

## Eye:A Window For Stroke.....

*Prof.B.N.R Subudhi., Asst.Prof.Sarita Panda., SR.Dr Pranati Sahu.  
M.K.C.G Medical College & Hospital.Berhampur.*

Many of our patients at risk for stroke don't know the first signs of it. Can we detect, and even help patients avoid, a stroke. The third leading cause of death and the primary cause of adult disability and hospital admissions in our country -stroke is a serious health concern that should be high on our watch list-whether we're seeing a patient for a medical visit or a routine eye exam. If a patient comes in with transient monocular vision loss, binocular vision loss, homonymous hemianopsia or acute diplopia, we need to recognize that they could be suffering from a transient ischemic attack (TIA) or stroke, and act promptly. Irreversible tissue injury and death can occur within three hours of a stroke, so time is of the essence in getting these patients the urgent attention they need in a hospital setting. we need to talk to our patients about stroke before we reach this point. As primary eye care providers, are we educating our patients appropriately and adequately regarding stroke risk and its signs and symptoms? Let's take a look at some of the warning signs that we should be relaying to our patients, as well as how stroke correlates to the eye specifically.

A stroke (more formally called a cerebrovascular accident, or CVA) is caused by an interruption in blood flow through the brain. it's crucial to educate patients about the common clinical symptoms of stroke, including:

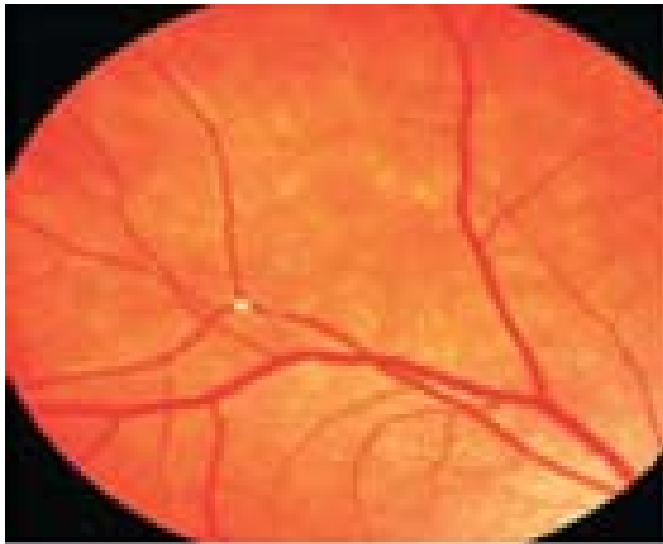
- o Weakness or paralysis on one side of the body (face, arm, leg).
- o Slurred speech.
- o Confusion.
- o Loss of balance.
- o Tingling, burning or numbness of the skin.
- o Headache.

o Vision loss.

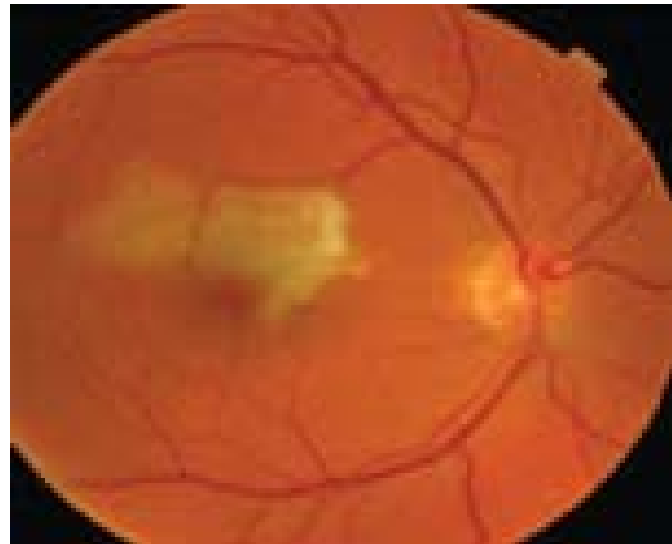
Risk factors for stroke include, but are not limited to, family history, age (>55 years), sex (male), hypertension, diabetes, high cholesterol, cigarette smoking, cardiovascular disease, obesity, sleep apnea, atrial fibrillation and giant cell arteritis. So it's particularly important to talk with patients who fall within one or more of those categories. in addition, one of the most important risk factors for a stroke is a transient ischemic attack (TIA) or mini-stroke.

