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Selected Topics: Neurological Emergencies

THE NOSE KNOWS: AN UNUSUAL PRESENTATION OF A CEREBRAL ANEURYSM

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□ Abstract—Background: Cerebral aneurysms most commonly present with subarachnoid hemorrhage (SAH), a catastrophic event. However, 11–15% of unruptured aneurysms are symptomatic, with presentations including seizures, unilateral cranial nerve deficits, visual loss, headache, and ischemia. Of patients presenting with seizures, the semiology described includes speech arrest, “feelings of dread,” localized pins and needles, and tonic clonic episodes. We report the case of a patient who presented to the emergency department (ED) with complex partial seizures secondary to a cerebral aneurysm. **Case Report:** A 54-year-old woman presented to the ED after an episode where she had noticed a “bad smell” and sensations of nausea and dizziness. This was the third episode she had experienced in 2 weeks, and other than migraine, she had no significant medical or family history. Physical examination was normal, but a computed tomography (CT) scan of the brain revealed a 15-mm aneurysm of the right middle cerebral artery. The patient was subsequently transferred for urgent neurosurgical intervention. **Why Should an Emergency Physician Be Aware of This?:** The emergency physician should strongly consider the use of head CT in the evaluation of adults presenting with a first unprovoked seizure, as rarely they can be caused by urgent pathologies including cerebral aneurysms. If a patient is found to have a possible symptomatic unruptured aneurysm, they should be referred for urgent neurosurgical consultation, as these lesions have an increased risk of rupture. © 2014 Elsevier Inc.

□ Keywords—cerebral aneurysm; seizure; middle cerebral aneurysm; complex partial seizure; focal seizure

INTRODUCTION

Cerebral aneurysms have a prevalence of 2–4% in the UK population (1). The estimated risk of rupture of a cerebral aneurysm is 0.05–2.5% per year, but the natural history of these lesions is poorly understood, and much controversy exists around the management of incidental aneurysms (2). A ruptured aneurysm is the most common cause of nontraumatic subarachnoid hemorrhage (SAH), a catastrophic event with a 1-month case mortality of 30–50% (3–5). However, SAH is not the only complication of these lesions. We report the case of a patient who presented to the emergency department (ED) with seizures secondary to a cerebral aneurysm. Unruptured aneurysms can present with various symptoms due to either a mass effect or distal clot migration. These symptoms include headache, cranial nerve deficits, ischemic events, and seizures. A review of the literature identified 32 cases of cerebral aneurysms presenting with seizures, and numerous theories exist to explain the pathogenesis of epilepsy in these cases. These theories include gliosis of cerebral tissue surrounding the aneurysm, due either to direct compression or small sub-clinical hemorrhages. Alternatively, it is believed that aneurysms can be a source of emboli causing both local and distant infarctions. These three mechanisms all result in abnormal cerebral tissue, which then has the potential to become an epileptogenic focus (6,7).

CASE REPORT

A 54-year-old woman presented to the ED having experienced an unusual episode while at work. The episode began with her noticing “a bad smell” that no one else was aware of. She then reported feeling hot, nauseous, and dizzy, and her colleagues observed that she became pale. The patient experienced no loss of consciousness and had been able to communicate verbally during the event. The episode lasted approximately 1 min and was the third such episode she had experienced in 2 weeks. The first and second episodes had occurred 4 and 14 days prior and had an identical symptomatology with no obvious triggering factor. Aside from these episodes the patient was well, with no history of new headaches, vomiting, or visual disturbance. The patient had a personal history of migraine, was a nonsmoker, and reported no significant family history. The examination was unremarkable, with normal gait, cranial nerve examination, and peripheral nerve examination. In view of the unusual history, a head CT scan was performed, which revealed a 15-mm partially thrombosed aneurysm of the right middle cerebral artery (Figure 1). This patient was transferred to a neurosurgical unit, where she underwent endovascular coiling of the aneurysm the next day.

DISCUSSION

The semiology described in this case report is typical of a temporal lobe partial seizure, with the olfactory hallucination a well-described form of aura. Among the 32 cases



Figure 1. Head computed tomography scan demonstrating a 15-mm right middle cerebral artery aneurysm, indicated by arrows.

described in the literature, seizure types included secondary generalized, partial, and complex partial seizures. The semiology included speech arrest, “feelings of dread,” localized pins and needles, and tonic clonic episodes (8,9). Furthermore patients with complex partial seizures did not always demonstrate an obviously altered level of awareness (9). This diverse semiology highlights the potential difficulties of recognizing a seizure history. This is further complicated as the symptoms described could mimic more common diagnoses such as transient ischemic attacks (TIA).

