

# Laser photocoagulation in DME Still exist?

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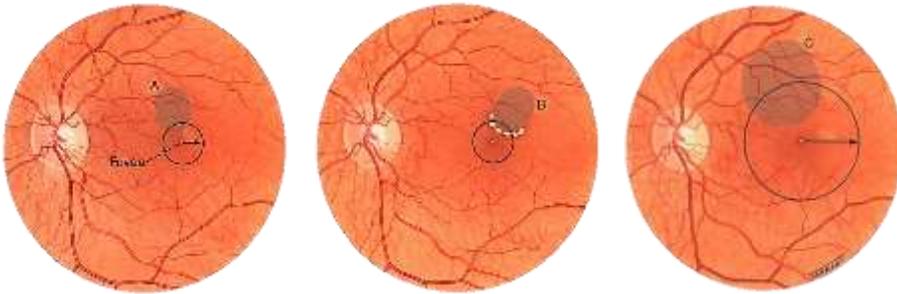


Rationale of visual improvement

# ETDRS

n: 3928

Macular focal/grid photocoagulation reducing the risk of moderate vision loss by 50% in CSME



# ETDRS

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Macular focal/grid photocoagulation reducing the risk of moderate vision loss by 50% in CSME

this effect persists for 3 years follow up  
3% VA gain of 3 or more lines

## ETDRS

n: 3928

Macular focal/grid photocoagulation reducing the risk of moderate vision loss by 50% in CSME

**Gold Standard for ttt DME**

## DRCR.net protocol A

n: 263

Using OCT to show the efficacy of modified ETDRS laser protocol in decreasing central macular thickness at 12 months and comparing it to a mild macular burn protocol

**Modified ETDRS protocol  
should continue as Standard  
for ttt DME**

## DRCR.net protocol B

Macular focal/grid laser photocoagulation was more effective and with fewer side effects than IVTA at 2 and 3 years follow up.

## Mechanism

### *Focal laser*

reduce the leakage from the microaneurysm by direct occlusion of the lumen

### *Grid laser*

Decreasing the oxygen demands

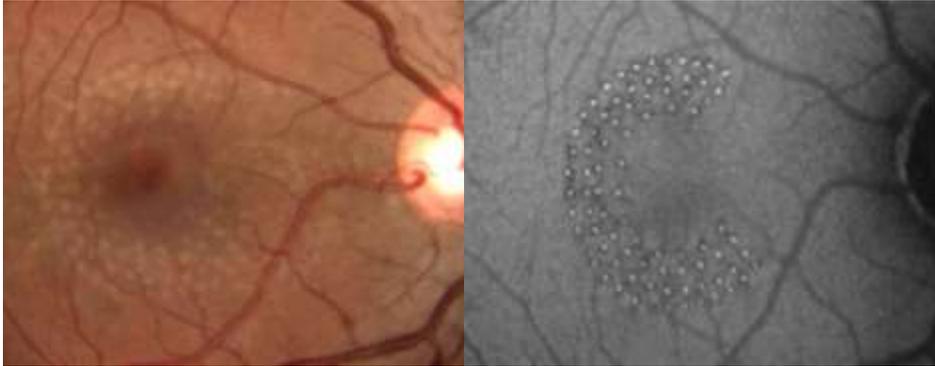
increased oxygenation of the retina through the laser scar

restoration of new RPE barrier by spreading in small lesions and by proliferation in larger lesions, release cytokines, bTGF, PEDF

