



Intracerebral hemorrhage as a probable manifestation of intracranial metastasis in synovial sarcoma: Expanding the differential diagnosis

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Keywords

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Brain metastases from synovial sarcoma are exceedingly rare, and hemorrhagic transformation within such lesions has been reported only sporadically.¹ Hemorrhagic brain metastases themselves are typically associated with a narrow group of malignancies, including melanoma, renal cell carcinoma, choriocarcinoma, and lung cancer.² We present this case to highlight the importance of including synovial sarcoma in the differential diagnosis of hemorrhagic brain metastases, particularly in oncologic patients presenting with acute neurologic deficits.

A 40-year-old homemaker woman, with a known history of left knee synovial sarcoma diagnosed in 2018, presented with sudden-onset left hemiplegia, facial paresis, and dysarthria lasting 10

hours. She had no other known comorbidities, was not on regular medications aside from chemotherapy, and had no known drug allergies. Her oncologic history began with a confirmed histopathological diagnosis of monophasic synovial sarcoma in 2018 (Figure 1), shortly after which she underwent an above-knee amputation. She subsequently received multiple adjuvant chemotherapy regimens over five years. Pulmonary metastases were confirmed radiologically and histologically in 2020, and she received systemic chemotherapy, with her most recent session administered the day before her neurological presentation (Table 1). There was no known brain imaging performed prior to this event.

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Table 1. Chronological summary of the patient's oncologic history, diagnostic milestones, treatments, and clinical outcomes

Date	Event
2018	Diagnosis of left-knee monophasic synovial sarcoma (biopsy-confirmed)
2018	Above-knee amputation performed
2018–2023	Multiple courses of adjuvant chemotherapy over a 5-year period
2020	Diagnosis of pulmonary metastases (confirmed radiologically and histologically)
2020–2023	Continued systemic chemotherapy for metastatic disease
Day -1	Last chemotherapy session (1 day before neurological symptom onset)
Day 0	Acute presentation with left hemiplegia, dysarthria, and facial paresis
Day 0–5	ICU admission, brain CT/MRI showing hemorrhagic metastasis, conservative management
Day 5	Discharged in stable condition with persistent neurological deficits
Day 19	Readmitted with massive pulmonary embolism and expired shortly after

ICU: Intensive care unit; CT: Computed tomography; MRI: Magnetic resonance imaging

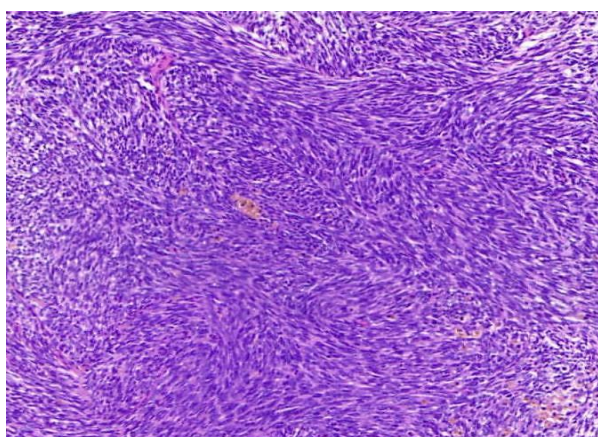


Figure 1. Monophasic synovial sarcoma [hematoxylin-eosin staining (H&E), 100×]. Compact fascicles of uniform, spindle-shaped cells with scant cytoplasm and elongated hyperchromatic nuclei.

On examination, the patient was conscious, alert, and hemodynamically stable [blood pressure: 146/85 mmHg, heart rate (HR): 94 beats per minute (bpm), respiratory rate (RR): 15 breaths/min, afebrile]. Pupils were equal and reactive to light, and no signs of meningeal irritation were noted. Systemic physical examination, including cardiovascular, respiratory, and abdominal assessments, was

unremarkable. Neurological examination revealed left-sided lower motor neuron facial paresis, dysarthria, and complete left-sided hemiplegia [Medical Research Council (MRC) grade 0/5]. Sensory testing showed reduced pinprick and light touch sensation on the left, with intact deep sensation. Initial laboratory results revealed anemia [hemoglobin (Hb): 9.1 g/dl] and elevated C-reactive protein (CRP) level of 69 mg/l, attributed to chronic systemic malignancy. Electrolytes, renal and liver function tests, and coagulation profile were within normal limits.

Non-contrast brain computed tomography (CT) revealed an acute intraparenchymal hemorrhage in the right frontal region, appearing as a hyperdense lesion with surrounding hypodense edema. T1-weighted brain magnetic resonance imaging (MRI) showed a heterogeneous intra-axial mass with hyperintense areas (consistent with acute hemorrhage) and a hypointense rim (hemosiderin deposition). T2-weighted images demonstrated a mixed-signal lesion with a hyperintense core (subacute hemorrhage) and peripheral hypointensity, surrounded by vasogenic edema. Post-contrast T1-weighted sequences revealed irregular peripheral enhancement, suggestive of a hemorrhagic metastatic lesion (Figure 2).

