 168-174, 2009.
3) Weustink AC, Hunink MG, van Dijke CF, Renken NS, Krestin GP and Oosterhuis JW : Minimally invasive autopsy: an alternative to conventional autopsy? Radiology. 250 : 897-904, 2009.
4) Julian LB and James U : Clinical, educational, and epidemiological value of autopsy. Lancet. 369 : 1471-1480, 2007.
5) Kaveh GS and Elizabeth CB : The vanishing nonforensic autopsy. N Engl J Med. 358 : 873-875, 2008.
6) Shen LY, Marcotte KN, Helmer SD, Dudley MH and Smith RS : Correlation of clinical findings and autopsy results after fatal injury from motor vehicular-related crashes. Am Surg. 72 : 282-287, 2006.
7) Hoey BA, Cipolla J, Grossman MD , McQuay N, Shukla PR, Stawicki SP, Stehly C and Hoff WS : Postmortem computed tomography, "CATopsy", predicts cause of death in trauma patients. J Trauma. 63 : 979-85, 2007.
8) Buck U, Christe A, Naether S, Ross S and Thali MJ. Virtopsy-noninvasive detection of occult bone lesions in postmortem MRI : additional information for traffic accident reconstruction. Int J Legal Med. 123 : 221-6, 2009.

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（和文抄録）

死後 CT と剖検による死因が一致しなかった 1 例

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ある冬の早朝，公園で中年男性が自転車の横で倒れているのを発見された．頭部 CT の結果から，臨床医は頭蓋骨骨折を伴う外傷性脳内出血と脳挫傷が死因と考えた．しかしながら，解剖の結果，外傷性脳内出血と頭蓋骨骨折は認められず，陳旧性の脳挫傷による欠損と陳旧性骨折を認め，欠損部位へのくも膜下出血からの血液の流入が脳内血腫のようにみえたと考えられた．一方，左腎動脈破裂が認められ，大量出血が死因と考えられた．死後 CT により遺体の情報を得ることは非常に有効だが，十分な注意が必要である．