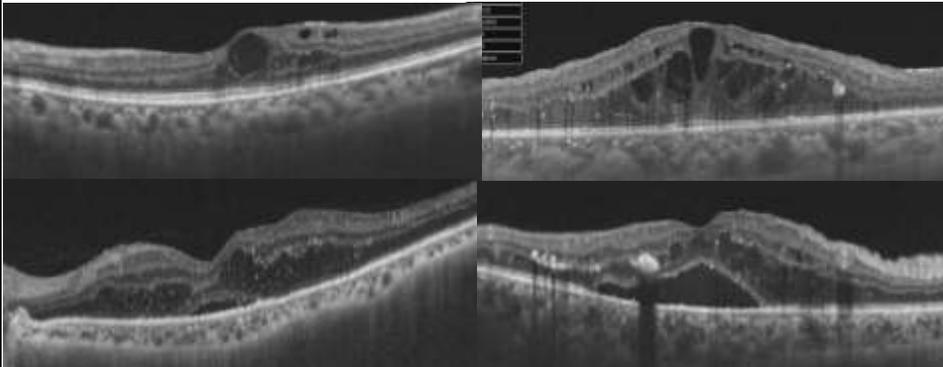
autoregulation with 2ry decrease in retinal blood flow and consequent decreased edema

In diffuse type is questionable

70% showed stable V/A in 1 year follow up  
15% showed improvement  
15% showed worsening of vision



Center involved DME



ERA of AntiVGEF

## LASER as ADJUVANT therapy

### READ-2 Study

n: 126

3-year outcomes of combination therapy showed the greatest CMT reduction, greater VA change than laser but no ranibizumab, and fewer injections needed than ranibizumab monotherapy.

## LASER as ADJUVANT therapy

### DRCR.net protocol I

n: 854

IV Ranibizumab with prompt or deferred (24 ws) laser is more effective compared with prompt laser alone for the treatment of DME involving the central macula

Most eyes maintain vision gains obtained by the first year through 5 years.

## LASER as ADJUVANT therapy

### DRCR.net protocol I

IV Ranibizumab with prompt or deferred laser is more effective compared with prompt laser alone for the treatment of DME involving the central macula

deferring focal/grid laser may be associated with a greater chance of relatively larger improvements in visual acuity through five years compared with prompt laser with IV ranibizumab especially among those eyes with worse visual acuity at baseline

## LASER as ADJUVANT therapy

### DRCR.net protocol I

IV Ranibizumab with prompt or deferred laser is more effective compared with prompt laser alone for the treatment of DME involving the central macula

over half of eyes where laser treatment is deferred require more injections when following this protocol.

## LASER as ADJUVANT therapy

### REVEAL Study

Although not statistically significant, combination therapy (Ranibizumab+laser) achieved better outcomes in terms of anatomical resolution of edema, with slightly less injections needed.

## LASER as ADJUVANT therapy

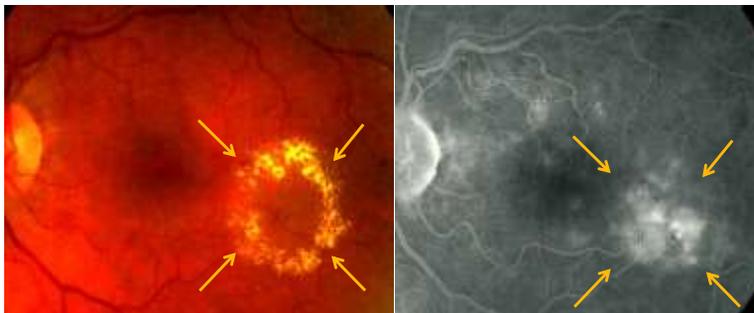
### Protocol T

Although laser was not part of study arms, laser was performed after 6 months if DME persisted