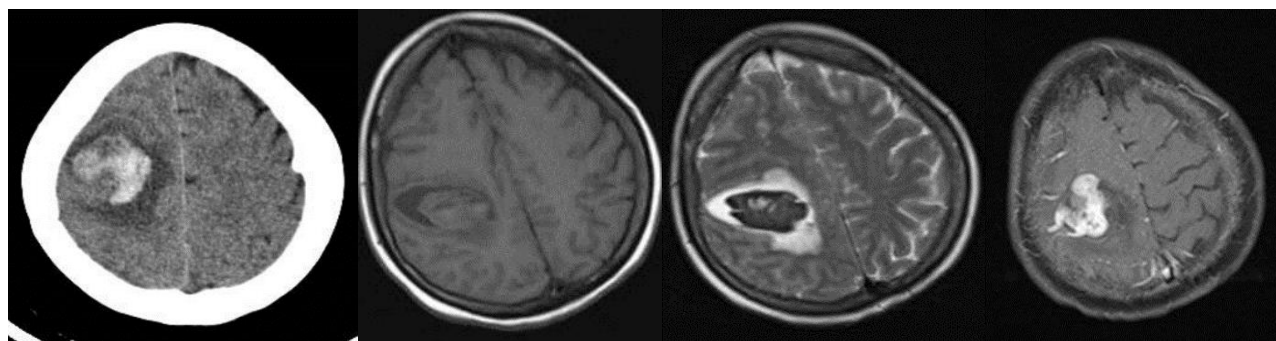


Figure 2. Non-contrast CT shows right frontal hemorrhage (Left side). MRI T1, T2, and post-contrast T1 confirm intra-axial hemorrhagic mass with enhancement.

No additional neuroimaging such as magnetic resonance venography (MRV), magnetic resonance angiography (MRA), or perfusion imaging was performed at the time of admission. Similarly, no new systemic staging, cerebrospinal fluid (CSF) analysis, or tumor marker studies were conducted during this hospitalization due to the patient's unstable condition and known metastatic cancer. Given the confirmed diagnosis of synovial sarcoma with lung metastases, the poor overall prognosis, and the highly suggestive imaging features, an intracranial biopsy was not pursued. This was deemed clinically inappropriate due to the patient's deteriorating condition and the risk-benefit profile. Differential diagnoses such as primary hemorrhagic stroke, cerebral amyloid angiopathy (CAA), vascular malformations, or coagulopathy-related hemorrhage were considered less likely based on the imaging characteristics, patient's oncologic history, and lack of supporting clinical or laboratory findings.

The patient was admitted to the intensive care unit (ICU), where she received conservative management. Treatment included intravenous (IV) dexamethasone to reduce vasogenic edema and supportive measures such as IV fluids, analgesia, and thromboprophylaxis.

Although neurosurgical intervention was initially considered, neurosurgical consultation concluded that neither surgical resection nor biopsy would provide clinical benefit due to the patient's known diagnosis of metastatic synovial sarcoma, poor prognosis, and the characteristic radiological appearance of the lesion. Over the course of her ICU stay, the patient demonstrated mild improvement in speech and alertness, though left-sided hemiplegia persisted without recovery. After five days, she was discharged in a medically stable condition. Nineteen days after her initial neurological symptoms, the patient was urgently readmitted due to a massive pulmonary embolism (PE) and died shortly after hospital arrival. This fatal complication underscores the aggressive course and systemic fragility associated with metastatic synovial sarcoma.

Synovial sarcoma is a rare and aggressive soft tissue malignancy that typically affects adolescents and young adults.³ While lung metastases are most

common, bone and liver are less frequent sites.⁴ Intracranial metastasis is exceedingly rare, with only a few cases reported.¹ Hemorrhagic brain metastases are uncommon and have a narrow differential diagnosis, including lung cancer, melanoma, renal cell carcinoma, and choriocarcinoma.² To our knowledge, only a few cases of brain metastasis from synovial sarcoma have been reported, with hemorrhagic features being exceptionally rare.⁵ Hemorrhagic transformation in brain metastases may result from tumor-induced neovascularization, vascular invasion, or necrosis. Synovial sarcomas are particularly vascular tumors,⁶ which may predispose these lesions to hemorrhagic metastasis. Unlike previously reported cases, our patient presented with acute hemiplegia due to a solitary hemorrhagic metastasis, without preceding neurologic symptoms, and experienced a rapid fatal course. This case expands the differential diagnosis of hemorrhagic brain metastases to include synovial sarcoma and underscores the importance of multidisciplinary management in oncologic patients with acute neurological symptoms. Limitations include the absence of intracranial histopathologic confirmation, incomplete access to systemic staging data, and lack of serial neuroimaging. Nonetheless, this case highlights a clinically and radiologically instructive presentation that warrants broader awareness among neurologists and oncologists. Further research is needed to understand the mechanisms of this rare metastatic behavior and to refine diagnostic and therapeutic approaches.

Written informed consent for publication of this case and accompanying images was obtained from the patient's daughter. A personal statement from the patient could not be obtained due to the acute and terminal nature of the patient's illness and the family's subsequent unavailability for further communication.

Conflict of Interests

The authors declare no conflict of interest in this study.

Acknowledgments

None.

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