A case of stroke mimic in the setting of metastatic melanoma

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Abstract

In the emergency setting, brain tumours can present as "stroke mimics", which are a category of non-vascular pathological conditions that can present with a stroke-like clinical picture. Ischemic stroke presentations are heterogenous with a wide variety of presenting symptoms and signs depending on the area of the brain affected. Distinguishing between stroke mimics and ischemic strokes is an important challenge that requires a thorough work-up. Due to the time-sensitive nature of ischemic stroke treatment and the potentially disastrous consequences of not receiving proper treatment for an ischemic stroke, accurately identifying an ischemic stroke or stroke mimic is of utmost importance. Accurate diagnosis of stroke mimic also allows for the mimic to be accordingly investigated and treated appropriately. This report presents a case of stroke mimic due to a metastatic brain tumour. The case illustrates one of the causes of stroke mimic, the work-up required to arrive at the correct diagnosis, and why distinguishing between an ischemic stroke and stroke mimic can prevent unnecessary treatment and lead to proper follow-up.

Keywords: ischemic stroke; stroke mimic; brain tumour; melanoma

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Introduction

Stroke mimics often present with similar acute neurological deficits to ischemic stroke and can correspond to many different vascular regions of the brain. This can complicate proper assessment on initial presentation.[1] Stroke mimics can have a wide variety of etiologies, including cardiovascular, neurological, metabolic, infectious, or psychiatric causes.[2] Brain tumours can present like strokes due to "tumour attacks", a multifactorial phenomenon that can create an acute stroke-like presentation.[3] Accurate diagnosis of a stroke mimic requires one to take note of features on history and physical exam that make stroke mimics more likely, laboratory investigations, and diagnostic brain imaging, such as computed tomography (CT) or magnetic resonance imaging (MRI).[1] This report presents a case of melanoma that metastasized to the brain and created a stroke-like presentation in a patient.

Case history

A 75-year-old man presented to the Selkirk Regional Health Centre Emergency Department (ED) with left-sided facial weakness. Approximately two hours prior to presentation, the patient experienced a sudden onset of difficulty swallowing, chattering teeth, slurred speech, left-sided drooling, and left facial droop. These symptoms gradually resolved by the time the patient presented to the ED. The patient denied any headaches, blurred vision, dizziness, and numbness or tingling.

The patient was vitally stable: temperature 37°C, heart rate 70 beats per minute, blood pressure 147/72mmHg, respiratory rate 16 breaths per minute, oxygen saturation 99% on room air). On physical exam, the patient was alert and oriented to time, place, and self. He was speaking clear, full sentences without any slurred speech. Cranial nerves II to XII were intact with no facial droop appreciated on exam. There were no motor or sensory deficits in the limbs, and reflexes were intact bilaterally. Tone in the upper and lower extremities was normal. The coordination exam was normal. Cardiovascular, respiratory, and abdominal exam were normal and unremarkable.

Further evaluation revealed that the patient's medical history included hypertension and malignant melanoma. In 2019, he had a right axillary and cervical lymph node dissection due to metastatic spread of the melanoma. He had no known allergies, did not smoke cigarettes, and consumed 1-2 alcoholic beverages per week.

Initial laboratory investigations revealed an elevated urea, creatinine, urea/creatinine ratio and decreased estimated glomerular filtration rate. Other parameters were unremarkable. Although the physical exam revealed no neurological deficits, the history given by

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the patient was concerning for transient ischemic attack (TIA) or ischemic stroke. This prompted an uninfused CT scan of the brain to be ordered.

The CT scan showed a new right posterior-lateral frontal lobe lesion, with vasogenic edema. The interpretation was that this was related to a metastatic lesion given the patient's history of metastatic melanoma, and that the appearance of changes on the scan were not consistent with infarction. Based on the CT and cancer history, a new diagnosis of central nervous system metastasis of melanoma was considered over ischemic stroke or TIA. In consultation with Neurology, it was suspected that the most likely cause of the patient's resolving symptoms was a seizure caused by the metastatic lesion. A loading dose of intravenous phenytoin was started. Oncology was consulted and an MRI of the brain was ordered.

The MRI showed an enhancing right frontal lobe lesion with surrounding edema. The clinical impression (considering the patient's history of metastatic melanoma, the acute development and resolution of symptoms, and the presence of a new brain lesion that explained the left-sided facial symptoms) suggested that the patient likely suffered a seizure. Oncology suggested that the patient be given a prescription for dexamethasone 4mg to be taken twice a day until a scheduled follow up appointment. Neurosurgery was then consulted, who suggested a referral for Gamma Knife radiosurgery. The patient was discharged from the ED with plans to follow up with Neurosurgery and Oncology.

