

Functional and Anatomic Outcomes of the Global Consortium of Autologous Retinal Transplantation for Primary, Refractory, and Macular Hole Retinal Detachments

Nicole Koulisis, MD

Tamer H. Mahmoud, MD, PhD

Retina Society 2020

Disclosures

- No relevant financial disclosures pertaining to this work.

Summary

- 89% macular hole closure for all cases
- 43% with at least a 3-line gain in VA
- 29% with at least a 5-line gain in VA
- Preoperative diagnosis ($p=0.026$) and preop VA ($p<0.001$) were significantly associated with post-op VA.
- Macular hole closure ($p<0.001$), reconstitution of the ellipsoid zone band ($p=0.02$), and alignment of neurosensory layers ($p=0.01$) on OCT were associated with better final VA.
- There were 5 cases of ART graft dislocation (3.9%).



Nicole Koulisis, MD



Barbara Parolini, MD



Mitsunori Yamada, MD, PhD



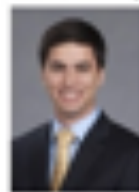
Naren Chetty, MD



Alberto La Mantia, MD



Izabela Rogalinska, MD



Stavros Moysidis, MD



Samir El Baha, MD



Flavio Rezende, MD, PhD



Virgilio Morales-Cantón, MD



Chi-Chun Lai, MD



Marcin Stopa, MD, PhD



Steve Charles, MD



Shunji Kusaka, MD, PhD



Xhevat Lumi, MD



Sean Adrean, MD



An-Lun Wu, MD



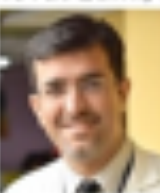
David Steel, MD



Kazuaki Kadonosono, MD



Keiko Yamada, MD



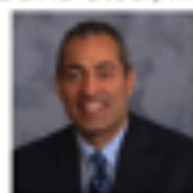
Jay Chhablani, MD



Carmelina Gordon, MD



Mohamed Mahgoub, MD, PhD



Tarek Hassan, MD



Ninel Gregori, MD



Sergio Rojas, MD



Mohamed Nowara, MD



Hisham Hassan, MD



Ogugua Okonkwo, MD



Tamer Mahmoud, MD, PhD



Sherif Embabi, MD, PhD



Takatoshi Maeno, MD, PhD



Ahmed Habib, MD



Odette Houghton, MD



Purpose

- To report the anatomical and functional outcomes of autologous retinal transplantation (ART) for the surgical repair of primary (PMH) and refractory macular holes (RMH) and macular hole rhegmatogenous retinal detachments (MH-RRD).

Methods

- Multicenter, retrospective, interventional, consecutive case series
- 33 surgeons
- 130 eyes (130 patients) undergoing ART
- January 2017 through December 2019
- All patients underwent PPV + ART, with surgeon modifications.
- A large array of data was collected.

Results - Demographics

- 130 ART surgeries were performed by 33 vitreoretinal surgeons globally

Patients:

- Mean age 63 ± 6.3 years
- 58% females
- 41% Caucasian, 23% African, 19% Asian, 17% Latino

Results - Patient Characteristics

- Primary macular holes: 27% of cases
- Refractory macular holes: 58% of cases
 - Mean number of previous surgeries: 1.6 ± 0.2
- Macular hole rhegmatogenous retinal detachments (MH-RRD): 15% of cases

Primary Macular Holes

- Mean maximum MH diameter $1480 \pm 297 \mu\text{m}$
- Mean minimum MH diameter $882 \pm 176 \mu\text{m}$
- Mean axial length $23.1 \pm 4.9 \text{ mm}$
- Mean spherical equivalent -0.95 ± 0.20
- Phakic: 77%

Primary Macular Holes

- Macular hole closure rate: 85.7%
- Mean preop logMAR VA: 1.090 ± 0.184 (20/246)
- Mean postop logMAR VA: 0.838 ± 0.142 (20/138; $p=0.003$), f/u 8.5 ± 1.4 mo.
- Gained at least 3-lines of VA: 37%
- Gained at least 5-lines of VA: 17%

