Steroid injections may slow diabetes-related eye disease

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Researchers led by specialists at the Johns Hopkins Wilmer Eye Institute have found that injecting a corticosteroid, triamcinolone, directly into the eye may slow the progression of proliferative diabetic retinopathy, a complication of diabetes that frequently leads to blindness.

Authors of the study caution, however, that because use of steroids in the eye may increase the risk of glaucoma and cataract, laser photocoagulation remains the treatment of choice until further development of drugs that may reproduce the good effects of steroids, without the damage.

"Steroid treatment worked, but because of safety issues, cannot be recommended routinely at this time," says Neil M. Bressler, the James P. Gills Professor of Ophthalmology and chief of the Retina Division of the Johns Hopkins Wilmer Eye Institute, chair of the government-sponsored Diabetic Retinopathy Clinical Research Network. "It is a condition that can be treated safely and effectively with lasers."

The study, published in the December issue of the *Archives of Ophthalmology*, described and compared one of two treatments on 840 eyes from 693 men and women between July 2004 and May 2006. The subjects, about evenly divided between men and women with an average age of 63, had diabetic retinopathy with macular edema, a swelling of the central portion of the retina that's caused by leakage of fluid.

Proliferative diabetic retinopathy is marked by the growth of new and

unwanted blood vessels on the optic nerve in the back of the eye (which communicates information from the retina to the brain) or another area of the retina, the light-sensitive part of the eye. Despite advances in treating both diabetes and its complications, about 700,000 Americans have proliferative diabetic retinopathy and 63,000 new cases develop each year.

In the study, each patient's eyes were randomly assigned to receive either a laser treatment (photocoagulation) for diabetic macular edema or an injection (1 or 4 milligrams) of triamcinolone acetonide directly into the eye as often as every four months.

According to Bressler, lead author of the study, there was some evidence that steroids could improve vision outcomes from diabetic macular edema (DME), swelling of the center of the retina, the part of the retina used for reading or driving. Study results showed that steroids were not superior to laser treatments for DME.

"The primary objective of the study was to determine if steroids were superior to laser for DME, and if so, to balance that superiority with steroids' side effects. A secondary objective was to determine if the steroids affected the progression of diabetic retinopathy," adds Bressler. "Steroid treatments did reduce the risk of progression of diabetic retinopathy, but, not DME, which can also cause vision loss from proliferative diabetic retinopathy, bleeding in the middle cavity of the eye or scarring of the retina, which can detach the retina from the back wall of the eye."

The steroid injections were not superior to laser with respect to increasing the chance of improved vision and decreasing the chance of vision loss, the primary objective of a study reported in 2008. "However, there was evidence that steroids can affect the pathways that lead to the development of new blood vessels on the surface of the retina in

diabetes, a secondary objective of the study" says Bressler. "Controlling blood glucose levels can help prevent the development of retinopathy and laser treatments can reduce the risk of vision loss, but the identification of other treatments remains important."

Bressler and colleagues, in the Diabetic Retinopathy Clinical Research (DRCR) Network, discovered that after two years, retinopathy had progressed in 31 percent of 330 eyes treated with laser treatment, 29 percent of 256 eyes treated with 1-milligram doses of triamcinolone acetonide, and 21 percent of 254 eyes treated with 4-milligram doses. The differences appeared to be sustained at three years, even though most eyes in the triamcinolone groups did not receive injections every four months during the second year and less than half received any injections in the third year because there no longer was macular edema, or less commonly, because side effects from the injections precluded applying additional steroids when following the study's treatment protocol.

Bressler says the study suggests that corticosteroids interfere with the creation of new blood vessels by reducing the production of compounds that spur their growth and cautions that steroids are also associated with other eye diseases. "Researchers now need to find ways of using the steroid effect on these blood vessels for treatment, but, not at the expense of causing glaucoma and the side effects of cataract formation or worsening of cataracts which could lead to the need for a patient to undergo cataract surgery."

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