香港中文大學
The Chinese University of Hong Kong

香港中文大學醫學院
Faculty of Medicine
The Chinese University of Hong Kong

A randomized controlled clinical trial comparing subthreshold micropulse yellow (577 nm) laser versus half-dose photodynamic therapy for central serous chorioretinopathy

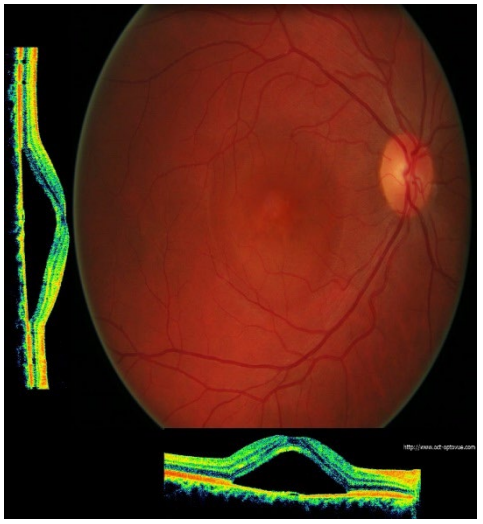
Parallel Session 4 on *"Advanced Technologies"*

Dr Marten E Brelen
Associate Professor
Department of Ophthalmology and Visual Sciences

Project No.: 04152826

Central serous chorioretinopathy (CSCR)

- Central serous chorioretinopathy (CSCR) is characterized by serous detachment of the neurosensory retina with or without retinal pigment epithelium (RPE) detachments at the posterior pole caused by increased permeability of the choroidal vessels[1,2].



- CSCR tends to resolve spontaneously within 6 months in more than 80% of patients who will obtain on average a final visual acuity of 20/30 or better.

- Persistent foveal detachment (>3-6 months) or recurrence of CSCR can result in visual loss.

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2. Prunte C, Flammer J. Choroidal capillary and venous congestion in central serous chorioretinopathy. *Am J Ophthalmol* 1996;121(1):26-34.
3. Yap EY, Robertson DM. The long-term outcome of central serous chorioretinopathy. *Arch Ophthalmol* 1996;114(6):689-692.
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The treatment options of chronic CSCR

- No standard treatment has yet been established, but many treatment approaches have been previously used:
  - Photodynamic Therapy with Verteporfin (PDT)
    - Verteporfin expensive SFI in HA
    - Supply chain shortage globally of Verteporfin
    - Labour and time intensive treatment
  - Micropulse Laser (810nm or 577nm)
    - New treatment with very few publications
    - No SFI / cheap treatment
    - Easy to setup and quick to perform
  - Systemic mineralocorticoid antagonist treatment
    - Systemic side effects and therefore seldom used

Half-Dose Photodynamic Therapy versus High-Density Subthreshold Micropulse Laser Treatment in Patients with Chronic Central Serous Chorioretinopathy

The PLACE Trial

- Prospective, randomised controlled, multicentre clinical trial
  1. 67 eyes received half dose PDT
  2. 66 eyes received 810nm micropulse diode laser

- If fluid persisted 6-8 weeks after first treatment the same treatment was repeated a second time and a further evaluation assessment 6-8 weeks thereafter
- Final evaluation 7-8 months after the first treatment.

Results

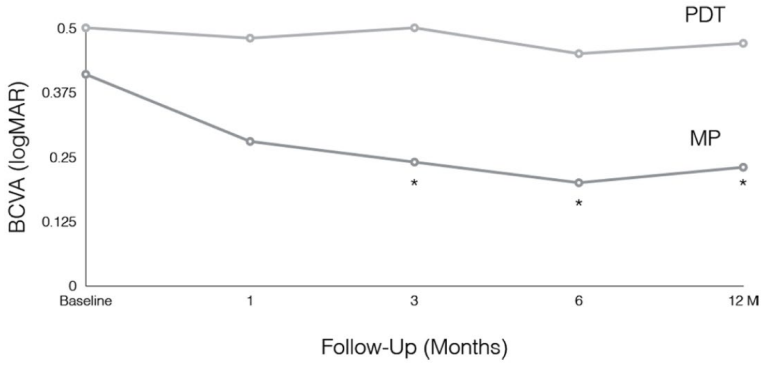
- Resolution of SRF
  - 51.2% half dose PDT vs. 13.8% SML (P<0.001)
  - 67.2% half dose PDT vs. 28.8% SML (P<0.001)
- BCVA
  - +4.60+/-6.62 ETDRS half dose PDT vs. +1.39+/-8.99 ETDRS SML (P=0.011).
  - +6.78+/-8.54 ETDRS half dose PDT vs +4.48+/-7.29 ETDRS SML (P=0.099)
- Retinal sensitivity measured using microperimetry
  - 2.013.04 dB half dose PDT vs. 0.923.65 dB SML (P=0.046)
  - 3.243.08 dB half dose PDT vs. 1.384.45 dB SML (P=0.008)
- Vision-related quality of life questionnaires (NEI-VFQ25)
  - Increased in both groups but was not statistically significant

