

# Microaneurysms Formation Rate as a Predictor of DR Progression to CSME Needing Photocoagulation in Nonproliferative Retinopathy in Diabetes Type 2

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## Purpose

Retrospective study to analyze the relation between MA turnover, obtained from the initial period of 2 years of follow-up with a semi-automatic method (“MA-Tracker”) based on color fundus photographs (CFP) and DR progression to CSME in the following 8 years.

## Methods

### Patients & Study design

**Study design** Retrospective study of 10 years of follow-up.

### Patients Selection

113 eyes / patients;  
Type 2 diabetes and mild NPDR.

### 10 years of Follow-up

- First 2 years – characterization period  
Ophthalmological examinations + CFP every 6 months.
- Next 8 years  
Ophthalmological care in the same institution.

### Examinations

#### Ophthalmological Examination

BCVA / Biomicroscopy / Intra-Ocular Pressure / Fundoscopy  
CFP – Kowa fundus camera – 50° fov.

#### Systemic Examination

Metabolic control - HbA<sub>1c</sub> (%) levels; Blood Pressure levels - medicated when > 130/80 mmHg; Lipid levels.

### CSME

Graded according the ETDRS protocol with established need for laser photocoagulation.

## Data Analysis

Parameters in the first 2 years of the follow-up were compared between patients that developed CSME and patients that did not develop CSME during the following 8 years of follow-up.

### Parameters collected in the first 2 years:

- Age and Diabetes duration
- HbA<sub>1c</sub> / BP / CH / HDL / LDL / TG
- Microaneurysm Turnover – formation (MAFR) / disappearance (MADR) rates

Assessed with the “MA-Tracker” – a semi-automatic method that assists the grader to earmark MAs on CFP.

### Statistical and Data Analysis

Non-parametric tests – Mann-Whitney and Chi-Square tests – were used to test for statistical significant differences between CSME and non-CSME eyes.

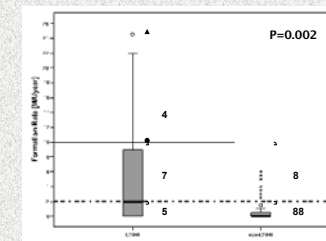
## Results

Over the 10 years of follow-up period, 17 patients (15.0%) developed CSME (between the 4<sup>th</sup> and the 10<sup>th</sup> year) and 96 patients (85.0%) did not develop CSME.

CSME patients presented a higher HbA<sub>1c</sub> level at baseline and a higher MA turnover in the characterization period.

		CSME (n=17)	non-CSME (n=96)	P
MA Turnover [MA/Year]	Formation Rate	9.2 ± 18.2	0.5 ± 1.2	<0.001
	Disappearance Rate	7.5 ± 16.6	0.5 ± 1.2	

12 out of the 17 (70.6%) eyes with CSME, needing photocoagulation, presented a MAFR over 2 MA/year in the characterization period.



- Sensitivity: 70.6%
- Specificity: 91.7%

## Conclusions

A high MA formation rate earmarked on color fundus photographs appears to be a good predictor of DR progression to CSME in type 2 diabetic patients with nonproliferative retinopathy.

## RetmarkerDR – MA-Tracker is now fully automated



Since Spring 2009, MA-Tracker is commercially available as a fully automated software - RetmarkerDR (www.retmarker.com).

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