Primary Macular Holes

- 1 case of ART graft dislocation: 2.9%
- 1 case of RD with PVR: 2.9%

Refractory Macular Holes

- Mean maximum MH diameter $1440 \pm 210 \mu\text{m}$
- Mean minimum MH diameter $796 \pm 117 \mu\text{m}$
- Mean axial length $24.8 \pm 4.6 \text{ mm}$
- Mean spherical equivalent -2.4 ± 0.40
- Pseudophakic: 57%

Refractory Macular Holes

- Macular hole closure rate: 88%
- Mean preop logMAR VA: 1.258 ± 0.144 (20/362)
- Mean postop logMAR VA: 1.063 ± 0.123 (20/231; $p=0.002$), f/u 8.6 ± 1.0 mo.
- Gained at least 3-lines of VA: 37%
- Gained at least 5-lines of VA: 25%

Refractory Macular Holes

- 3 cases of ART graft dislocation: 4.0%
- 1 case of RD: 1.3%
- 1 case of endophthalmitis: 1.3%

Macular Hole Rhegmatogenous Retinal Detachments

- Mean maximum MH diameter $1630 \pm 576 \mu\text{m}$
- Mean minimum MH diameter $932 \pm 330 \mu\text{m}$
- Mean axial length $28.0 \pm 9.3 \text{ mm}$
- Mean spherical equivalent -10.3 ± 2.9
- Pseudophakic: 68%

MH-RRDs

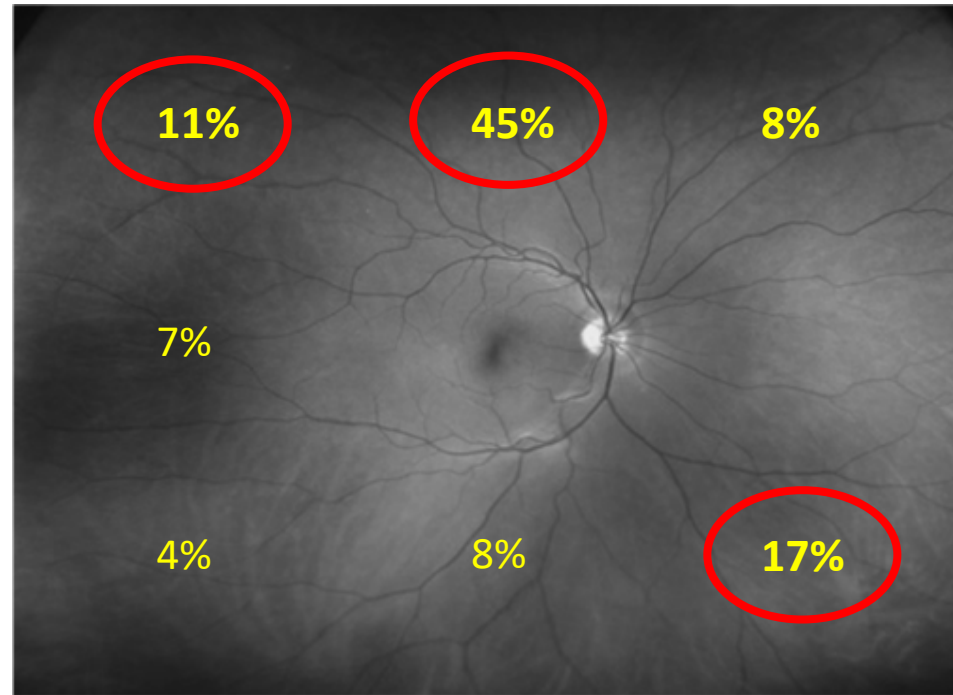
- Macular hole closure rate: 95%
- 79% single-surgery retinal attachment rate
- Mean preop logMAR VA: 2.316 ± 0.531 (Hand Motion)
- Mean postop logMAR VA: 1.403 ± 0.322 (20/500; $p < 0.001$), f/u 8.9 ± 2.0 mo.
- Gained at least 3-lines of VA: 74%
- Gained at least 5-lines of VA: 68%