The resolution of SRF is known to be much slower in SML and it often requires multiple treatments to achieve a dry macula

Yellow (577 nm) micropulse laser versus half-dose verteporfin photodynamic therapy in eyes with chronic central serous chorioretinopathy: results of the Pan-American Collaborative Retina Study (PACORES) Group

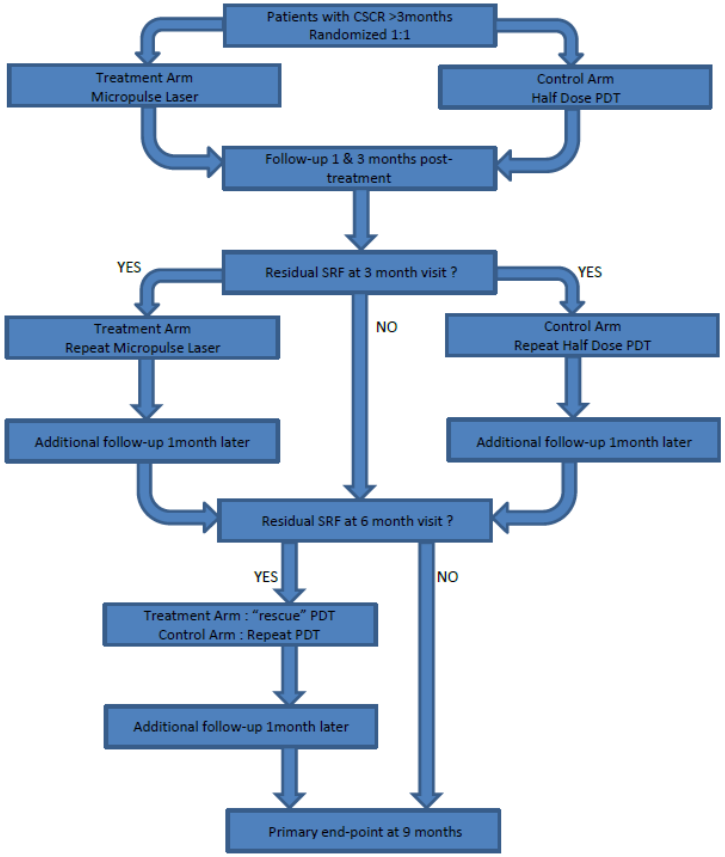
- Retrospective multicentre clinical trial
  - 92 eyes received yellow SML
  - 67 eyes received half dose PDT

- BCVA
  - Half dose PDT: baseline 0.50+/-0.34 logMAR to 0.47+/-0.2 logMAR (P>0.9)
  - SML: baseline 0.41+/-0.27 logMAR to 0.21+/-0.26 logMAR (P<0.0001)



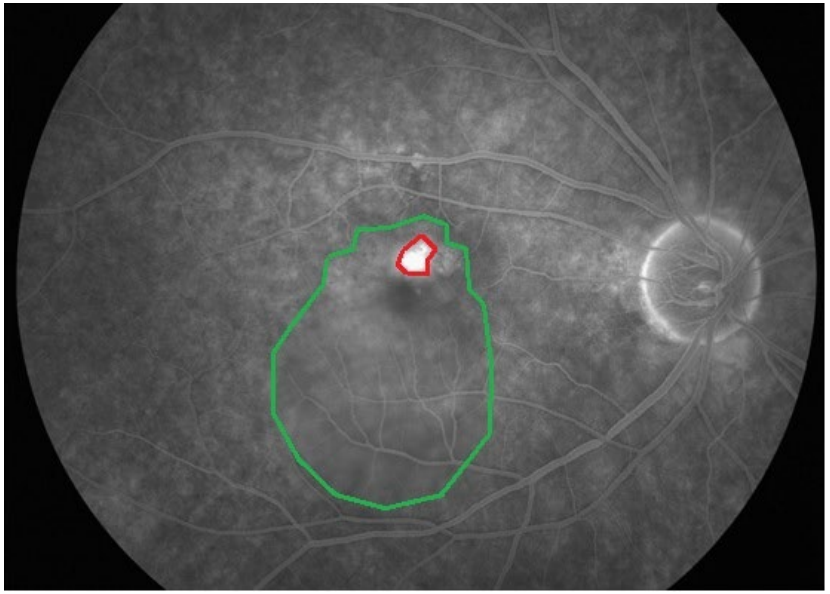
A Randomized Controlled Clinical Trial Comparing Subthreshold Micropulse Yellow (577 nm) Laser versus Half-dose Photodynamic Therapy for Central Serous Chorioretinopathy

