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
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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%).
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 $1480 \pm 297 \, \mu m$
- Mean minimum MH diameter $882 \pm 176 \, \mu m$
- Mean axial length $23.1 \pm 4.9 \, mm$
- Mean spherical equivalent $-0.95 \pm 0.20$
- 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 ± 210 μm
- Mean minimum MH diameter 796 ± 117 μm
- Mean axial length 24.8 ± 4.6 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 $1630 \pm 576 \mu m$
- Mean minimum MH diameter $932 \pm 330 \mu m$
- Mean axial length $28.0 \pm 9.3$ mm
- Mean spherical equivalent $-10.3 \pm 2.9$
- 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
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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).
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