MH-RRDs

- 1 cases of ART graft dislocation: 5.3%
- 4 case of RD with PVR: 21%
- 2 cases of subretinal PFO: 11%

Results - Intraoperative Surgical Variables

- PPV Gauge: **67%** performed with **23g**
- Type of Graft: **88% neurosensory retina** without choroid
- Harvest site:
 - **45% superior**
 - **17% inferonasal**
 - **11% superotemporal**
 - 8% superonasal
 - 8% inferior
 - 7% temporal
 - 4% inferotemporal



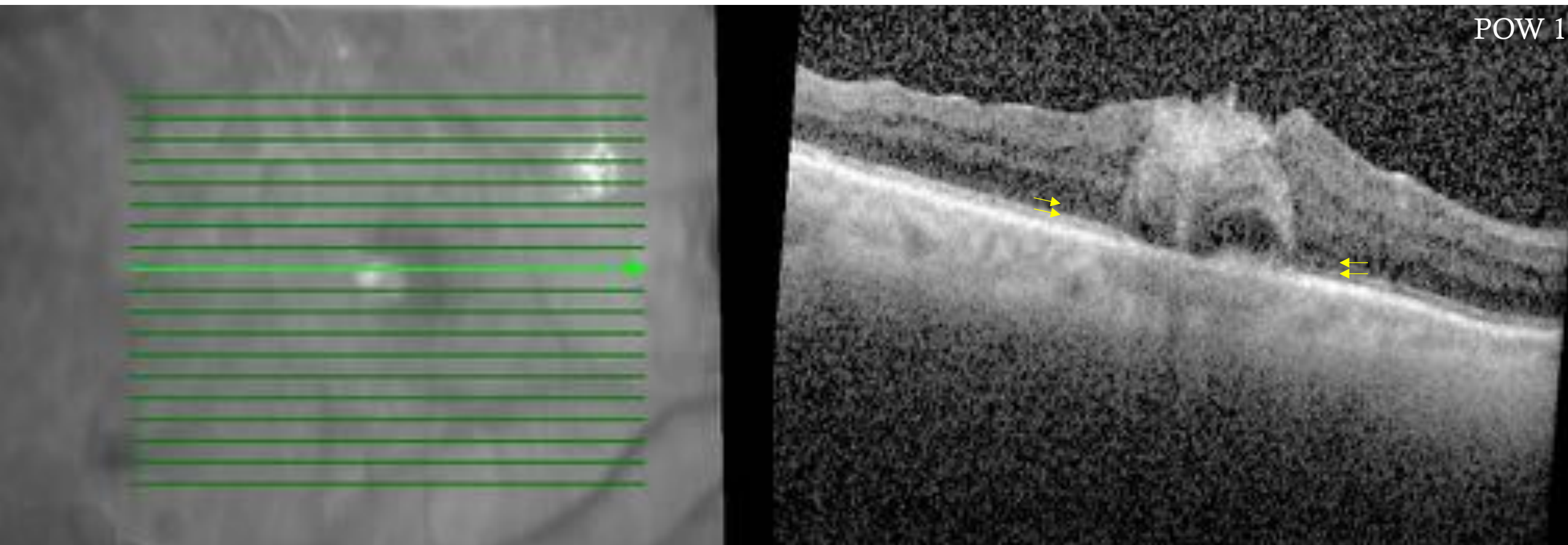
Results - Intraoperative Surgical Variables

- Harvest site:
 - **84% posterior to equator**
 - 16% anterior to equator
- Size of graft (in disc diameters)
 - **0 to 1 DD: 70%**
 - 1 to 2 DD: 29%
 - 2 to 3 DD: 1%

