

## Image Report

# A case of metastatic brain tumor mimicking an expanding thalamic hematoma

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## Abstract

**Background:** Brain tumor are a major etiology of secondary intracranial hemorrhage (ICH) because ICH in patients with cancer often occurs from an intratumoral hemorrhage. However, it is sometimes difficult to detect a tumor when it is tiny and buried, especially during initial examination.

**Case Description:** A 65-year-old woman who was diagnosed with pulmonary small cell carcinoma 6 months previously developed sudden-onset consciousness disturbance and left hemiparesis. Head computed tomography (CT) showed a round, high-density lesion with a diameter of 31 mm in the right thalamus. There was no enhancement with administration of contrast agent. Five days later, CT revealed significant progression of the hematoma in the thalamus with perifocal edema. She underwent total removal of the hematoma. Histopathological examination revealed a tiny cluster of metastatic cancer tissue within the hematoma.

**Conclusions:** When cerebral hemorrhage occurs in a cancer patient, we must consider the possibility of hemorrhage due to a brain metastasis.

**Key Words:** Expanding hematoma, intratumoral hemorrhage, metastatic brain tumor, small-cell lung cancer, thalamic hemorrhage

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**Quick Response Code:**

A 65-year-old woman was diagnosed with pulmonary small-cell carcinoma 6 months previously developed sudden-onset consciousness disturbance and left hemiparesis. Her clinical examination revealed a Glasgow Coma Scale (GCS) score of 10 (E3, V3, M4) and severe motor dysfunction (manual muscle test, 2/5). Head computed tomography (CT) showed a 31-mm diameter round, high-density lesion in the right thalamus [Figure 1a], with no enhancement contrast agent administration [Figure 1b]; no hydrocephalus was present. Her blood pressure was high (190/110 mmHg), but laboratory examination showed no abnormal results, including coagulopathy.

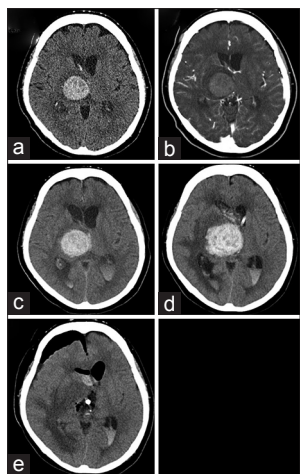
External ventricular drainage was performed after 3 h because acute hydrocephalus progressed, and her consciousness deteriorated [Figure 1c]. CT, performed

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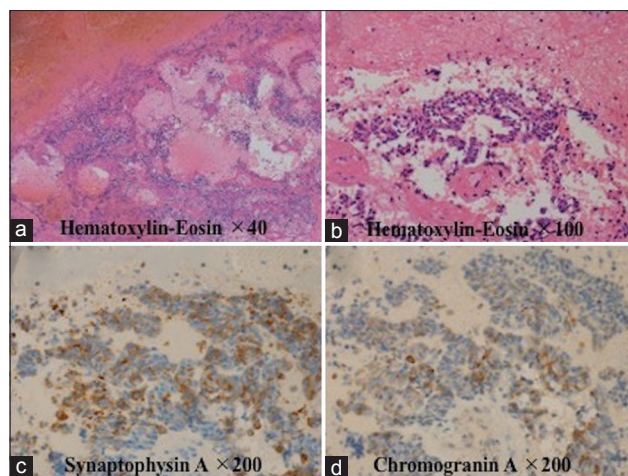


**Figure 1: Radiological examination: (a) computed tomography (CT) showing a high-density area in the right thalamus at admission; (b) CT showing no enhancement of the hematoma following contrast agent administration at admission; (c) CT showing acute hydrocephalus with mild progression of the hematoma 3 h after admission; (d) CT showing significant hematoma progression 5 days after hospitalization; and (e) postoperative CT showing total removal of the right thalamic hemorrhage 6 days after hospitalization**

5 days after hospitalization, revealed significant hematoma progression in the thalamus with perifocal edema (diameter, 47 mm) [Figure 1d], despite good blood pressure control. Total removal of the hematoma in the thalamus was performed via a transcortical, transventricular approach [Figure 1e]. Her consciousness recovered immediately after surgery (GCS score 11 [E4, V3, M4]). Histopathological examination revealed tiny clusters of small, round cells within the hematoma [Figure 2a, b]. Immunohistochemically, carcinoma cells tested positive for several neuroendocrine markers, including chromogranin A and synaptophysin [Figure 2c and d]; therefore, the small-cell carcinoma present in the thalamic hemorrhage was confirmed as lung cancer metastasis.

Considering the prognosis of the primary tumor, radiotherapy was not administered at the family's request; 30 days after hospitalization, she was transferred to receive palliative medical care. Written informed consent was obtained from the patient and her family.

Brain metastases occur in the gray/white matter region of the cerebral hemisphere. However, metastasis of cancer cells to the thalamus is uncommon (2.2%).<sup>[1]</sup> Kondziolka *et al.* demonstrated that 24% (36/147) of metastatic brain tumors develop intratumoral hemorrhages, 25% (9/36) of hemorrhages are macroscopic, and only 2.7% of hemorrhagic metastatic brain tumors are associated with acute neurological symptoms.<sup>[2]</sup> These findings indicate that cancer metastasis to the thalamus with secondary hemorrhage and neurological symptoms is rare.



**Figure 2: Pathologic examination: (a, b) pathologic examination showing some clusters of naked small round cells with hyperchromatic round nuclei in the area of bleeding. Immunohistochemical studies revealing that tumor cells tested positive for (c) synaptophysin A and (d) chromogranin A**

The etiology of intracerebral hemorrhage (ICH) in cancer patients is heterogeneous. The largest clinical series, including 208 cancer patients who developed ICH or subarachnoid hemorrhage, showed that 61% ( $n = 127$ ) of hemorrhages were caused by intratumoral hemorrhage, 46% ( $n = 95$ ) by coagulopathy, 33% ( $n = 69$ ) by multifactorial causes, and 21% ( $n = 44$ ) by intratumoral hemorrhage and coagulopathy.<sup>[3]</sup> We failed to detect the tiny metastatic thalamic tumor in our case during the initial radiological examination, despite performing contrast-enhanced CT. The unusual clinical course suggested that a metastatic tumor was responsible for repeated ICH. The standard for diagnosing metastatic brain tumor is contrast MRI,<sup>[4]</sup> but it is not usually the first choice for cerebral hemorrhage diagnosis. If ICH is caused by tiny metastatic brain tumors, detecting the cause of ICH during the initial examination can be difficult. Thus, when cerebral hemorrhages occur in a cancer patient, hemorrhage due to a metastatic brain tumor should be considered.

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### Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Nil.

### Conflicts of interest

There are no conflicts of interest.

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