

Treatment of Hard Macular Exudates in Diabetic Retinopathy

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Exudative diabetic maculopathy is a frequent cause of visual deterioration in patients with diabetic retinopathy and represents a form of diabetic macular edema (DME), which is derived from leaking retinal vessels. As the extracellular fluid that accumulates within the retina is reabsorbed into the retinal capillaries, the deposition and localized collection of large molecules that cannot be removed causes the clinical picture of plaque-like hard exudates.

Hard exudates are composed of lipid and proteinaceous material that settle in the outer retinal layers. These plaques often cause significant visual loss when deposited in the foveal region.

Until now, there have been no treatment guidelines for this pathology, and unfortunately, hard exudates have often gone unresolved with scant or no recovery for the patient.

Glycometabolic compensation alone is insufficient for clinical improvement. Cases of spontaneous resolution of plaque-like hard exudates have been described. A long period of time (months), however, is required for spontaneous resolution and direct and definitive damage to photoreceptors can occur during this waiting period. Furthermore, the accumulation of plaque-like hard exudates near the retinal pigment epithelium (RPE) can provoke a focal alteration (most likely metaplasia) of the RPE itself that can be the basis for macular scar formation, similar to that which occurs with laser treatment.

The unfavorable prognosis in eyes with these hard exudates that are treated with either laser or observation has spurred the development of alternative treatment options such as surgical excision.

SURGICAL EXCISION OF HARD EXUDATES

The removal of the vitreous body and the posterior hyaloid has yielded minimal results because exudative plaque is localized within the retina.

Subsequently, the transretinal approach was considered as a possible therapeutic solution with the rationale that although exudates initially deposit within the external retinal layers, those that cause the most significant visual damage accumulate in the subretinal space. Therefore, retinotomy with a gentle washout under the retina was suggested as the most effective approach.

Takagi et al¹ and Sakuraba et al² first performed this surgical procedure and reported encouraging short-term results. Takaya et al,³ however, demonstrated that the surgical removal of hard exudates fails to provide long-term functional vision improvement.

The rationale for surgical intervention has expanded from the concrete removal of the lipoproteinaceous material via washout of exudates to include the removal of vascular endothelial growth factor (VEGF) and other cytokines that play a key role in the pathogenesis of the diabetic macular edema and exudation. This was demonstrated also by immunohistochemical studies,¹ which found VEGF on samples of surgically removed hard exudates.

SURGICAL COMPLICATIONS

Although surgery is a therapeutic alternative, it is associated with intra- and postoperative complications. Takaya et al³ described a case of iatrogenic macular hole that occurred during the surgical procedure, most likely due to the thinning and degeneration of retinal macular tissue that had become fragile in the presence of exudation plaque. They also reported one case of a self-repaired choroidal detachment and one case of vitreal and subretinal hemorrhage that required a second vitrectomy procedure.

DECISIONS IN INTERVENTION

Considering the risks of vitreoretinal surgery and weighing these against the fact that there are no therapeutic alternatives to removing hard exudates, it is our



Figure 1. Hard exudates, seen on fundus and OCT imaging.

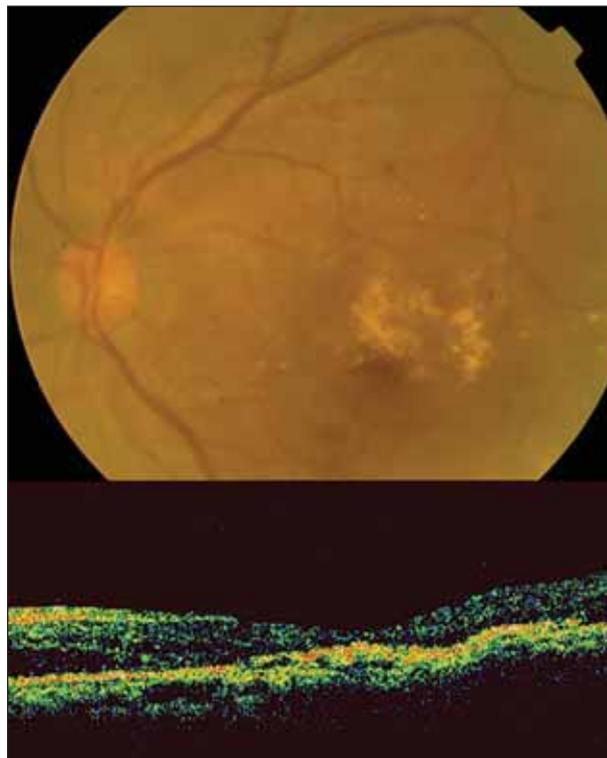


Figure 2. In postoperative fundus and OCT imaging, the exudative mass has cleared.

opinion that it is appropriate to proceed with surgery for this indication. We, of course, consider the clinical status of the patient and make our decisions based on whether we find surgery appropriate for a given individual. For example, it is fundamental to examine not only the condition of the affected eye, but also of the contralateral eye. It is also important to consider the systemic health of the patient.

Determining the best timing for surgery is difficult. It is our recommendation that it is appropriate to proceed with submacular surgery when exudates begin to accumulate under the fovea. The aim is to avoid the well-known irreversible damage of retinal tissue due to plaque-like exudation.

It has been statistically proved³ that the functional prognosis correlates with the extent of plaque exudation and glycometabolic compensation, estimated either as glycosylated hemoglobin or as glycemic control.⁴

CASE REPORT

A 50-year-old man presented to our clinic with hard exudates, seen on fundus and optical coherence tomography (OCT) imaging (Figure 1).

We performed a standard three-port pars plana vitrectomy and we removed the posterior adherent cortical

vitreous with vitrectomy suction; through a small retinotomy and with subretinal infusion, we created a macular detachment, and the hard exudates were gently washed out. After removal, a fluid-gas exchange was performed to reattach the retina. Laser was applied around the retinotomy at the end of surgery.

On postoperative fundus and OCT imaging, the exudative mass has cleared (Figure 2). Visual acuity improved from 1/50 to 1/10. ■

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