### ***Monocular Vision Loss***

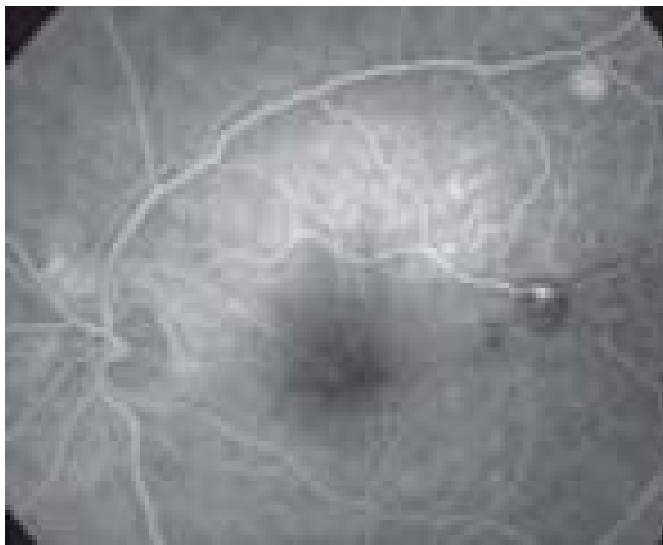
Several studies have identified transient monocular vision loss (TMVL) as the single greatest predictor of hemodynamically significant stenosis on a carotid ultrasound. Any time that a patient reports TMVL, consider the possibility that carotid artery disease is responsible. Patients tend to report painless total or sectoral loss of vision lasting from a few seconds to a few hours, which resolves completely. During an eye exam, you may find an explanation for the transient vision loss; however, the patient's ocular health may also be unremarkable. In any case of TMVL, consider the patient's overall health and order a carotid ultrasound to evaluate the patient for significant blockage. Perhaps even more important, while the patient is still in the exam chair, it is our responsibility as primary eye care providers to ask pertinent questions to rule out a possible TIA. Because symptoms of TIA mirror those of stroke, it is also possible that these questions may help us diagnose an acute stroke. The difficult part in this triage process is determining whether the patient needs to go to the emergency room immediately or if he or she can schedule an appointment with their primary care provider in a few days.



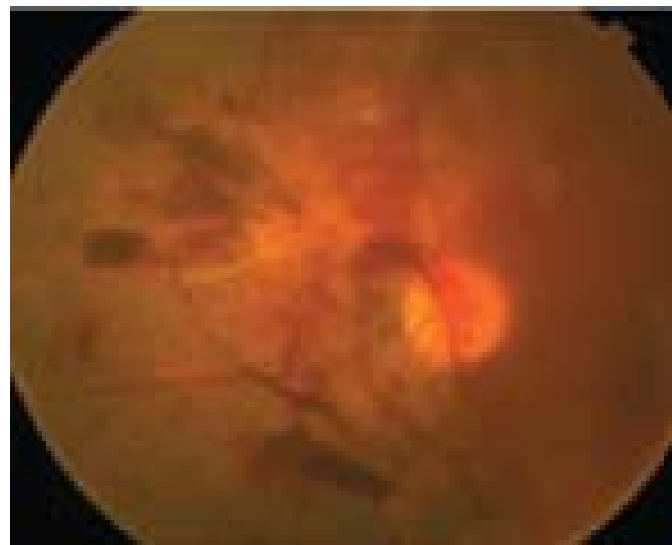
In the Beaver Dam Eye Study, the presence of retinal emboli was shown to be associated with a threefold greater risk of fatal stroke over eight years



A study in Taiwan found retinal arterial occlusions increase risk of subsequent stroke, particularly within the first six months following the occlusion.



Fluorescein angiography illustrating a retinal arterial macroaneurysm (RAM), resulting from hypertension. Uncontrolled blood pressure can increase the risk of stroke four- to sixfold



In the Wisconsin Epidemiological Study in Diabetic Retinopathy, the risk of stroke was found to be six times higher in patients who had proliferative diabetic retinopathy

**Carotid Artery Disease**

Many eye findings that worry us about stroke risk often relate to the carotid artery-either as a source of plaque (retinal emboli, artery occlusion) or as a result of significant carotid artery blockage (venous stasis retinopathy, TMVL). Carotid artery stenosis is a major cause of morbidity and mortality, and the eye may be the first place it manifests. While TMVL is a symptom that

may prompt a patient to seek medical care, venous stasis retinopathy (VSR) may not have any significant symptoms and routine eye exams are crucial for its detection. Some of the common signs include dilation of retinal veins, mid-peripheral dot-and-blot hemorrhages, venous beading, flame hemorrhages and microaneurysms. In a study of 110 patients with symptomatic carotid artery occlusion, 100% had mid-peripheral hemorrhages, so this is a finding

that has to be present to make this diagnosis. When hemorrhages are seen outside the posterior pole, carotid artery disease should be considered as a potential underlying cause. Specifically, the study found that 69% of patients with VSR had between one to five mid-peripheral hemorrhages per quadrant.<sup>7</sup> Thus, from a management standpoint, these are individuals who should have a carotid ultrasound ordered to detect hemodynamically significant stenosis and educated regarding stroke risk.