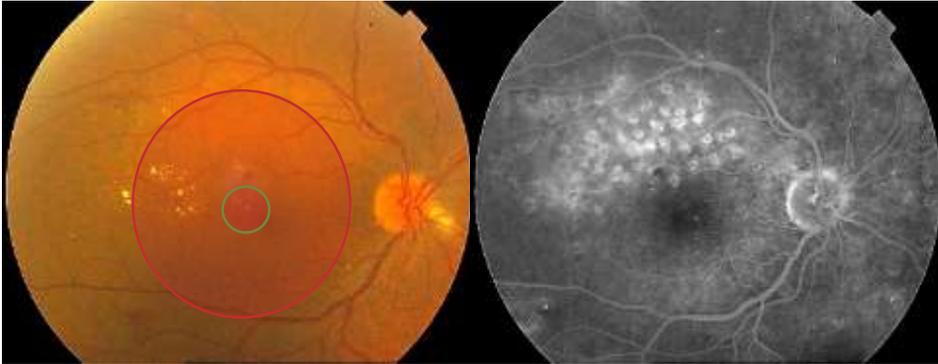
Fewer injections were needed during the second year in all groups.

## When and How?

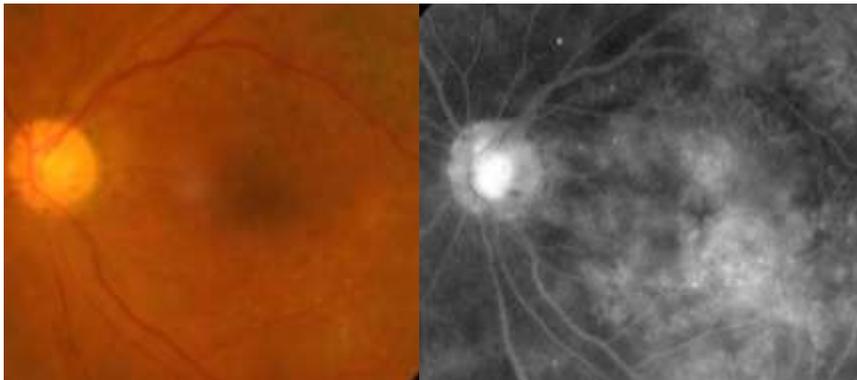
ETDRS demonstrates that focal laser is effective in focal macular oedema

