

# SYMPOSIUM: DIABETIC MACULAR EDEMA

Moderators: Stephen Sinclair, Martine Mauget-Faysse, Silvia Bopp, Ferenc Kuhn

Tuesday, September 14, 2004 ; 8:00 - 3:10



## Intravitreal triamcinolone application in diabetic eyes: rationales, indications and mode of action

*Author: Silvia Bopp, MD, Klaus Lucke, MB ChB, Augenklinik Universitätsallee, Bremen, Germany*

### **Purpose:**

To demonstrate possible indications for intravitreal triamcinolone acetonide (TA) injections in diabetic eyes, and to contribute to the understanding of triamcinolone-induced resolution of diabetic macular edema.

### **Introduction:**

Corticosteroids show a broad spectrum of pharmacologic effects, such as anti-inflammatory/anti-edematous, angiostatic and anti-proliferative activities. In recent few years, intravitreal injection of crystalline TA has become a therapeutic option for diabetic macular edema. However, randomized clinical studies on its effectiveness are not available, and specific indications for therapy remain under debate. Based on theoretical considerations and clinical observations, TA may be used in various clinical situations. Possible indications in diabetic eyes are presented. Furthermore, mechanisms for resolution of retinal edema in diabetic retinopathy, based on FAG- and OCT-findings, are suggested.

### **Methods:**

Clinical situations, in which intravitreal TA may be applicable: 1. Eyes with refractive diabetic macular edema ( $\pm$  prior focal laser treatment) o TA selectively. 2. Eyes with clinically significant macular edema (CSME) and advanced cataract o simultaneous phaco/IOL and TA. 3. Eyes with proliferative diabetic retinopathy (PDR) and concurrent CSME o vitrectomy and TA. 4. Vitrectomy eyes that undergo extensive surgical maneuvers and massive laser o surgery and TA. Ophthalmoscopic images, the angiographic pattern and cross-sectional OCT scans were correlated and pre-/post findings will be demonstrated.

### **Results:**

1) Regression of macular edema and an angiographically improved blood-retina barrier (BRB) were characteristic features. Some eyes failed to respond to treatment, particularly those that had advanced microvascular changes (complex findings with multiple microaneurysm, hemorrhages, capillary dropouts, hard exudates). 2) Eyes with preexisting CSME that were at a high risk to develop cystoid reaction (Irvine Gass) or progression of diabetic microangiopathy did not show this complication when treated with TA during cataract surgery. 3) A significant number of eyes that underwent vitrectomy for diabetic complications and had coexisting clinically CSME showed an improved macular situation. In comparison to vitrectomy alone, the positive effect on macular edema seemed to be more pronounced. 4) Selected eyes that had extensive surgical maneuvers or aggressive coagulation treatment and were at risk to develop severe inflammatory reaction (fibrin formation, chronic BRB breakdown) received TA at the end of surgery. Postoperatively, we found unusually calm eyes with a mild degree of intraocular inflammation only. Most striking FAG phenomenon was a reduced leakage in late-phase angiogram indicating a restoration of the blood-retina barrier. Ophthalmoscopically, macular thickening diminished and hard exudates, if present, slowly resolved. Eyes responded differently to the drug: OCT showed, that some eyes with large cystic spaces showed complete restoration of the retinal architecture and foveal contour, but others

had incomplete resolution of edema with intraretinal cysts persisting. Leakage as shown by FAG, however, was reduced significantly in both situations. Some eyes also showed improvement of microvascular changes suggesting that TA may have an anti-angiogenic and anti-proliferative effect as well.

### **Conclusion:**

In diabetic eyes, intravitreal corticosteroids can control CSME, improve a compromised BRB and prevent progression of diabetic maculopathy. However, regression of CSME is not always accompanied by visual improvement and may be transient with recurrences occurring. Stabilization of the BRB and resolution of fluid may be related to the anti-inflammatory and anti-edematous effect of corticosteroids. Improvement of microvascular alterations indicates an angiostatic effect as well.

### **Take-home message:**

The broad mode of action that corticosteroids have, can be utilized in various clinical situations. Either as an exclusive therapy or in combination with other treatment options, such as vitrectomy, TA may be a useful adjunct to improve diabetic macular edema and to control diabetic complications. Since TA application is no causative therapy, its effect may be transient. The pharmacological mode of action in eyes with in diabetic microangiopathy is not exactly known, but clinical, FAG and OCT-findings indicate that TA target on various pathologic mechanisms.

