AURA
MIGRAINE'S ODD COMPANION

Migraine-associated aura remains for many a mystifying and often frightening neurologic symptom

Despite its high prevalence and typically benign nature, migraine-associated aura remains for many a mystifying and often frightening neurologic symptom. Witness the following description provided by Diane, a veteran migraineur:

It was just my usual run. 6 miles along city streets during the peak heat of a Gulf Coast summer day. I was 23 years old at the time, a bit of a running addict and also a creature of habit who preferred running the same route at the same time every afternoon. As my feet pounded the pavement in rhythm with my favorite tunes blasting through my headphones, the days stress fell away. At the end, I was usually refreshed and relaxed. Except on this day. Something very different happened. Something unprecedented and a little terrifying.

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I rounded a corner to run the last mile. Home stretch. Beside me was a long, tall wrought iron fence with vertical bars spaced about a foot apart. The sun was beginning to set, and, strobe-like, it rhythmically flickered brightly between

the bars as I ran by. I sprinted for my imaginary finish line just beyond the fence. Red-faced and drenched in sweat, I caught my breath and started to walk home.

Suddenly I stopped. There was something odd about my vision. A blob had appeared to the left of center, like a bright white light refracted through a prism. When I closed my eyes, I saw the blob in the very same place. Over the next 15 minutes the blob grew larger, to the point that I could not see well enough to find my way home. Then the blob transformed into crescent-shaped lines of purple angles that marched across my vision like waves. Gradually they faded away. My vision seemed fine, but I began to develop a terrible headache. The headache was not so unusual; just like my father, I'd struggled from time to time with bad headaches... but never accompanied by this visual weirdness. The next morning I awoke with no headache and my vision entirely normal.

My primary care provider referred me to a local neurologist. As I waited to be seen, I quietly obsessed about the strange visual episode. What had caused it? Was there a tumor growing inside my brain? Did I have an aneurysm? Were alien bacteria colonizing my eye?

Whatever it was, I was convinced it must be serious. To make matters worse, the same symptoms occurred a few days later, at precisely the same time during my usual run and just beyond the iron fence with its flickering sunlight.

My visit to the neurologist provided little comfort. He was a mild mannered doctor who performed his exam in near silence. I imagined he must be deciding how best to break the bad news. At the end of the appointment, however, he simply told me I needed some tests. He ordered a brain MRI scan (yikes!) and an EEG (gulp!), presumably to confirm the horrible fate awaiting me.

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But at my follow-up appointment a week later he pronounced my diagnosis: "migraine with visual aura". No life-threatening tumor. No exploding aneurysm. No nasty bacteria. Migraine is genetic, he explained. And apparently the sunlight flashing through the fence had caused my aura and the migraine headache that followed.

Flash forward 26 years to the present. I have continued to experience exactly the same aura. But one thing is dramatically different: when the small white prism appears in my left visual field, instead of panicking I go take an aspirin.

Diane's story is familiar to health care providers who frequently treat migraine. Upwards of 39 million Americans – roughly 1 in 8 – are actively afflicted by migraine, and as many as 9 million will at least occasionally experience aura. Aura is a common reason for migraineurs to seek medical attention, and many of those who do will undergo MRI scans and other testing that typically add little beyond financial expense and patient inconvenience. So if aura is so common and benign, why all the fuss?

As is true of migraine generally, high prevalence does not equate with a clear understanding. Like Diane, many of those with long-established migraine are shocked by their first experience with aura. Conversely, many people (including doctors) believe that what we term "migraine" must involve aura which invariably is followed by a severe headache that is throbbing in character and accompanied by nausea, vomiting, and sensitivity to light and sound. The reality: although many of the 36 million Americans afflicted by migraine do at times suffer migraine attacks that match up perfectly with what is described, in only a very few does their migraine always involve this stereotyped array of symptoms.

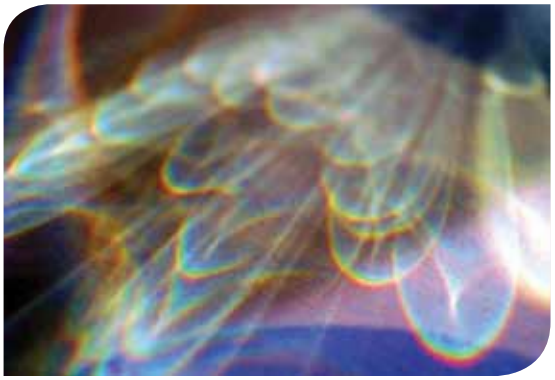
A migraine attack may consist of only aura and no headache whatsoever (see Tip of the Month section in this issue), or it may be expressed as incapacitating head pain... or as any degree of pain on the spectrum between these 2 extremes. Be it mild or severe, most headaches suffered by a migraineur are "migraines" that result from the same underlying biologic process.

