

Diabetic Complications and How to Avoid Them

By Philip R Nicol MD

Strictly speaking, any medical problem that develops as a result of having Type I or Type II Diabetes, should be labeled a diabetic complication. However, it has become a convention when referring to diabetic complications, to limit the discussion to three areas. These are diabetic retinopathy (eye disease), diabetic nephropathy (kidney disease) and diabetic neuropathy (nerve damage). Other issues such as heart disease, stroke, high blood pressure and lipid abnormalities are usually addressed in discussions centering around the cardiovascular problems of diabetics.

One of the reasons that we lump eye disease, kidney disease and nerve damage together is that all three share common underlying mechanisms, which result in their occurrence. Each organ in the body is made up of specialized cells adapted to perform specific functions unique to that organ. For instance the cells of a peripheral nerve are able to conduct a nervous impulse from the toe to the brain. They cannot perform functions required to produce vision. Similarly, the cells in the portion of the kidney that exchange substances between blood and urine are not able to conduct a nervous impulse.

However, whenever any of these specialized cells is subjected to continuous high levels of blood sugar, the proteins in the cell undergo alterations in their structure. These alterations affect the ability of the cell to perform its normal functions which, in turn, prevents the whole organ from behaving normally. The changes, which occur in each of the specialized cells, are often very similar, regardless of the location. Therefore, the same mechanism that damages a peripheral nerve cell leading to numbness in the feet, may damage a cell on the back of the eye leading to vision problems.

It follows that correcting the underlying problem of exposure to high blood levels would be expected to reduce the occurrence of all three diabetic complications, given that they are all caused by the same mechanism, and that is exactly what we see in patients. Large studies of diabetics have shown us that tight blood sugar control reduces the incidence of all three of these complications.

There are several different eye problems commonly seen in diabetics. Cataracts are commoner, glaucoma (high pressure inside the eye) is commoner and macular degeneration is commoner. The term “diabetic retinopathy” encompasses many different problems recognized by the eye doctor, which occur on the back portion of the eye known as the retina. In the earlier stages of diabetes these changes do not have a serious effect on vision. They provide the eye doctor with clues that all is not well in the control of the patient’s sugar levels and they provide the patient with an opportunity to tighten things up before irreversible damage occurs.

Later on, if diabetic control is not improved, the retina develops the changes known as “proliferative diabetic retinopathy”. The hallmark of this stage of disease is the development of clusters of brand new blood vessels in areas of the retina. Unfortunately, these new blood vessels are not as robust as a normal blood vessel in other parts of the body. Their walls may be very thin. They rupture very easily and when they do, blood leaks out and damages an area of the retina resulting in loss of vision. If the bleeding is extensive, the resulting loss of vision can be catastrophic. When the eye doctor sees these vessels, he or she will often recommend laser treatment. The laser beam destroys the new vessels and prevents the possibility of future hemorrhage. Many diabetics undergo multiple laser treatments throughout their lives, due to an inability to get their blood sugars stable enough to prevent the formation of new areas of proliferative retinopathy. Despite requiring multiple treatments, vision is often preserved for many years. This is in stark contrast to the era prior to laser treatment, when patients would often go blind after a very few episodes of bleeding which caused permanent damage to the retina.

An important clinical trial published in 1993, The Diabetes Control and Complications Trial, showed that if a diabetic is able to achieve tight control of blood sugar, the incidence of diabetic retinopathy can be reduced by 76%. To some degree this payoff can also be seen in the other two complications, neuropathy and nephropathy. In my clinical practice, I often see patients whose kidney function improves, or whose foot numbness improves, after their sugar control has improved for an extended period of time.

The message is that all the hard work with multiple fingersticks, pills, injections and visits to the doctor, does pay off over time. Good control means fewer complications.

I shall review the other two diabetic complications, neuropathy and nephropathy, in the next two months articles.

*Dr Philip Nicol is the Director of **The Diabetes Center**, the only medical practice in the region devoted solely to the care of diabetics. Dr Nicol has received recognition from The Diabetes Physician Recognition Program, a joint program of the NCQA and ADA, for the period March 2005 through February 2008, for providing quality care to diabetic patients. The Center offers free, no obligation, screening for diabetes and pre-diabetes Monday-Friday. To contact Dr Nicol, or to schedule a free screening, call 843-293-8400.*