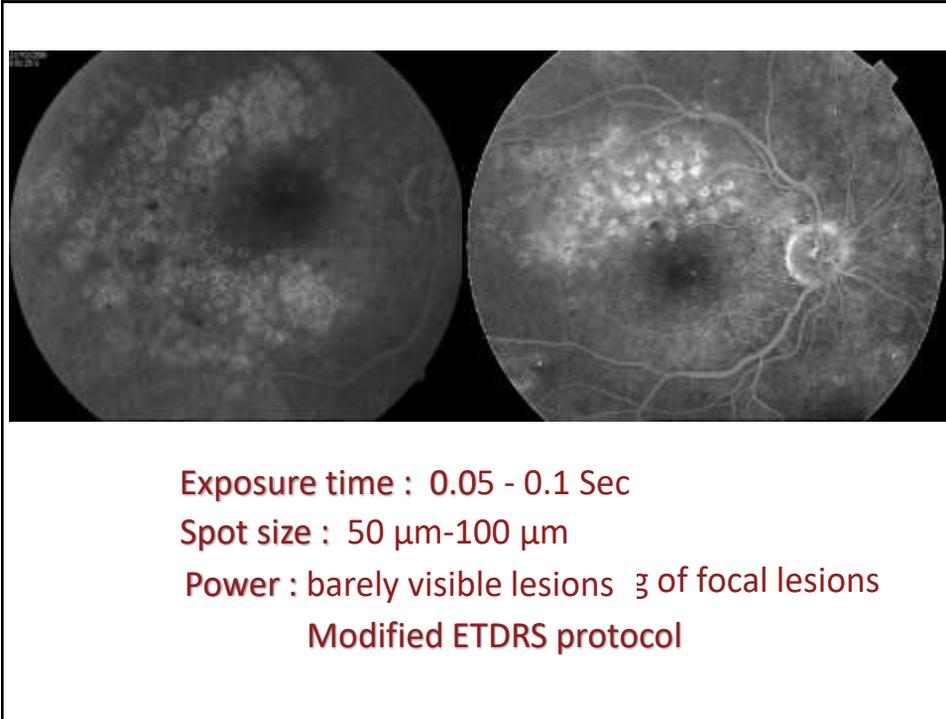


ETDRS demonstrates that focal laser is effective in focal macular oedema



Grid laser in diffuse macular oedema

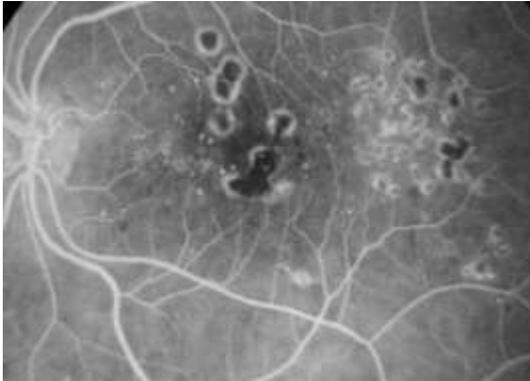




Side effects and future

## Side effects

Enlargement of laser scars “atrophic creep”



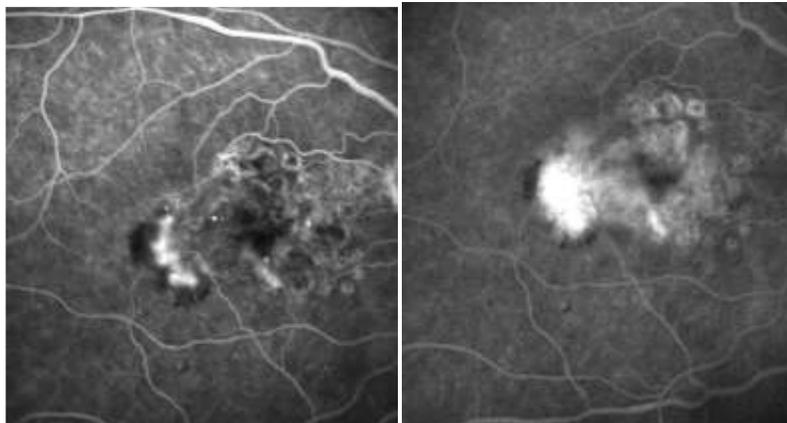
Higher 4 ys post ttt

With Longer wave length lasers.

Due to Cross reaction between photoreceptors

## Side effects

CNVM



## Side effects

Central or Paracentral Scotoma

Epiretinal membrane

Disturbed color vision

## Subthreshold Endpoint Management (EPM)Laser

An array of laser spots (pattern scanning) with a shorter pulse duration of 10 to 30 ms.

Begins with the titration of the laser power to a minimally visible retinal burn (threshold) at the edge of the macula and the energy set to deliver 50% of the threshold.

### Micropulse subthreshold laser



Repetitive short laser pulses within an “envelope” whose width is typically 0.1–0.5s. The normal length of each pulse is 100–300  $\mu$ sec

The “envelope” includes “ON” time, which is the duration of each micropulse, and “OFF” time, which is the time between the micropulses. The “OFF” time is important since here the originated heat can cool down.

### Micropulse Subthreshold Laser

Non destructive laser shown in RCTs

Improve retinal sensitivity in Microperimetry

Retain neuroretinal physiological functions in mfERG

### Absence of visible endpoint

Risk of undertreatment

## Conclusion

### WHEN TO USE MACULAR LASER IN DME?

FOCAL CSME(NON-CENTER)

ADJUVANT TO ANTIVGEF IN CENTER INVOLVED DME AFTER 24ws

RESISTANT TO ANTIVGEF OR REFUSE INJECTIONS

DME IN PDR WITH FIBROUS PROLIFERATION WITHOUT MACULAR TRACTION

## Conclusion

SO MACULAR LASER IN DME TRULY EXISTS AND IT WILL PERSIST

