Abstract. A 61-year-old male presented with a rare case of glioblastoma mimicking a cerebral contusion subsequent to collapsing. The patient had been medicated for hypertension for seven years and diabetes for eight years prior to hospitalization. Brain computed tomography (CT) revealed a cerebral contusion and intracerebral hemorrhage (ICH) in the left temporal region. The patient was initially administered intravenous drugs to reduce the intracranial pressure following the diagnosis of a cerebral contusion. Serial CT revealed ICH resorption. However, the patient was again admitted due to a headache and vomiting two months later. Magnetic resonance imaging (MRI) demonstrated an enhanced ring-shaped mass around the cyst cavity within the left temporal region, with surrounding edema. The patient underwent cyst puncture drainage in the temporal region. No tumor cells were identified in the cyst fluid and the culture was also negative. The patient was admitted for a headache and vomiting for the third time one month after being discharged. A cyst, tumor and meningoencephalitis were suspected following an MRI scan. Under local anesthesia, the patient was treated by cyst puncture drainage within the temporal region, following which, a steady recovery was made. CT revealed cyst fluid resorption (Fig. 2C). The histopathological result did not show any tumor cells in the cyst fluid and the culture was also negative. The patient was readmitted for the third time with the same recurrent symp-
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A cyst, tumor and meningoencephalitis were suspected following enhanced MRI (Fig. 3A). The patient underwent a left temporal craniotomy for a mass resection and biopsy under general anesthesia. The histological diagnosis was that of glioblastoma multiforme. Two months later, MRI revealed a recurrence of the glioblastoma (Fig. 3B). The patient received no further treatment and succumbed to the disease.

**Discussion**

ICH accounts for nearly one-half of all cerebrovascular events (4). Clinical and autopsy studies have identified that BTs represent 0.9-11% of spontaneous ICH (5-14). However, cases of ITH caused by craniocerebral trauma have rarely been reported (2,3). It has been well established that the structure...
and function of blood vessels becomes markedly abnormal in brain tumors (15). Goetting and Swanson (16) suggested that an abrupt, large increase in arteriovenous pressure creates a transient gradient between the vascular and extravascular intracranial compartments, which may lead to the rupture of fragile tumor vessels.

The approach to the present case had been biased towards the treatment of a cerebral contusion in the left temporal region due to the initial pretreatment CT and pre-existing hypertension. The diagnosis of a cerebral contusion and ICH was easily justifiable, which attributed to the delayed correct diagnosis and treatment of the patient. Initially, only CT was performed, as craniocerebral trauma was the only cause of the ICH and also as the conservative treatment was apparently effective. Cyst puncture drainage was performed in the temporal region and, notably, the histological examination revealed no tumor cells in the cyst fluid and the cyst fluid culture demonstrated negative results. These results confirmed the first diagnosis until the pathological investigation finally revealed the definitive diagnosis of a glioblastoma.

The present case shows that pre-operative CT with or without MRI does not exclude brain tumors as the cause of ICH, despite the present patient having a history of craniocerebral trauma and hypertension. Up to 10% of patients with BTs may experience a diagnostic delay if CT is the only imaging modality that is used (17). Dual-energy CT may be useful in detecting underlying tumors in patients with an ICH of unknown origin, and is a useful tool in differentiating between tumor bleeding and pure ICH in patients with acute ICH of an unclear origin (18). Using MRI with gadolinium early in the post-operative period is likely to lead to an earlier detection of the BT. A previous study showed that the use of MR angiography (MRA) aided the disclosure of the development of an intratumoral aneurysm on a dilated feeding artery, the rupture of which led to intratumoral bleeding (19). The standard treatment of a BT manifesting as an ICH is the surgical removal of the hematoma and the tumor (13,20). However, the optimal timing of the therapeutic intervention is poorly defined, particularly when the neurological status of the patient is stable following admission and there is only a minimal or no mass effect on the CT scan (21).

In the present case, since the signs and symptoms developed shortly following a head trauma, it is possible that the trauma participated in the induction of the hemorrhage. The numerous tumor vessels and microcysts may have been distorted by the force of the impact, causing their thin walls to rupture. In such cases, BT should be suspected as a cause of ICH, despite a history of craniocerebral trauma and hypertension. An appropriate and prompt investigation should be performed and clinical follow up is also essential for detecting subtle neurological deterioration of the patient to avoid a delay in the diagnosis and treatment.

References