VISUAL COMPLICATIONS

The leading cause of blindness in American adults is diabetic retinopathy, a common consequence of microvascular disease in people with diabetes. The small blood vessels supplying the retina are particularly vulnerable to hyperglycemia. Over time, chronic hyperglycemia leads to progressive occlusion of these vessels, as well as microaneurysms (which are outpouchings of weakened vessel walls). Both of these can be damaging to one's sight. Microaneurysms can lead to leakage of lipid and protein material, so-called “hard exudate”. In addition, there can be macular edema and subsequent moderate vision loss. Vessel occlusion can cause retinal ischemia, which in turn promotes neovascularization, the body's attempt to restore perfusion to the retina. Unfortunately, the newly generated vessels are prone to bleeding, which results in hemorrhages. All these processes – leakage of lipid and protein, macular edema, and hemorrhages – cause prolonged vision loss. In addition, the scarring that takes place after neovascularization may actually lead to retinal detachment and permanent loss of vision.

More information about the pathophysiology, evaluation, and management of diabetic retinopathy is discussed in the following articles:


History:
The history of patients with diabetic retinopathy may range widely, from being asymptomatic in individuals who present for routine checkups, to quite worrisome, with complaints of acute onset of blurry vision or even sudden blindness.

Physical Exam:
Certain features that are observed in the fundoscopic exam are used to divide diabetic retinopathy into two different stages: nonproliferative (or “background”) retinopathy and proliferative retinopathy. The key features of nonproliferative retinopathy include microaneurysms and hard exudates (see Figure 1). As its name implies, this stage of the disease does not involve neovascularization. Proliferative retinopathy, on the other hand, does involve neovascularization, as well as the presence of several hemorrhages because of the fragility of these new vessels (see Figure 2).

Tests:
Direct ophthalmoscopy by a well-trained person (typically an ophthalmologist or optometrist) is the best method for detecting diabetic retinopathy.

Treatment:
Strict glycemic control is very effective in not only preventing retinopathy, but also in slowing its rate of progression. Unfortunately, glycemic control shows little or no benefit in people with advanced retinopathy, demonstrating that it is critical for physicians to screen for the disorder early and emphasize the importance of glycemic control to their patients.

Pharmacological therapy may also be useful in treating diabetic retinopathy. Because both hypertension (which increases the risk of hemorrhage) and ischemia contribute to the progression of diabetic retinopathy, anti-hypertensive and anti-platelet drugs may be indicated.

In advanced retinopathy, photocoagulation (laser therapy to halt neovascularization) and vitrectomy (removal of the vitreous humor of the eye) may be indicated.

More information about current treatments for diabetic retinopathy is discussed in the following article:

Self Assessments:
All of the following components of diabetic retinopathy are correctly paired with their corresponding features, EXCEPT:

A. Neovascularization: hemorrhages  
B. Hard exudates: lipids and proteins  
C. Microaneurysm: thickened vessel walls

Explanations:
A. Incorrect. The new vessels resulting from neovascularization are very fragile and thus are prone to hemorrhage.  
B. Incorrect. Together, the plasma lipids and proteins that escape through the vessel wall in microaneurysms compose hard exudate.  
C. Correct! Microaneurysms are outpouchings of weakened vessel walls, not thickened vessel walls.

The most beneficial intervention for preventing diabetic retinopathy is:

A. Strict glycemic control  
B. Vitrectomy  
C. Photocoagulation

Explanations:
A. Correct! Strict glycemic control has been proven to not only slow the rate of progression of diabetic retinopathy, but also to prevent retinopathy altogether. Thus, the benefits of glycemic control must always be emphasized by the physician.  
B. Incorrect. Although vitrectomy is helpful in the treatment of advanced retinopathy, it has no application in the prevention of the disease.  
C. Incorrect. Although photocoagulation is helpful in the treatment of advanced retinopathy, it has no application in the prevention of the disease.