FACT SHEET

Diabetic Retinopathy

NATIONAL INSTITUTES OF HEALTH

Yesterday

- Thirty years ago, diabetes mellitus affected about 5 million Americans. Diabetic retinopathy was a frequent, blinding complication of the high blood sugar levels that characterize diabetes.
- Diabetic retinopathy was responsible for about 20 percent of new cases of blindness between the ages of 45 and 74.
- Half of the nearly one million patients who developed severe diabetic retinopathy went blind within 5 years of diagnosis.
- Researchers did not yet recognize the need for intensive glucose control to delay or prevent the complications of diabetes. Also, the importance of blood pressure control in preventing complications was not established.
- Diabetic retinopathy lacked safe and effective treatments, condemning patients to progressive loss of their vision and independence.
- The only available treatment, destruction of the pituitary gland, an aggressive and controversial surgical procedure that caused many complications, had fallen out of favor.
- Laser treatment to prevent neovascularization, the abnormal blood vessel growth that defines the condition, was becoming more widely used but it was unknown whether this treatment was truly effective in preventing vision loss.

Today

- Thanks to a series of landmark clinical trials sponsored by the NIH, people with diabetes can now control their disease better and greatly reduce their risk of developing the many complications that result from poorly controlled diabetes.
- The Diabetes Control and Complications Trial showed that blood glucose control dramatically delays or prevents diabetic retinopathy and other complications in people with type 1 diabetes. The benefits in reduced eye complications extend for years with early diabetes control.
- Another NIH-supported trial showed that lowering blood glucose and blood pressure levels in people with type 2 diabetes reduces the risk of diabetic retinopathy and other diabetes complications.
- The recent Action to Control Cardiovascular Risk in Diabetes (ACCORD) Eye Study (http://www.nei.nih.gov/news/pressreleases/062910.asp) found that intensive control of blood glucose levels with combination lipid therapy (statin and fibrate) reduced diabetic retinopathy disease progression in patients with type II diabetes.
- Clinical trials also established the value of vitrectomy for patients who experience bleeding in the vitreous, the clear, jelly like substance inside the eye. Vitrectomy allows surgeons to remove blood that often occludes vision.
- In an early NIH trial, timely treatment with laser therapy and appropriate follow-up care was established as an effective regimen to prevent vision loss.
- More recently, NIH researchers discovered that abnormal blood vessel growth, which invades the retina to cause blindness, is spurred by a protein called vascular endothelial growth factor (VEGF). Based on this finding, a class of anti-neovascular drugs has been developed to block the activity of the VEGF protein.
- A 2010 clinical trial evaluating Lucentis, an anti-neovascular drug, combined with timely laser treatment significantly improved vision in patients with diabetic macular edema, a complication of diabetic retinopathy. This is the first sight-restoring therapy for diabetic eye disease.
- With laser treatment and vitrectomy for diabetic retinopathy, blindness has been was reduced by 90 percent in patients with severe diabetic retinopathy.

- This dramatic improvement in the nation's eye health has dramatically reduced the economic burden associated with blindness and disability and significantly improved the quality of life for the millions of Americans with diabetic retinopathy.

Tomorrow

The NIH is poised to make major discoveries in the diagnosis and treatment of diabetic retinopathy.

- Investigators are exploring the utility of several anti-neovascular agents, alone and in combination, to further improve treatment of the disease.
- Currently, anti-neovascular agents are delivered through eye injections that require frequent administration. Efforts to provide more continuous and more tightly controlled delivery of these agents through gene transfer and implantable drug delivery devices are being explored.
- In preliminary studies, bone marrow-derived stem cells stabilized the vasculature of an animal model of neovascularization. These studies offer proof of concept that stem cell therapies may provide benefit for diabetic retinopathy.
- NIH researchers have developed a high resolution imaging technology called optical coherence tomography (OCT) that allows clinicians to definitively diagnose diabetic retinopathy in its earliest stage. This imaging technology will eventually become a standard diagnostic tool.
- Much of the research responsible for the dramatic reduction in blindness associated with diabetic retinopathy relied on large-scale, multi-center clinical trials. Moving forward, the NIH recently established the Diabetic Retinopathy Clinical Research Network, (DRCR.net) (http://drcrnet.jaeb.org/ViewPage.aspx?PageName=Home_Page). This collaborative group of clinicians from around the country is able to quickly recruit the thousands of patients needed to test new treatments in clinical trials, thus allowing promising research to move quickly from the laboratory to the clinic.
- Federally-sponsored health education programs will continue to inform patients and the public about ways to improve the treatment and outcomes for people with diabetes, to promote early diagnosis, and to prevent or delay the onset of diabetes, and thus reduce the burden of diabetic retinopathy and other complications.

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