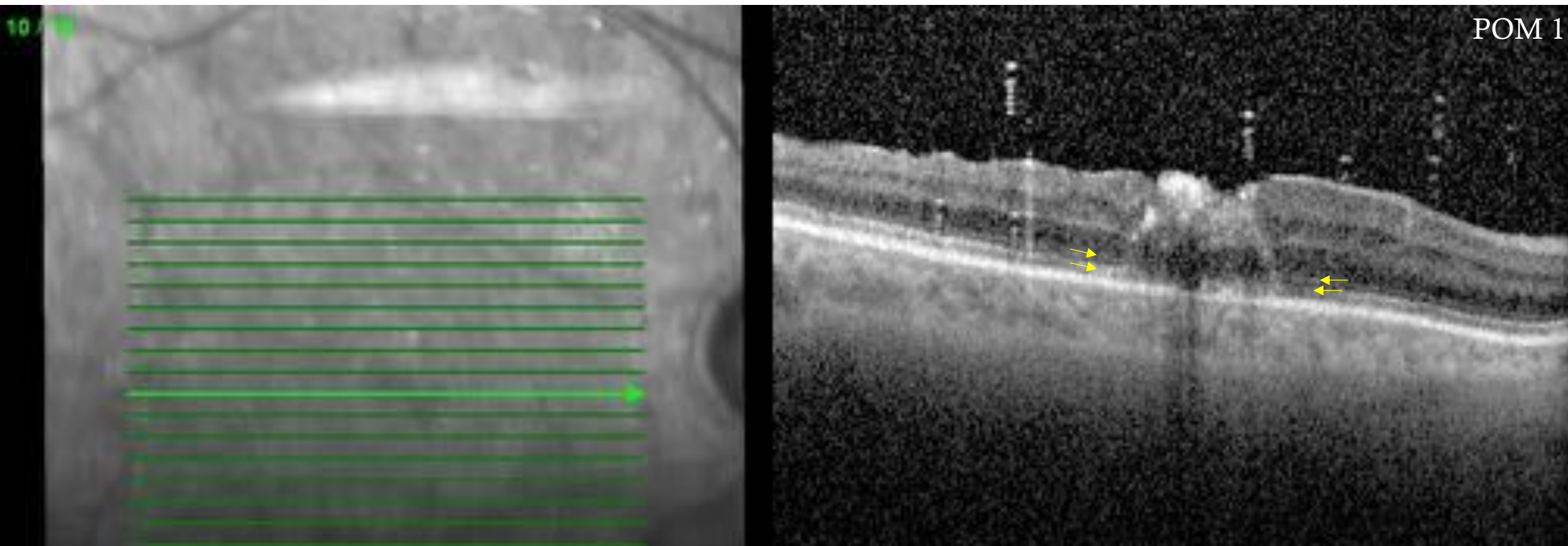
Results - Intraoperative Surgical Variables

- Graft positioning:
 - **81% at the level of or overlying the retina**
 - 19% subretinal
- Tamponade agent:
 - **Silicone oil: 78 cases (60%)**
 - PFO: 26 cases (20%)
 - Gas: 26 cases (20%)