Discussion

The frequency of stroke mimics observed in the ED ranges from 15-43% of suspected ischemic stroke cases.[4–6] A single-centre retrospective analysis of 950 consecutive patients presenting with suspected stroke from 2012-2013 in a Canadian ED showed that 43% of those patients had stroke mimics.[6] In the largest study of stroke mimics to date, it was found that, of 8187 patients referred to the ED for suspected stroke, 30% were stroke mimics.[5] Some common etiologies of stroke mimics are epileptic seizures, metabolic abnormalities (hypoglycemia, hyperglycemia, and hepatic encephalopathy), migraines, psychogenic causes, and infections.[1]

Brain tumours account for 6-8% of stroke mimics.[2,7] Brain tumours can present with a sudden onset of stroke-like symptoms due to the aforementioned "tumour attacks".[3] However, the pathophysiology of "tumour attacks" is not fully understood. Mechanisms thought to contribute to these attacks include: acute intracranial pressure changes that result in decreased blood flow, vascular steal phenomenon, acute hemorrhage, and vascular compression with resultant infarction.[3] In addition to "tumour attacks", brain tumours can precipitate seizures, likely due to the changes in neurotransmitter homeostasis in the brain parenchyma surrounding the tumour.[8] A resulting Todd's paralysis can occur in the post-ictal period of the seizure, mimicking an ischemic stroke (as occurred in this case).[9] Seizures are especially common in metastatic brain tumours due to melanoma versus other primary cancers with one retrospective study estimated a seizure incidence of 67%.[10] One systematic review of 18 studies (N = 2012) examining seizure incidence due to intracranial metastatic disease determined that a metastatic brain tumour where melanoma was the primary site had the highest seizure rate compared to other primary cancers, including ovarian, lung, colorectal, hepatocellular, and prostate.[11]

Correctly diagnosing an ischemic stroke or stroke mimic can be challenging for even the most experienced clinician. However, there are certain features on history and physical exam that are more suggestive of stroke mimic. An absence of hypertension, dyslipidemia, or atrial fibrillation favor stroke mimics.[5] Classically, ischemic strokes present with sudden-onset focal neurological deficits, whereas seizures can evolve over seconds and are associated with positive neurological symptoms such as excessive motor activity or sensory symptoms.[12] Headache, or seizure at symptom onset, are also features associated with brain tumour-stroke mimics.[13] On physical exam, the absence of neurological signs is suggestive of stroke mimic rather than an ischemic stroke.[14] In addition to the history and physical exam, initial tests such as rapid glucose testing, electrocardiography, complete blood count, blood urea nitrogen, creatinine, electrolytes, troponins, and coagulation studies can rule out other common causes of stroke mimics.[12]

In the case presented, the patient had a history of hypertension. In the history of presenting illness, he endorsed a sudden onset of symptoms, facial droop, and slurred speech, all of which would favor ischemic stroke. However, the absence of neurological signs was more suggestive of stroke mimic. Laboratory testing was also unremarkable, indicating that other causes of stroke mimic such as metabolic abnormalities, infection, and drug or alcohol intoxication were less likely.

Although the history and physical exam can provide suggestive features of a stroke mimic, diagnostic imaging is the most essential tool to distinguish between an ischemic stroke and brain tumour-stroke mimic. Non-contrast CT head and MRI are the two most important imaging modalities for the evaluation of ischemic strokes.[3] Non-contrast CT scan is the most readily available imaging modality, and is often the first imaging modality used in the work-up of strokes and stroke mimics. On non-contrast CT, evidence of multiple lesions, mass effect, edema, and a lack of vascular distribution are features that are more suggestive of a brain tumour-stroke mimic as opposed to an ischemic stroke.[3,15] Brain tumours are expected to enhance on contrast CT.[3] The patient presented in this case had an uninfused CT scan that revealed there was a new area of low attenuation with associated mass effect and vasogenic edema. Although these features would be indicative of a brain tumour, it was recommended to further evaluate with MRI. This ultimately served to support

the diagnosis of metastatic melanoma. MRI is more sensitive and specific than non-contrast CT head scan for detecting ischemic strokes, and MRI with diffusion-weighted imaging is even more sensitive than standard MRI.[12,16] Smaller tumours, those not causing mass effect, or those that are iso-attenuating can be missed on non-contrast CT.[3]

It is imperative to distinguish between an ischemic stroke and brain tumour-stroke mimic because it prevents unnecessary treatment. If there are no contraindications, intravenous tissue plasminogen activator (tPA) administered within 4.5 hours of symptom onset is first-line therapy for most acute ischemic strokes.[16] Many physicians have a very low threshold for diagnosing and treating ischemic strokes due to the time-sensitive nature of the treatment and potentially catastrophic side effects of missed diagnoses. In some instances, stroke mimics are inadvertently treated with thrombolytics. Rates of stroke mimics treated with tPA vary from 1.4-16.7%.[17] Exposing patients to unnecessary treatments can have adverse psychological effects, add unnecessary risks, use resources improperly, and delay the correct diagnosis for a patients.[14] With respect to brain tumours, delayed diagnosis may allow the malignancy to spread further in the brain and result in increased morbidity and mortality.[15] Whereas, timely excision of brain tumours can improve survival and quality of life.[15]

Conclusion

The case in this report demonstrated a case of a 75-year-old man presenting with resolving stroke-like symptoms. This was determined to be the result of seizure caused by metastatic melanoma to the brain. The case illustrates the importance of distinguishing between an ischemic stroke and stroke mimic so that patients can receive proper management. A thorough history and physical exam can help to reveal some features that might be suggestive of a stroke. Laboratory testing and imaging modalities are crucial in differentiating between a stroke and stroke mimic.

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