Isolated Ophthalmic Migraine in the Differential Diagnosis of Cerebro-Ocular Ischemia

THOMAS R. HEDGES, M.D., AND RICHARD D. LACKMAN, B.S.

SUMMARY
Thirty-three of 129 patients who incurred isolated ophthalmic migraine had monocular attacks of scotomatous visual field loss. Fifteen of 33 patients with monocular attacks had immediate or remote evidence of vascular disease. Four patients had carotid bruits on the same side as the monocular attacks and low ophthalmodynamometer readings. One patient had ischemic optic neuropathy and two had atheromatous disease (advanced stage in one patient). Forty-five percent of the patients with monocular attacks and only 13% of the remaining patients with homonymous attacks had vascular complications. This represents an important finding even in such a small group of patients. It is felt that, whether the vascular problems are trigger mechanisms or coexistence pathology to the migraine-type attack, one should strongly suspect such an association when a patient describes a monocular attack and one should look for a possible vascular explanation other than migraine.

INTRODUCTION
VISUAL OBSCURATIONS are a well-recognized prodroma of classic migraine. Isolated episodes similar to the classic fortification scotoma and variations of these visual attacks not accompanied by subsequent vascular headache are also a common disorder.

The phenomenon of isolated ophthalmic migraine was well recognized as early as the nineteenth century by Charcot who termed it "migraine fruste." In 1936, Johnson described his own attacks of isolated scintillating scotomas. Since then the literature has been summarized by the reviews of Alvarez, Aring, and Hedges dealing specifically with the incidence and diagnosis of these attacks.

Little attention has been given to distinguishing whether these attacks, which simulate the prodroma of migraine, occur in a monocular or a binocular fashion. This distinction may well be one of importance in properly classifying this phenomenon as to its etiology and eventual prognosis. It is for this reason that this series of 129 patients is presented.

CLINICAL MATERIAL
Placing patients in the category of "isolated ophthalmic migraine" is not, by the nature of the disorder, a precisely quantitative procedure. Relatively objective criteria were used for the proper selection and classification of patients. All of the patients must have fulfilled all of the following requirements in order to be designated as having experienced isolated ophthalmic migraine.

1. The patient must have experienced a visual obscuration lasting not less than five minutes (though most lasted 15 to 30 minutes). Qualitatively these visual symptoms were fairly uniform in that most resembled the classic fortification scotoma in migraine with or without accompanying scintillations.

2. These episodes were not associated with subsequent headaches.

3. The visual symptoms were not accompanied by any other neurological deficits (i.e., motor or sensory loss, etc.).

4. The attacks must have cleared completely leaving no residual visual deficit.

5. Patients who were on medications which may produce visual symptoms as known side effects were excluded.

Each patient considered had a carefully performed ophthalmological examination including a detailed history. In addition, radial and carotid pulses, auscultation for bruits, ophthalmodynamometry and visual fields were performed. Few of the patients had complete blood, general physical or neurological studies except where specifically indicated and thus one cannot rule out some possible vascular, hematological or other contribution to the visual symptomatology.

RESULTS
Table 1 shows that 60% of the patients were between 50 and 81 years of age; 53% were women. Seventy-five percent of the patients had homonymous hemianopic scotomas without headache (as in the prodrome of classic migraine). The homonymous scotomas were accompanied by scintillation in 36% and occurred without any scintillation in 36%.

An important finding was that 33 of the 129 patients or 25% had specific monocular symptoms. These patients alternately covered one and then the other eye and stated they could be sure the scotomas occurred on one side only.

As in our previous series, most patients (73%), according to their recollection, had less than six attacks per year and 42% had less than four attacks.

Eighty-four patients (65%) had no previous history of migraine though many had a family history of migraine.

Table 2 shows certain aspects of the monocular group which are of primary importance. The average age incidence of the entire group was 52 years old and, of the monocular group, 55 years. Frequency of attacks also was not greatly different between those patients who had predominantly typical scintillating scotomas of a homonymous character and those with monocular attacks (the majority of both groups did not experience more than six attacks per year).