### ***Retinal emboli***

Emboli are another risk factor for stroke that requires proper education and work-up in our patients. Emboli can be asymptomatic, but can also cause more severe visual sequelae in cases of retinal artery occlusion. Most emboli are either cholesterol, calcific or fibrino-platelet in nature, with the majority being of cholesterol composition. We should order proper imaging to evaluate the carotid artery and the heart as the source of the retinal emboli. One study found that there was an abnormal echocardiogram in 62% of central retinal artery occlusions (CRAO) and 44% of branch retinal artery occlusions (BRAO). Similarly, there was plaque present on carotid doppler in 71% of CRAOs and 66% of BRAOs. With regards to stroke risk, the Beaver Dam Eye Study found that retinal emboli were associated with a threefold greater risk of fatal stroke over eight years. The Blue Mountain Eye Study found that over 12 years, 30% of patients with retinal emboli died-with 4% of the deaths resulting from stroke. There was a moderate threefold increase in stroke-related mortality rates in patients with emboli. In general, patients with emboli have a higher mortality rate compared to those without emboli.

### ***Hypertension***

Elevated blood pressure can increase the risk of stroke through atherosclerosis of the vessels over time; this may lead to blockage of small vessels in the brain and ischemia. "Severe" hypertensive retinopathy can occur when elevated blood pressure causes an increase in intracranial

pressure and optic nerve swelling. Severe hypertension can also lead to infarction of segments of the choriocapillaris. Siegrist's streaks refer to linear RPE hyperplasia over infarcted choroidal arterioles, and Elschnig spots are a sign of non-perfused choriocapillaries. Uncontrolled hypertension has been shown to increase the risk of stroke four- to sixfold, so this is another group we need to educate.

### ***Diabetes***

Diabetes increases the risk for stroke by inhibiting blood flow and fostering ischemia. In the eye, diabetic retinopathy is commonly detected in individuals who have poorly controlled blood sugars or have had the disease more than 10 years. Atherosclerosis Risk in Communities (ARIC) Study, found the risk of incident ischemic stroke was two to three times higher in individuals with non-proliferative diabetic retinopathy vs. individuals without diabetic retinopathy. In addition, the level of diabetic retinopathy also seemed to correlate with stroke risk. Of the 1,305 individuals in the study who had no diabetic retinopathy, only 3.9% went on to suffer an ischemic stroke. In contrast, 9.6% of individuals with mild to moderate diabetic retinopathy and 11.4% of individuals with severe diabetic retinopathy went on to suffer a stroke. The Wisconsin Epidemiological Study in Diabetic Retinopathy found the risk of the stroke was six times higher in patients with PDR, and the risk of stroke mortality was double compared to patients without PDR.

Ultimately, the need to educate our patients about stroke risk and signs of stroke should be taken on a patient-by-patient basis and depends on patient personality as well as doctor comfort. Older patients with multiple vasculopathies who are not compliant with their medications are likely better candidates for education compared to relatively younger and healthier individuals who are more compliant with their treatments.

Overall, the role of ophthalmologist can be paramount in detecting current stroke as well as preventing future

incidents. With the majority of at-risk patients poorly educated about the signs of stroke as well as the need for urgent care when it occurs, we can help our patients to recognize these signs and to act appropriately.

**REFERENCES**

1. Rosamond W, Flegal K, Furie K, et al. Heart disease and stroke statistics-2008 update: a report from the American Heart Association Statistics Committee and Stroke Statistics Subcommittee. *Circulation*. 2008 Jan 29;117(4):e25-2146.
2. Bull DA, Fante RG, Hunter GC, et al. Correlation of ophthalmic findings with carotid artery stenosis. *J Cardiovasc Surg (Torino)*. 1992 Jul-Aug;33(4):401-6.
3. Lawrence PF, Oderich GS. Ophthalmologic findings as predictors of carotid artery disease. *Vasc Endovascular Surg*. 2002 Nov-Dec;36(6):415-24.
4. Klein R, Klein BE, Jensen SC, et al. Retinal emboli and stroke: the Beaver Dam Eye Study. *Arch Ophthalmol*. 1999 Aug; 117(8):1063-8.
5. Chang YS, Jan RL, Weng SF, et al. Retinal artery occlusion and the 3-year risk of stroke in Taiwan: a nationwide population-based study. *Am J Ophthalmol*. 2012 Oct;154(4):645-52
6. Cooper LS, Wong TY, Klein R, et al. Retinal microvascular abnormalities and MRI-defined subclinical cerebral infarction: the Atherosclerosis Risk in Communities Study. *Stroke*. 2006 Jan;37(1):82-6
7. Klein R, Klein BE, Moss SE, Cruickshanks KJ. Association of ocular disease and mortality in a diabetic population. *Arch Ophthalmol*. 1999 Nov;117(11):1487-95.