- Prospective RCT
  - Patients randomized 1:1
- Re-treatment every 3months if persistent SRF on OCT in SMLT
- Rescue therapy at month 9 with half dose PDT
- Primary end point at <u>one year</u>
  - Resolution of SRF
  - BCVA, microperimetry, NEI-VFQ



Methods for treating CSCR with Subthreshold Micropulse Yellow (577nm) Laser

- 34 patients treated with SMLT vs 34 patients treated with PDT
- 49 patients male and 19 patients female
- Mean age 53.8 +/- 11.2 years



Micropulse

- Micropulse → 200µm, 340-400mW 200ms (5% duty cycle)

Photodynamic Therapy

- Standard half dose (3mg/m2) full fluence (50J/cm2) PDT

SMLT group 1.67 ± 0.73 laser treatments, 1/2PDT group 1.30 ± 0.47 laser treatments

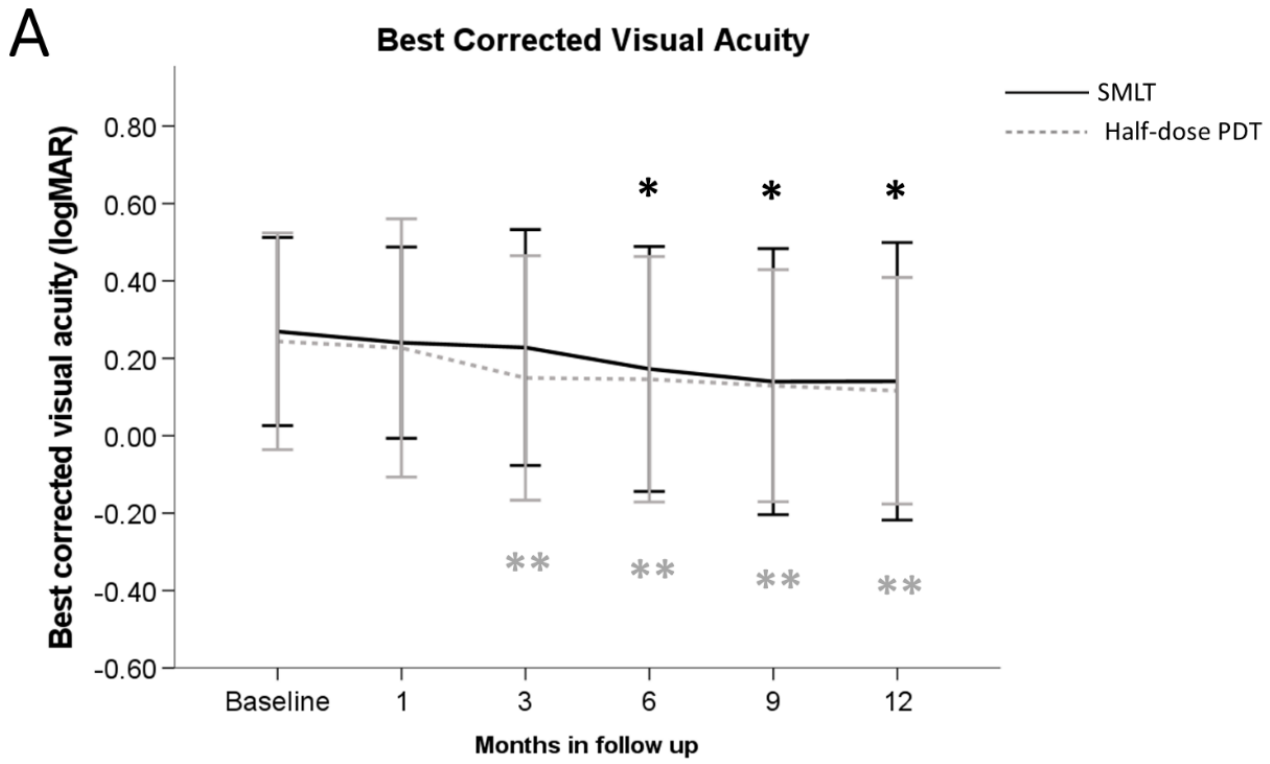
SMLT group 5 rescue PDT, ½ PDT 10 rescue PDT