The most striking fact was that 15 of 33 patients with monocular visual attacks (45%) had overt clinical evidence of other vascular complications. Only 12 of the remaining 96 patients (13%) with homonymous hemianopic attacks had evidence of such stigmata on a purely clinical basis (without a thorough vascular or neurological workup).

Table 3 classifies the vascular complications experienced by patients in the monocular group. Four of the patients with monocular symptoms had carotid bruits on the same side as the visual loss. This is of utmost importance despite the small numbers, since monoclonal amaurosis fugax due
to atheromatous emboli is commonly associated with carotid stenosis.

One patient with monocular visual attacks had experienced a central retinal vein thrombosis 30 years earlier (his present age: 59). His monocular visual symptoms began 16 years later at age 45 and continued on the average of one to two per year up to the present. Two women, ages 53 and 56, had their visual attacks in the presence of hyperlipemia and both had had previous cerebrovascular accidents. One man, age 55, had had previous myocardial infarction and another man, age 61, had a history of "cold hands" for the previous ten years. Another man was afflicted with hypertension and diabetes of longstanding duration.

One patient with a vascular complication is of special interest. This 57-year-old white man was recorded as having three attacks within two years of a "small red spot with a vertical jagged border and blurred area in the center which spread to the periphery in the right eye only" (by monocular testing). These attacks of blurring lasted five to ten minutes. He had no other neurological or vascular signs and symptoms until two weeks prior to observation when he suddenly had blurred vision in the right eye. At this time, he had 20/200 vision on the right, an afferent pupillary response deficit on the right as evidenced by pupillary escape to direct light, and a positive swinging light test. The right optic nerve was swollen and visual fields showed a nerve fiber bundle defect on the right (Bjerrum-type scotoma). The diagnosis was ischemic neuropathy. The acute signs resolved but he continued to have 20/70 vision and a small but well-defined central scotoma and optic atrophy.

Also of interest was the fact that two of these 33 patients had had "flashes of light" with a movement spread of the scotoma from center fixation to the periphery. Four patients, including these two, stated the visual phenomenon was always temporal to fixation. In seven patients, the duration was 20 minutes. All of these attributes, save the fact that the visual disturbance was definitely monocular and not in a homonymous scintillating scotoma, could be easily mistaken for a binocular attack unless the patient had been a good observer.

One patient experienced visual disturbances for many years and stated that the 15-minute to 20-minute visual disturbance could occur in both eyes simultaneously or in one eye alone. In each instance the attack was similar; it began temporal to fixation and was accompanied by a pulsating vertical zig-zag line that moved off to the periphery. If the attacks occurred in both eyes, the temporal half of the patient's vision was affected at fixation as a bitemporal defect through which the patient was able to see enough to read with difficulty. No headache ever followed but some nausea usually accompanied these attacks. The important thing is that three other patients in the monocular group indicated that the scotoma was not completely central but only in the temporal field. These three patients described the duration of their visual attacks as short-lived (five minutes or as long as three hours). All of these symptoms previously described may or may not have a causal relationship to monocular attacks resembling isolated ophthalmic migraine but are certainly an important consideration in reviewing the differential diagnosis of "benign" attacks of isolated ophthalmic migraine and in distinguishing them from incipient stroke symptoms.

**Table 1**

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>No. pts.</th>
</tr>
</thead>
<tbody>
<tr>
<td>5-30</td>
<td>11</td>
</tr>
<tr>
<td>31-50</td>
<td>40</td>
</tr>
<tr>
<td>51-81</td>
<td>78</td>
</tr>
<tr>
<td>Total</td>
<td>129</td>
</tr>
</tbody>
</table>

