To Bee or Not to Be: The Story of a Rare Cause of Ischemic Stroke

Megan Baikie MD, Nancy Armanious MD, Aimmee Chin MD, MaryJo Groves MD

Introduction

Hyperlipidemia, hypertension, cardiovascular disease, and diabetes are common risk factors contributing to ischemic strokes. There are few cases documenting an inflammatory process leading to ischemic stroke, however. There are only 7 documented cases of pro-inflammatory ischemic strokes due to insect bites; it has been suggested that vasoconstriction and platelet aggregation caused by the release of inflammatory mediators and exogenous adrenaline may contribute to acute ischemia in the brain.

Case Presentation

63-year-old male with a PMH of controlled type 2 diabetes, hypertension and hyperlipidemia who presented to the Eisenhower Health Emergency Room complaining of swelling of his face and bilateral upper extremities after sustaining 100-200 bee stings. He worked as a gardener and was cutting down bushes at a local hotel when he accidentally stepped onto a bee hive. The patient was suddenly attacked by over one hundred bees, ultimately sustaining injuries to his face, left eye and upper body. On route to the ED, he was given a dose of intravenous Benadryl.

On initial presentation, patient's vitals were within normal limits. Physical exam showed multiple erythematous lesions on his face with swelling. He was alert and oriented without any focal neurological deficits. His lungs were clear to auscultation. Cardiac exam showed regular rhythm without murmurs or extra heart sounds. He was given a dose of intravenous Solumedrol, started intravenous Benadryl and fluids. He was admitted to for further monitoring due to concern for development of anaphylactic shock.

Hospital Course

Two hours after admission, the patient's daughter noted that the patient's speech had become slowed and slurred. On re-exam, he was newly disoriented to place with a new facial droop. The remainder of his neurologic exam was insignificant. A stat CT head (figure 1) was negative.

Approximately twelve hours later, a rapid response was called due to the patient's worsening mental status. He was drowsy with a persistent facial droop. A stat MRI brain (figure 2) was significant for multiple, acute infarcts within the midbrain, pons, posterior left occipital lobe, and both cerebellar hemispheres. He was outside of the tPA window. Patient was transferred to the ICU in which his neurologic status continued to decline with a GCS of 7 and a dilated left pupil. He was intubated for acute respiratory failure due to encephalopathy from acute ischemic strokes. A TTE and TEE were negative. He was followed by stroke neurology who started aspirin and high-dose Lipitor. After 7 days in the ICU, the patient was extubated and transferred to the floor. At this time, he was noted to be nonverbal with right hemiplegia, which persisted throughout hospitalization.

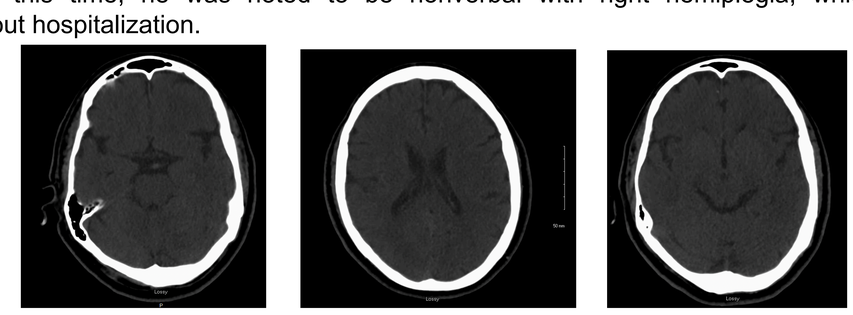

Figure 1: CT head negative for stroke.

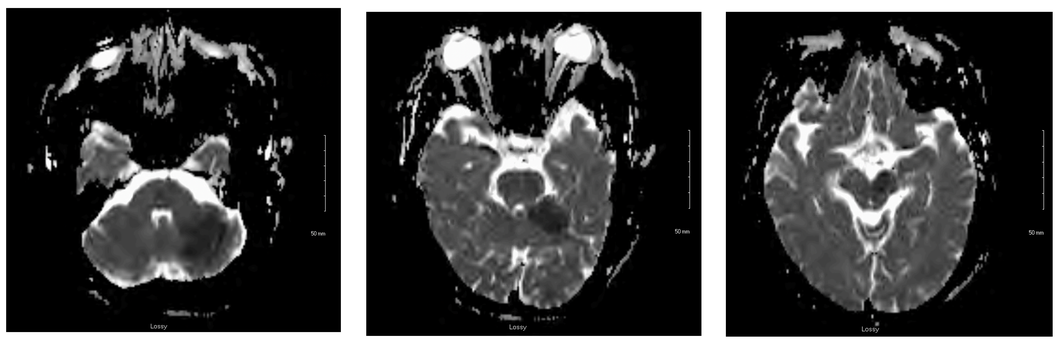

Figure 2: MRI brain w/wo contrast showing acute infarcts within midbrain, pons, posterior left occipital lobe and both cerebellar hemispheres.

Discussion

According to a case report published in 2012, although not definitely known, there appears to be two pathophysiologic mechanisms behind stroke after hymenoptera stings. First, hypotension in the presence of an anaphylactic reaction can certainly induce ischemia leading to stroke. This, however, was not likely documented in our case given patient's persistently stable vital signs. Secondly, however, vasoconstriction secondary to mediators released after the sting, aggravated by exogenous adrenaline and platelet aggregation, may very well contribute to the acute development of cerebral ischemia. Furthermore, it has also been proposed that bee venom itself contains vasoactive mediators, thereby worsening the acute inflammatory process. More specifically, wasp venom contains inflammatory and thrombogenic peptides, including histamine, leukotrienes, thromboxane and allergenic proteins such as phospholipases. All of these elements ultimately induce an IgE response, resulting in mast cell activation and causing a systemic immune mediated reaction consisting of vasoconstriction and pro-thrombosis, ultimately increasing the risk of ischemic stroke.

While this remains a rare event and treatment options are not clear, awareness of possible links between pro-inflammatory states and ischemic stroke is important as management may include timely control of inflammation. In addition, awareness of potential stroke risk after exposure to high levels of venom should be evaluated closely along with the timing of the exposure, particularly those exposed to more than one hundred stings. We thought it might be useful for other physicians to be aware of this potential link and the unusual ramifications from a high burden of venom, even in the absence of anaphylactic shock.

References

Available at request; mbaikie@eisenhowerhealth.org, narmanious@eisenhowerhealth.org