Improvement in logMAR BCVA

- Both groups demonstrated significant improvement in best-corrected vision at end-point as compared to baseline
  - SMLT group average improvement was -0.12 +/- 0.21 logMAR (p=0.001)
  - PDT group average improvement was -0.13 +/- 0.12 logMAR (p<0.001)
  - No statistically significant difference between the two groups at any timepoint

- SMLT group
  - Significant visual improvement at 6 months (p=0.003)
- PDT group
  - Significant visual improvement at 3 months (p<0.001)

BCVA outcomes in PDT and SMLT groups



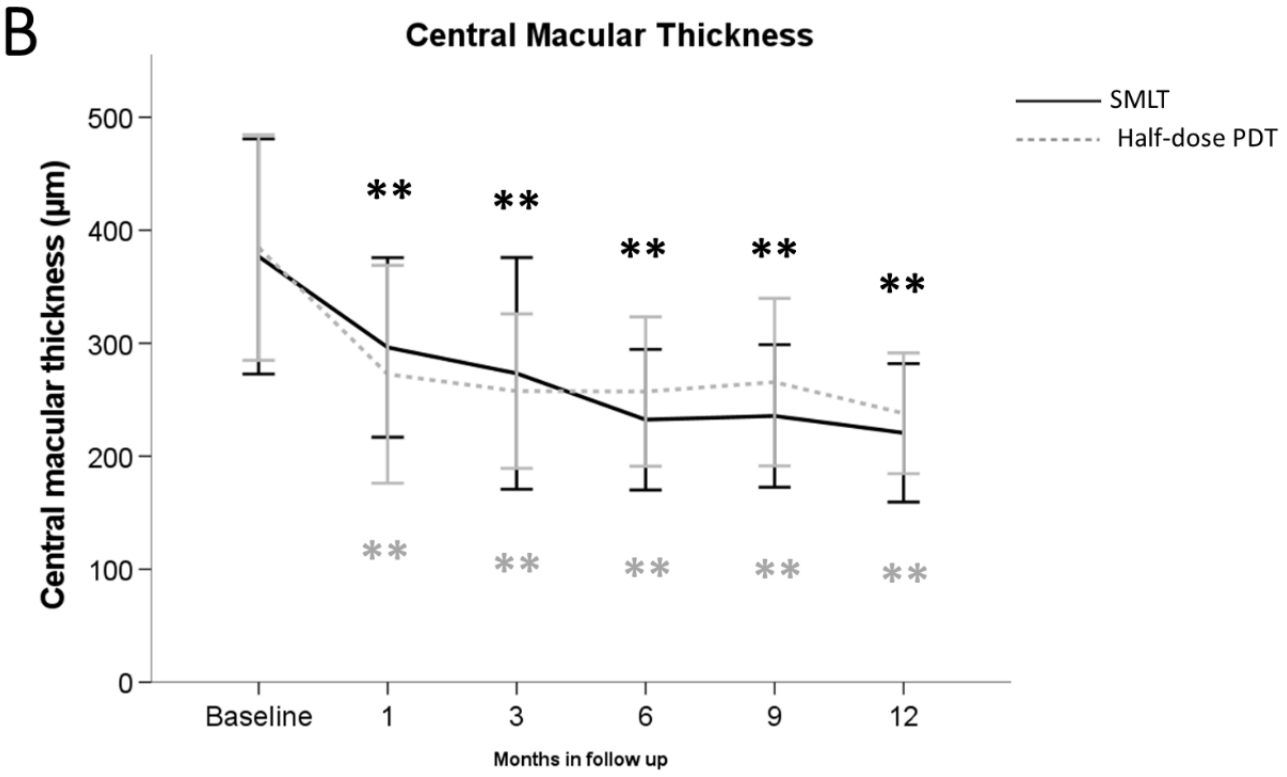
Central Macular Thickness

- Central macular thickness (CMT) showed a significant and sustained reduction in both groups at all time points after receiving treatment

