Table 1. Classification of retinal lesions of diabetic retinopathy.

A. Non-proliferative (Background diabetic retinopathy)
   - Microaneurysms
   - Intraretinal haemorrhages
   - Hard exudates

B. Pre-proliferative diabetic retinopathy
   - Intraretinal microvascular abnormalities (IRMAs)
   - Venous dilatation, venous beading, loop formation
   - Soft exudates (Cotton-wool spots)
   - Deep round haemorrhages

C. Proliferative diabetic retinopathy
   - Neovascularization at the optic disc
   - Neovascularization elsewhere at the retina
   - Preretinal haemorrhage or vitreous haemorrhage
   - Preretinal fibrosis ± tractional retinal detachment

A precise definition of a patient’s “diabetic retinopathy level” is critical because there is a varying risk of progression to proliferative diabetic retinopathy depending on the specific non-proliferative “diabetic retinopathy level”.

The first clinical signs of diabetic retinopathy are microaneurysms, which are saccular outpouchings of retinal capillaries (Figure 1). Ruptured microaneurysms, decompensated capillaries and intraretinal microvascular abnormalities (IRMAs) result in intraretinal haemorrhages. Hard exudates are depositions of lipid-rich proteins within the retina after the breakdown of the blood-retinal barrier.

Intraretinal microvascular abnormalities (Figure 2) represent either new vessel growth within the retina or, more likely, pre-existing vessels with endothelial cell proliferation that become “shunts” through areas of nonperfusion. IRMAs may be seen adjacent to soft exudates (cotton-wool spots). Multiple IRMAs mark a severe stage of non-proliferative diabetic retinopathy, and frank neovascularization is likely to appear on the surface of the retina or optic disc within a short time.

Venous calibre abnormalities are indicators of severe retinal hypoxia. These abnormalities can be venous dilatation, venous beading, or loop formation.

There are often large areas of nonperfusion adjacent to these veins. Cotton-wool spots are fluffy white spots in the inner retina that represent infarcts of the nerve-fibre layer.

Proliferative diabetic retinopathy is marked by proliferating endothelial cell tubules. The rate of