Head CT is the neuroimaging modality of choice in the ED, as it is quick and readily available. However, guidelines as to who should be imaged after a first seizure in adulthood are vague, owing to a lack of high-quality evidence. The American Academy of Neurology guideline recommends that a head CT scan in the ED should be “considered” in adults with a first unprovoked seizure. Interestingly, its best-evidenced finding is a range of features most predictive of an abnormality on head CT. These features include abnormal neurological findings on examination and a focal onset of seizures (10). It is well described that focal seizures are the seizure type most frequently associated with intracranial abnormalities, with up to 53% of patients demonstrating a possible epileptogenic lesion on magnetic resonance imaging (MRI) (11–14). Head CT is less sensitive than MRI, detecting intracranial pathology in only 44% of the same patient group (11). However, head CT will identify those with major pathology including hemorrhage, vascular malformations, and most tumors (15). It is these patients with major pathology who need a prompt diagnosis in the ED. Consequently, head CT alone is an adequate imaging modality in the ED for adults with a first unprovoked seizure and of particular importance in patients with a history of focal seizures. Those with a normal scan appearance should be referred for timely outpatient follow-up and MRI imaging.

Management of patients with new or worsening neurological symptoms and an aneurysm on head CT must include urgent neurosurgical consultation. Studies suggest that neurological symptoms from unruptured aneurysms are likely a result of aneurysm expansion, which is a risk factor for rupture (3,16). Consequently, it should not be presumed that an aneurysm found on imaging is an incidental finding, as a delay in intervention can have catastrophic consequences.

WHY SHOULD AN EMERGENCY PHYSICIAN BE AWARE OF THIS?

This case report emphasizes three main points. Firstly, that an emergency physician should strongly consider the use of head CT imaging in adults presenting with

a first unprovoked focal seizure. Head CT is useful in detecting major intracranial pathology, and patients with negative scans should be referred for prompt outpatient review. Secondly, it highlights the importance of urgent neurosurgical consultation for patients with possible symptomatic unruptured aneurysms, as these lesions are at increased risk of rupture. Finally, it is a reminder of the diverse and singular semiology of complex partial seizures, and the importance of an open-minded approach to patients who present with unusual symptoms.

REFERENCES

1. Rinkel GJE, Djibuti M, Algra A, van Gijn J. Prevalence and risk of rupture of intracranial aneurysms: a systematic review. *Stroke* 1998; 29:251–6.
2. Wiebers D. Unruptured intracranial aneurysms: natural history, clinical outcome, and risks of surgical and endovascular treatment. *Lancet* 2003;362:103–10.
3. Burns JD, Brown RD. Treatment of unruptured intracranial aneurysms: surgery, coiling, or nothing? *Curr Neurol Neurosci Rep* 2009;9:6–12.
4. Broderick JP, Brott T, Tomsick T, Miller R, Huster G. Intracerebral hemorrhage more than twice as common as subarachnoid hemorrhage. *J Neurosurg* 1993;78:188–91.
5. White PM, Wardlaw JM. Unruptured intracranial aneurysms detection and management. *J Neuroradiol* 2013;30:336–50.
6. Sengupta RP, Saunders M, Clarke PR. Unruptured intracranial aneurysms—an unusual source of epilepsy. *Acta Neurochir (Wien)* 1978;40:45–53.
7. Yacubian EM, Rosemberg S, da Silva HC, Jorge CL, de Oliveira E, de Assis LM. Intractable complex partial seizures associated with posterior cerebral artery giant aneurysm: a case report. *Epilepsia* 1994;35:1317–20.
8. Hänggi D, Winkler PA, Steiger H-J. Primary epileptogenic unruptured intracranial aneurysms: incidence and effect of treatment on epilepsy. *Neurosurgery* 2010;66:1161–5.
9. Kamali AW, Cockerell OC, Butlar P. Aneurysms and epilepsy: an increasingly recognised cause. *Seizure* 2004;1311:40–4.
10. Harden CL, Huff JS, Schwartz TH, et al. Reassessment: neuroimaging in the emergency patient presenting with seizure (an evidence-based review): report of the Therapeutics and Technology Assessment Subcommittee of the American Academy of Neurology. *Neurology* 2007;69:1772–80.
11. Guberman A. The role of computed cranial tomography (CT) in epilepsy. *Can J Neurol Sci* 1983;10:16–21.
12. Reinikainen KJ, Keränen T, Lehtinen JM, Kälviäinen R, Saari T, Riekkinen PJ. CT brain scan and EEG in the diagnosis of adult onset seizures. *Epilepsy Res* 1987;1:178–84.
13. Scollo-Lavizzari G, Eichhorn K, Wüthrich R. Computerized transverse axial tomography (CTAT) in the diagnosis of epilepsy. *Eur Neurol* 1977;15:5–8.
14. Hakami T, McIntosh A, Todaro M, et al. MRI-identified pathology in adults with new-onset seizures. *Neurology* 2013;81:920–7.
15. Kuzniecky RI. Neuroimaging of epilepsy: therapeutic implications. *NeuroRx* 2005;2:384–93.
16. Yasui N, Magarisawa S, Suzuki A, Nishimura H, Okudera T, Abe T. Subarachnoid hemorrhage caused by previously diagnosed, previously unruptured intracranial aneurysms: a retrospective analysis of 25 cases. *Neurosurgery* 1996;39:1096–100. discussion 1100–1.