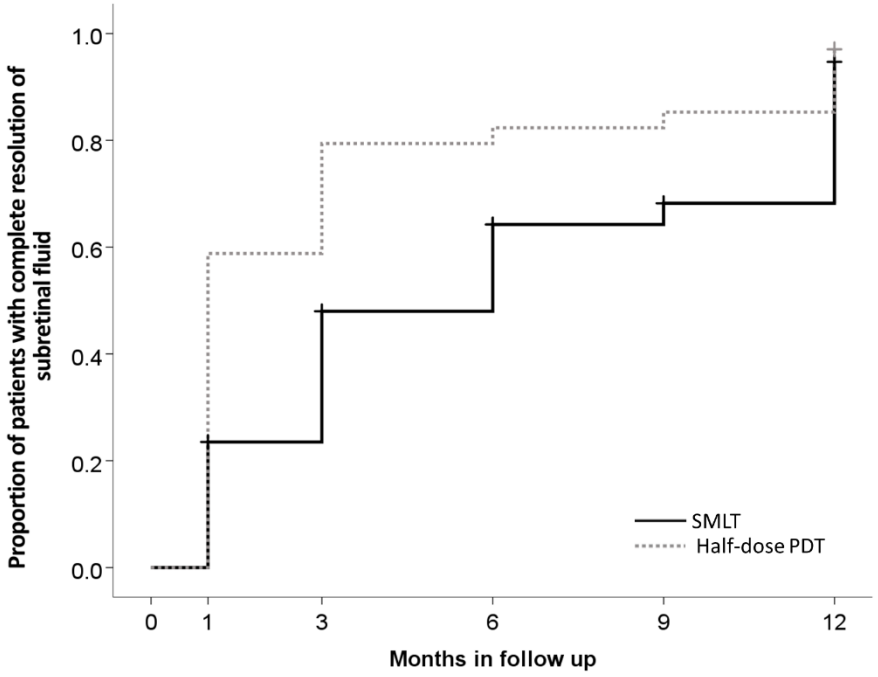
- SMLT
  - At 12 months reduction in CMT was -154.2 +/- 105.6μm ($p<0.001$)
- PDT
  - At 12 months reduction in CMT was -140.8 +/- 94.0μm ($p<0.001$).

- There was no statistically significant difference in CMT between the two treatment groups at each timepoint ($p>0.05$).

CMT on OCT between PDT and SMLT

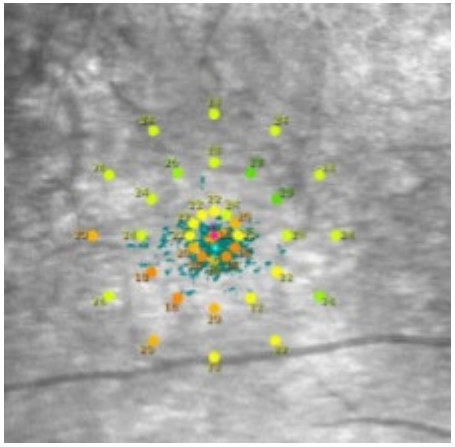


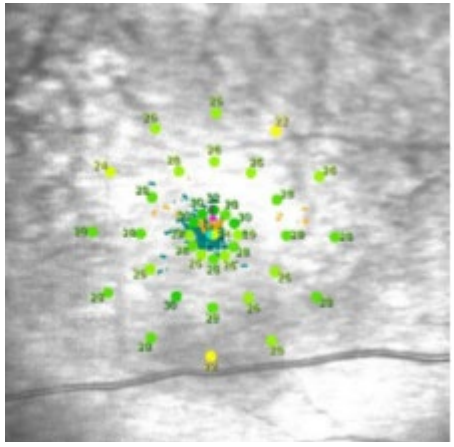
Proportion of patients with complete resolution of SRF