While only 20-25% of migraineurs ever experience aura, the majority of migraineurs at times experience a prodrome prior to their headache attacks. The symptoms of a migraine prodrome typically are vague or nonspecific (commonly occurring examples are euphoria or depression of mood, hyperactivity, food cravings (eg, sweets or salt) and repetitive yawning). Vague or not, the experienced migraineur often learns to identify those symptoms as a reliable indicator that headache is soon to follow.

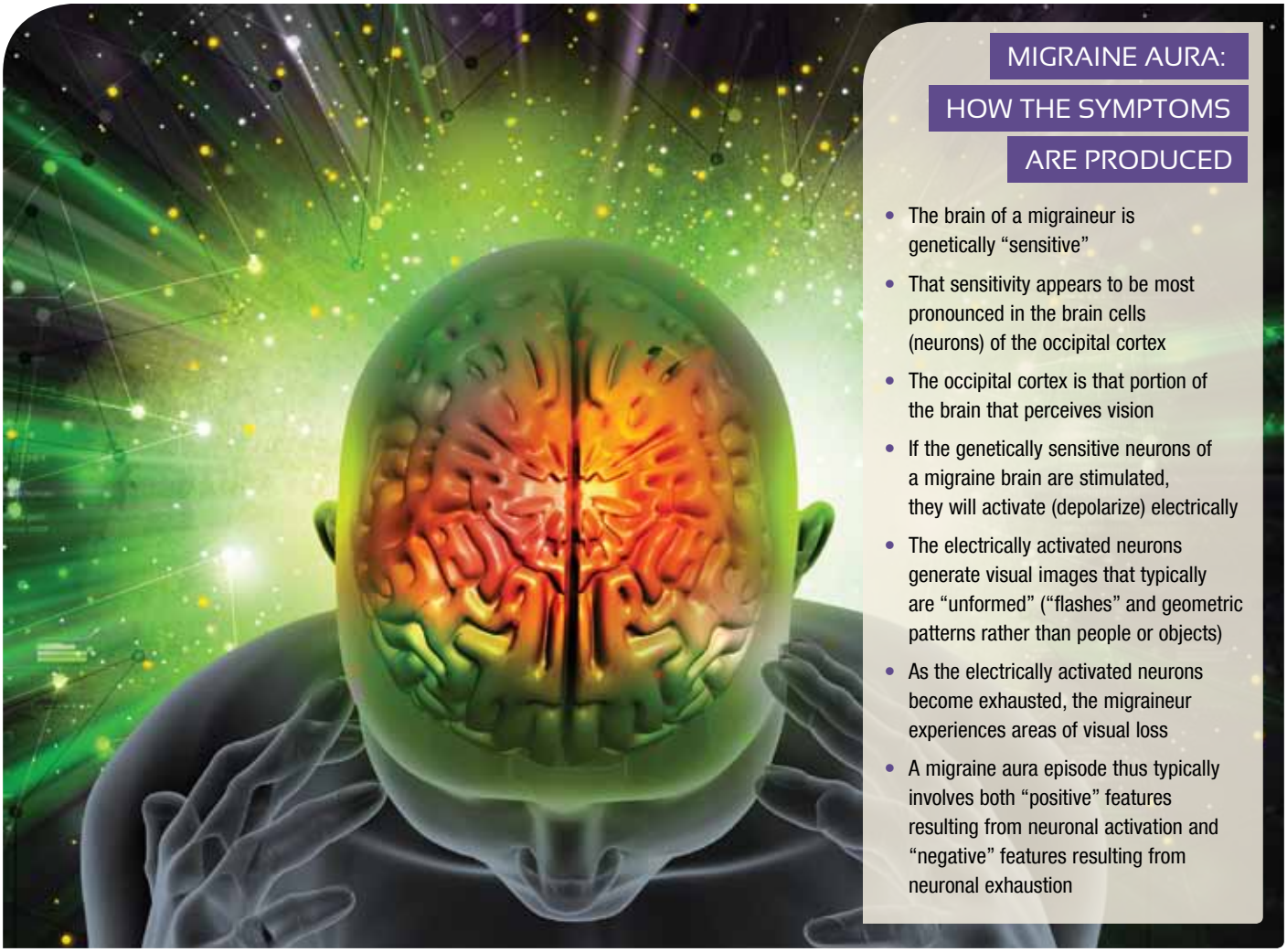
Again, no more than a quarter of migraine patients will ever experience aura, and in only a very few is aura a component of each and every attack. The symptoms of aura are much more specific and strictly "neurologic" than those of the migraine prodrome. As Diane experienced, aura symptoms typically possess both "negative" features (for example, vision loss) and features which are "positive" (as examples, geometric patterns, flashing or shimmering lights, "heat waves rising") perceived with one or both eyes.