**Table 2**

<table>
<thead>
<tr>
<th>Age range (years) (average: 55 years)</th>
<th>No. pts.</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 30</td>
<td>2</td>
</tr>
<tr>
<td>30-50</td>
<td>10</td>
</tr>
<tr>
<td>51-70</td>
<td>21</td>
</tr>
<tr>
<td>Total</td>
<td>33</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Frequency</th>
<th>No. pts.</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 4 (total)</td>
<td>16</td>
</tr>
<tr>
<td>&lt; 6 per year</td>
<td>6</td>
</tr>
<tr>
<td>&gt; 6 per year</td>
<td>11</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Vascular complications</th>
<th>No. pts.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central scotomas</td>
<td>5</td>
</tr>
<tr>
<td>Ipsilateral carotid bruits</td>
<td>4</td>
</tr>
<tr>
<td>Ipsilateral abnormal ODM</td>
<td>5</td>
</tr>
<tr>
<td>Cold hands</td>
<td>1</td>
</tr>
<tr>
<td>Ischemic neuropathy</td>
<td>2</td>
</tr>
<tr>
<td>Previous cerebrovascular accidents</td>
<td>2</td>
</tr>
<tr>
<td>Atherosclerosis</td>
<td>2</td>
</tr>
<tr>
<td>Previous myocardial infarction</td>
<td>1</td>
</tr>
<tr>
<td>Diabetes and hypertension (long duration)</td>
<td>1</td>
</tr>
</tbody>
</table>

(Average age: 53 years)
A majority of the total group had typical homonymous hemianopic scotomas and therefore they were cortical in origin (75%). It is this group that is relatively easy to diagnose; they have the posterior cerebral artery and calcarine cortex as their anatomical location and, in almost all instances, have a benign prognosis. The monocular group, on the other hand, were unusual in that they occasionally had a longer and, even more often, a shorter duration than the usual 20-minute attack of typical homonymous fortification scotoma. An important observation was that they had more frequent vascular complications.

Age, Sex and Previous Migraine History

Vascular complications occurred in 52% of the monocular group as compared with 12% in the remaining patients who had typical homonymous attacks. One might have thought this was due to age factors. However, the average age for the total group was 54 years, for the monocular group 55 years, and for the 11 patients with vascular complications 53 years. Thus, age would not appear as important as one might have expected. Their sex distribution and the incidence of previous classic or common migraine were the same as in the group as a whole. Two-thirds of the patients had no previous history of migraine.

Carotid Bruit Patients

Three women had carotid bruises, and their ages were 54, 55 and 66. No patient as yet has had a carotid or brachial arteriogram in order to establish a diagnosis of carotid stenosis. All had significantly lower diastolic ophthalmodynamometry readings on the side of the lesion (30 x 20, 55 x 35, and 50 x 30 mm Hg). All three had previously experienced classic migraine and two stated that this was due to age factors. However, the average age for the total group was 54 years, for the monocular group 55 years, and for the 11 patients with vascular complications 53 years. Thus, age would not appear as important as one might have expected. Their sex distribution and the incidence of previous classic or common migraine were the same as in the group as a whole. Two-thirds of the patients had no previous history of migraine.

References

10. McDonald WI, Sanders MD: Migraine complicated by ischemic papillopathy. Lancet 2: 521-523 (Sep 4) 1971
Isolated ophthalmic migraine in the differential diagnosis of cerebro-ocular ischemia.
T R Hedges and R D Lackman

*Stroke*. 1976;7:379-381
doi: 10.1161/01.STR.7.4.379

*Stroke* is published by the American Heart Association, 7272 Greenville Avenue, Dallas, TX 75231
Copyright © 1976 American Heart Association, Inc. All rights reserved.
Print ISSN: 0039-2499. Online ISSN: 1524-4628

The online version of this article, along with updated information and services, is located on the
World Wide Web at:
http://stroke.ahajournals.org/content/7/4/379

Permissions: Requests for permissions to reproduce figures, tables, or portions of articles originally published in
*Stroke* can be obtained via RightsLink, a service of the Copyright Clearance Center, not the Editorial Office.
Once the online version of the published article for which permission is being requested is located, click Request
Permissions in the middle column of the Web page under Services. Further information about this process is
available in the Permissions and Rights Question and Answer document.

Reprints: Information about reprints can be found online at:
http://www.lww.com/reprints

Subscriptions: Information about subscribing to *Stroke* is online at:
http://stroke.ahajournals.org//subscriptions/