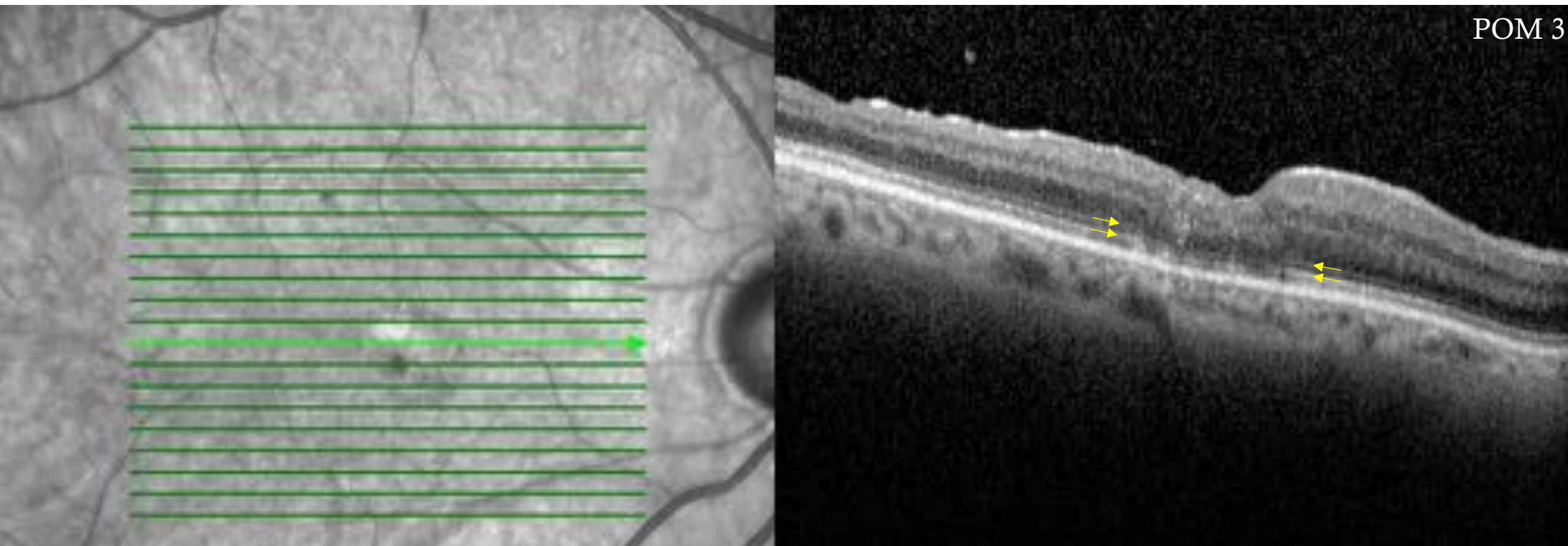
Results – Reconstitution of ELM and EZ Band



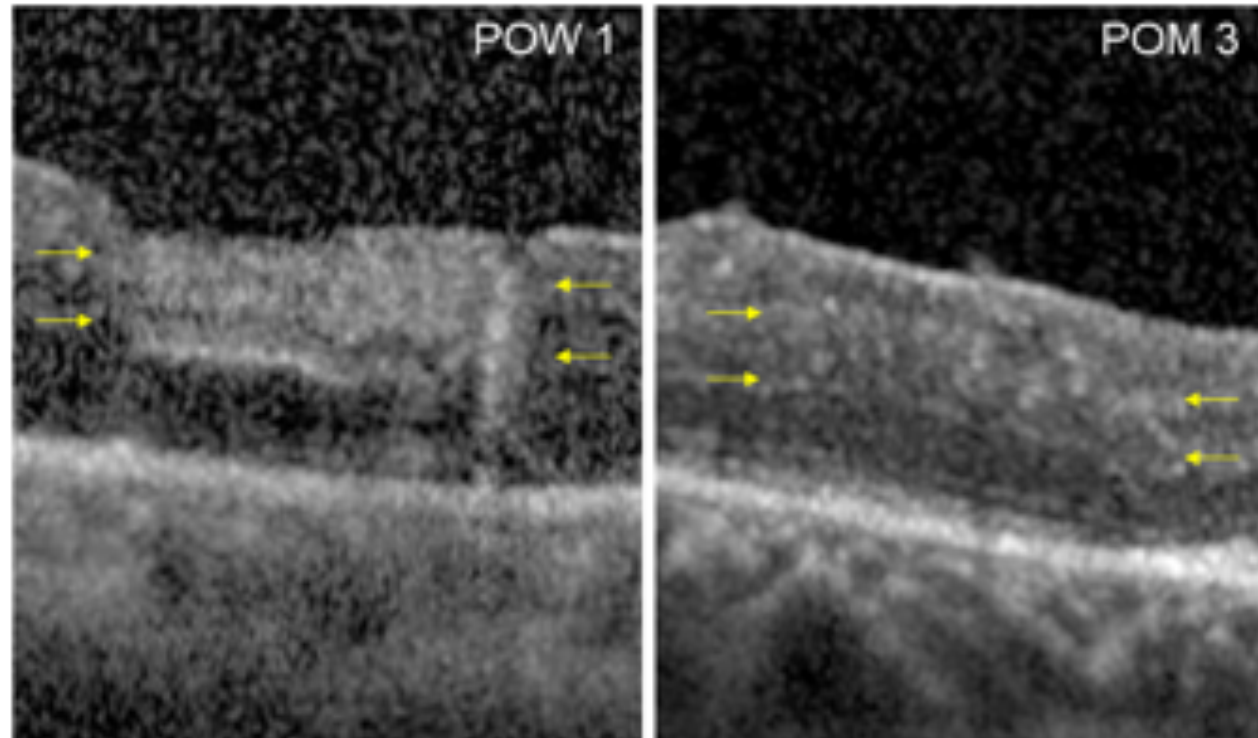
Results – Reconstitution of ELM and EZ Band