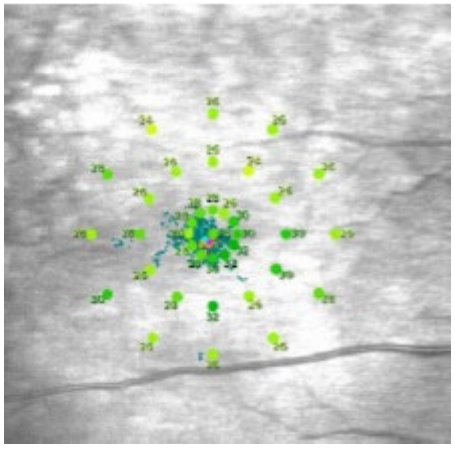


Average Threshold Sensitivity

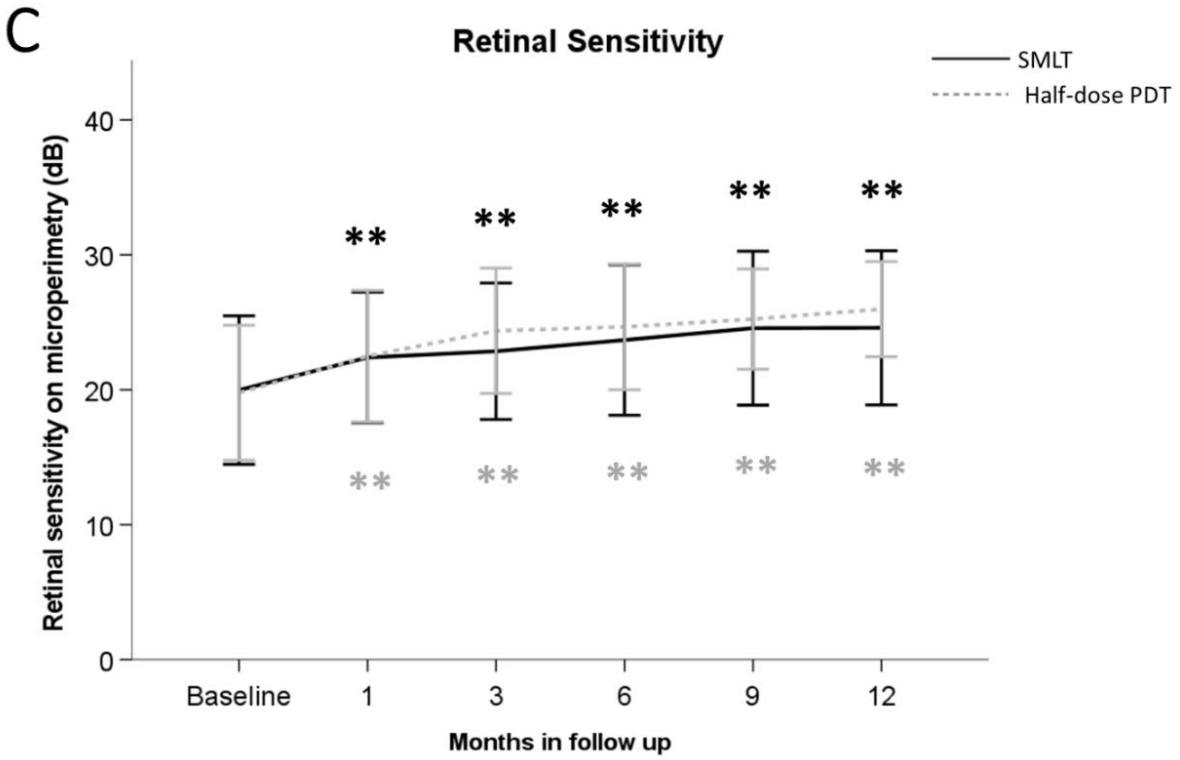
- No significant differences can be found between groups (p=0.29).
- Both groups showed statistically significant improvement from baseline at month 1 (p<0.001)
- Both groups had a steady improvement of retinal sensitivity throughout the duration of follow-up







Average Threshold in PDT and SMLT



Summary

- BCVA improved marginally faster in the PDT group and patients achieved complete resolution of SRF faster in the PDT group
- There were no differences in BCVA, CMT, retinal sensitivity between the groups at any timepoint.
- Interestingly NEI-VFQ were scored higher in the SMLT group
- In conclusion, at one year timepoint the results were equivalent in the two treatment groups showing SMLT is a viable alternative treatment to half-dose PDT.

New protocol for the management of chronic CSCR at NTEC now submitted and under internal review

Acknowledgements

Health and Medical Research Fund (HMRF)
Health Bureau, Hong Kong SAR Government - 04152826

Prof CP Pang
Prof Clement Tham
Prof Alvin Young
Prof Wilson Yip

The Prince of Wales Eye Department
The Hong Kong Eye Hospital
The CUHK Eye Centre
The CUHK Medical Centre

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