



Report in Diabetic Macular Edema

Navya Nuthal*

Department of Ophthalmology, Vignan collage of pharmacy, Hyderabad, India

*Corresponding author: Navya Nuthal, Department of Ophthalmology, Vignan collage of Ophthalmology, Hyderabad, India, E-mail: nuthal_n@gmail.com

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Description

The most relevant risk factors for the development of DR are disease duration, a poor glycemic control (high HbA1c levels), and the presence of hypertension. Other risk factors for DR include higher body mass index, puberty and pregnancy, as well as cataract surgery.

There is robust evidence regarding the relationship between blood glucose levels and the development and progression of DR. Intensive versus conventional glycemic management was associated with a 39% reduction in the risk of laser photocoagulation in the type 2 diabetic population of the UKPDS. Tight versus less tight glycemic control in the type 1 diabetic population of the Diabetes Control and Complications Trial (DCCT) reduced the risk of new retinopathy by 76% and of the progression of existing retinopathy by 54%. Recently, it has been reported that keeping the HbA1c level below 7.6% (60 mmol/mol) as a treatment target seems to prevent proliferative DR for up to 20 years in type 1 diabetic patients. Serum lipids seem to have less influence in the development of proliferative DR or Diabetic Macular Edema (DME). However, increasing evidence supports the idea that nontraditional lipid measures (for example, apolipoproteins A and B) are stronger risk markers of DR than total cholesterol and triglyceride levels.

Diabetic Macular Edema

The relationship between hypertension and DR is also well established. The UKPDS showed that after 9 years of follow-up, the group assigned to tight blood pressure control had a 34% reduction in risk in the proportion of patients with deterioration of retinopathy by two steps ($p = 0.0004$) and a 47% reduced risk ($p = 0.004$) of deterioration in visual acuity by three lines of the ETDRS chart. A recent cross-sectional population-based study (13,473 subjects) showed that hypertension was an independent risk factor for both mild-to-moderate DR and sight-threatening DR. Control of blood pressure to a level of $<140/90$ mm Hg is recommended under the Joint National Committee 8 regulations. Best current evidence from the ophthalmology literature does not suggest any benefit to altering this recommendation for patients with confirmed DR.

Risk Factor

Circulating cytokines, which are increased in type 2 diabetic patients, could also increase the vascular leakage but their contribution to the DR and DME development remains uncertain. In this regard, it should be noted that the local synthesis by the retina, mainly retinal pigment epithelium and glial cells, is the main source of

proinflammatory cytokines. For this reason, intraocular rather than systemic anti-inflammatory agents, such as corticosteroids, are effective in the treatment of DME.

Despite of the influence in the development and progression of the abovementioned risk factors, clinical studies on diabetic patients reveal a substantial variation in the onset and severity of DR that is not fully explained by the known risk factors, and all clinicians are aware that a subset of patients with poor control of glycemia and uncontrolled blood pressure do not develop DR. On the other hand, there are patients with very good control of blood glucose levels and without hypertension that will develop DR. In fact, the DCCT/EDIC Research Group showed that HbA1c values explained up to 11% of the risk of DR and that the unexplained 89% of variation in risk is due to elements of the diabetic milieu not captured by the mean HbA1c value.

These data suggest that other factors play an essential role in accounting for the susceptibility to the development of this late diabetic complication. In this regard, heritability estimates ranging from 25 to 50% have been reported for proliferative DR. Indeed, the study of identical twins found a concordance for DR (68% in type 1 and 95% in type 2 diabetes). In the DCCT cohort, the odds ratio for severe retinopathy when a relative had retinopathy was 3.1. Similar findings have been replicated in other familial risk studies.

Studies from Western Pacific region report that low education level, increase in cerebrospinal fluid pressure, and short axial length are independent risk factors for DR, which was not reported in other studies. Madiabetes cohort study reported a unique factor which was not observed in other studies that use of aspirin is an independent predictor of DR as they noticed that patients who developed DR have used aspirin in a higher percentage than those who did not develop DR. Studies from South-East Asia and Africa report that middle and upper socioeconomic status groups and those subjects living in urban areas were at higher risk of developing DR.

The occurrence of DR is more in diabetics who take low fiber diet in comparison with people who take high fiber diet (20% vs. 15%). People with suboptimal glycemic control ($HbA1c > 7$) have more risk for having DR and those with poor control ($HbA1c > 8$) also had more risk of sight-threatening retinopathy. Abnormal serum lipids (especially serum cholesterol and low-density lipoprotein cholesterol) have more role in DME (both in center involving and center not involving DME). People with a combination of suboptimal control (blood sugar, blood pressure, and lipids) have greater risk of both retinopathy and sight-threatening retinopathy. Nearly, 1 in 3 diabetics with suboptimal control have retinopathy. If a person has early nephropathy (presence of microalbuminuria) he has two times more risk of retinopathy. If he has advanced nephropathy (albuminuria) he has six times more risk of retinopathy. Anemia is more prevalent in India, more so in women and has two times more risk of developing retinopathy.

This would imply approximately 2 million diabetics who would have STDR depicts the projections for a number of new cases of DR in India, based on a census of India 2011 and incidence and progression of DR based on SN-DREAMS urban data. India ranks third in the world in the number of Internet users by volume. In addition, 70% has access to mobile phones, and 39% of them live in rural areas. Teledensity has increased from merely 12.1% to 73.3%, a growth of 600%, during the past 5 years.