Results – Reconstitution of ELM and EZ Band



Results – Alignment of Neurosensory Layers



Multivariate Analysis

- Preoperative diagnosis ($p=0.026$) significantly associated with post-op VA.
- Preop VA ($p<0.001$) significantly associated with post-op VA.
- No significant association between patient variables and macular hole closure rate or final VA.
- No significant association between intraoperative surgical variables and macular hole closure rate or final VA.

Multivariate Analysis

- Macular hole closure associated with better final VA ($p < 0.001$).
- EZ Band reconstitution associated with better final VA ($p = 0.02$).
- Alignment of neurosensory layers associated with better final VA ($p = 0.01$).

Summary

- 89% macular hole closure for all cases
- 43% with at least a 3-line gain in VA
- 29% with at least a 5-line gain in VA
- Preoperative diagnosis ($p=0.026$) and preop VA ($p<0.001$) were significantly associated with post-op VA.
- Macular hole closure ($p<0.001$), reconstitution of the ellipsoid zone band ($p=0.02$), and alignment of neurosensory layers ($p=0.01$) on OCT were associated with better final VA.
- There were 5 cases of ART graft dislocation (3.9%).



Nicole Koulisis, MD



Barbara Parolini, MD



Mitsunori Yamada, MD, PhD



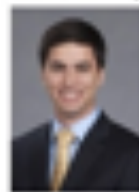
Naren Chetty, MD



Alberto La Mantia, MD



Izabela Rogalinska, MD



Stavros Moysidis, MD



Samir El Baha, MD



Flavio Rezende, MD, PhD



Virgilio Morales-Cantón, MD



Chi-Chun Lai, MD



Marcin Stopa, MD, PhD



Steve Charles, MD



Shunji Kusaka, MD, PhD



Xhevat Lumi, MD



Sean Adrean, MD



An-Lun Wu, MD



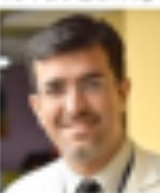
David Steel, MD



Kazuaki Kadonosono, MD



Keiko Yamada, MD



Jay Chhablani, MD



Carmelina Gordon, MD



Mohamed Mahgoub, MD, PhD



Tarek Hassan, MD



Ninel Gregori, MD



Sergio Rojas, MD



Mohamed Nowara, MD



Hisham Hassan, MD



Ogugua Okonkwo, MD



Tamer Mahmoud, MD, PhD



Sherif Embabi, MD, PhD



Takatoshi Maeno, MD, PhD



Ahmed Habib, MD



Odette Houghton, MD