Aura symptoms tend to be dynamic, building in their intensity before receding and vanishing. The symptoms usually develop gradually over 5-20 minutes and last for less than 60 minutes. In a substantial number of migraineurs, however, aura symptoms may come and go for a much more extended period, and in a small minority of migraine suffers aura may persist for weeks or months.

Headache usually follows the aura, but in some cases the headache may begin before the aura or before the aura has stopped, and, as mentioned previously, aura symptoms can occur without any temporally associated head pain at all. While prodromal symptoms tend to occur many hours before the headache phase of a migraine episode, headache typically follows right on the heels of an aura.



The most common migraine aura involves visual symptoms, but many migraineurs experience sensory aura. Sensory aura often begins with numbness (loss of sensation: a negative feature) and tingling (a hallucination of sensation: a positive feature) affecting the lips and tongue and one side of the face, spreading to involve the cheek and then gradually extending to involve the hand on that same side. Many patients with sensory aura also describe "heaviness" of the affected limb, and not surprisingly sensory aura frequently is misdiagnosed as a warning symptom of



MIGRAINE AURA: HOW THE SYMPTOMS ARE PRODUCED

- The brain of a migraineur is genetically "sensitive"
- That sensitivity appears to be most pronounced in the brain cells (neurons) of the occipital cortex
- The occipital cortex is that portion of the brain that perceives vision
- If the genetically sensitive neurons of a migraine brain are stimulated, they will activate (depolarize) electrically
- The electrically activated neurons generate visual images that typically are "unformed" ("flashes" and geometric patterns rather than people or objects)
- As the electrically activated neurons become exhausted, the migraineur experiences areas of visual loss
- A migraine aura episode thus typically involves both "positive" features resulting from neuronal activation and "negative" features resulting from neuronal exhaustion

stroke or, less often, as a partial seizure. Patients may experience both visual and sensory aura within the same attack, with the symptoms occurring together or one after the other.

Aura symptoms are believed to arise as a result of electrochemical changes occurring in that portion of the brain which is relevant to the symptoms. For example, visual aura results from electrochemical event arising within the occipital lobes, the brain area which is primarily responsible for processing vision. If that genetically primed visual area is acutely exposed to a sufficiently compelling stimulus (eg, the "flickering sunlight" experienced by Diane), the neurons in that area react in a manner that produces aura. Whether that same electrochemical event is the origin of migraine head pain remains a source of controversy within the scientific community.

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Many migraineurs report that with aging, aura symptoms become more prominent while the headache portion of their migraine attacks lessens or vanishes entirely. Again, these episodes of aura without headache occurring in the older population frequently are mistaken to be indicators of impending stroke.

Although migraine with aura is much, much more common than migraine causing stroke, the risk of stroke in migraineurs with aura is increased relative to that of the general population and relative to migraineurs who experience no aura.

That risk may be further increased by the use of an estrogen-based oral contraceptive. While female migraineurs with aura consequently may wish to consider an alternative method of contraception, it should be emphasized that although their relative risk of stroke is increased by use of the OCP, the absolute risk associated with their OCP use remains extremely low.

If you are one of the minority of migraineurs who typically experience aura prior to headache onset, you may wish use this association to increase the effectiveness of the medication you administer for acute migraine treatment. Early treatment of migraine is critical to achieving a total elimination of symptoms and to lowering the chance of early headache recurrence. Think of your aura as a thundercloud that warns of the storm to come.