

5-2019

Urgent Surgical Embolectomy for Retinal Embolus

Andre Aung
Henry Ford Health System

Daniel Brill
Henry Ford Health System

Follow this and additional works at: <https://scholarlycommons.henryford.com/merf2019caserpt>

Recommended Citation

Aung, Andre and Brill, Daniel, "Urgent Surgical Embolectomy for Retinal Embolus" (2019). *Case Reports*. 54.
<https://scholarlycommons.henryford.com/merf2019caserpt/54>

This Poster is brought to you for free and open access by the Medical Education Research Forum 2019 at Henry Ford Health System Scholarly Commons. It has been accepted for inclusion in Case Reports by an authorized administrator of Henry Ford Health System Scholarly Commons. For more information, please contact acabrer4@hfhs.org.



Abstract

Purpose: Branch retinal artery occlusions can lead to devastating, permanent vision loss. Here we present a case of branch retinal artery occlusion (BRAO) treated with surgical embolectomy.

Methods: Interventional Case Report.

Results: 67 year old woman presented with sudden onset vision loss of her superior hemifield in the left eye and was diagnosed with a BRAO. Surgical embolectomy was performed 17 hours after symptom. The retinal embolus was successfully removed. Her visual acuity returned to near baseline. Fluorescein angiography confirmed reperfusion. She retained a significant superior altitudinal defect.

Conclusion: This case demonstrates the potential of embolectomy/embolysis to restore anatomical retinal perfusion in patients with fovea involving BRAOs with retinal emboli present on the optic disc. Large, multicentered prospective studies are needed to evaluate the efficacy and safety of surgical embolectomy for the acute management of fovea involving BRAOs.

Background

- Retinal artery occlusion (RAO) is a lack of blood flow to the retinal vasculature, which can result in immediate and often permanent visual loss. A central retinal arterial occlusion (CRAO) involves lack of blood flow to the central retinal artery, whereas a branch retinal arterial occlusion (BRAO) involves lack of blood flow to one of the central retinal artery's downstream arterioles. Retinal ischemia begins at 100 minutes after complete occlusion¹. Diagnosis is made by dilated fundus exam, which may reveal a retinal arteriole embolus, cherry-red foveola, and retinal whitening and edema. Though over 80% of all BRAOs result in improved visual acuity over time, fovea involving BRAO and CRAO have a poor visual prognosis^{2,3}.
- While there have been several proposed methods for treating BRAOs, there is currently no accepted treatment. Traditionally, acute RAOs can show clinical improvement with paracentesis, ocular massage, intraocular pressure reduction, and hemodilution^{4,5}. Hyperbaric oxygen has shown favorable results in some studies⁶. Newer therapies, including transluminal neodymium-doped yttrium aluminum garnet laser (Nd:YAG), surgical embolectomy, and intravenous/intra-arterial/intravitreal tissue plasminogen activator, are controversial as there is limited research support and possible complications with each entity^{5,6,7}.
- To date, there are 15 other published cases of attempted surgical embolectomies for RAOs. Using pars plana vitrectomy, the majority of these cases attempted embolectomy via embolus massage and/or arteriotomy with forceps. Here we report our experience with surgical embolectomy for one case of fovea involving BRAO with emboli on the optic disc.

Case Report

- A 67 year-old female with a past medical history of diabetes mellitus, hypertension, hyperlipidemia, and atrial fibrillation presented with 14 hours of vision loss in the left eye.
- Her visual acuity was 20/100 in the left eye. Confrontational fields showed a superior altitudinal defect in the left eye. Indirect ophthalmoscopy revealed a retinal embolus on the nasal aspect of the optic disc with inferior retinal whitening (Figure 1).
- Surgical embolectomy was performed 17 hours after symptom onset.
- Transscleral trocars were placed in the inferotemporal, superotemporal, and superonasal quadrants. The conjunctiva was displaced with 0.12 mm forceps, and sclerotomy sites were created 3.5 mm posterior to the limbus. Core vitrectomy was performed. Crushing of the embolus was attempted with a soft tip flute needle, but this was not successful. An arteriotomy with a 23-gauge microvitrectoretinal (MVR) blade was attempted, but minimal hemorrhage occurred. Internal limiting membrane (ILM) forceps were used to attempt to crush the embolus, but this was also not successful. Next, curved scissors were used to make an arteriotomy, and a small hemorrhage appeared. ILM forceps were used to remove the embolus. Sclerotomy trocars were removed. Sclerotomy sites were ensured that they were water tight.
- At 8 weeks after surgery, the patient's vision returned to near baseline (20/25). Fluorescein angiography showed near normal fluorescein transit time. Postoperative optical coherence tomography at one month showed resolved retinal edema, but nasal outer retinal and retinal pigmented epithelium atrophy. On postoperative one and two month visits, her 30-2 HVFs showed near complete superior altitudinal defects (Figure 2).

Photos

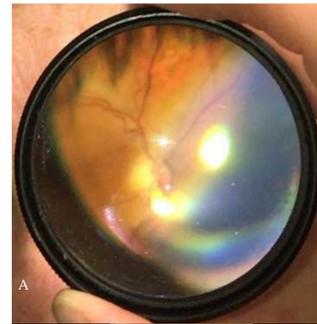


Figure 1. Fundus photos preoperatively (A), post-operatively one day (B-D) and one month (E-G).
A. Smartphone funduscopy shows a retinal embolus on the nasal optic disc and inferior retinal whitening.
B/C. Color and monochromatic fundus photographs shows no retinal embolus. There is vitreous hemorrhage, and retinal whitening.
D. FA at 27.8 seconds shows delayed perfusion through the inferior hemiretinal artery.
E/F. Color and monochromatic fundus photographs shows no retinal embolus, resolved retinal whitening and vitreous hemorrhage, and peripapillary RPE changes.
G. FA at 23.3 seconds shows near normal perfusion through the inferior hemiretinal artery.

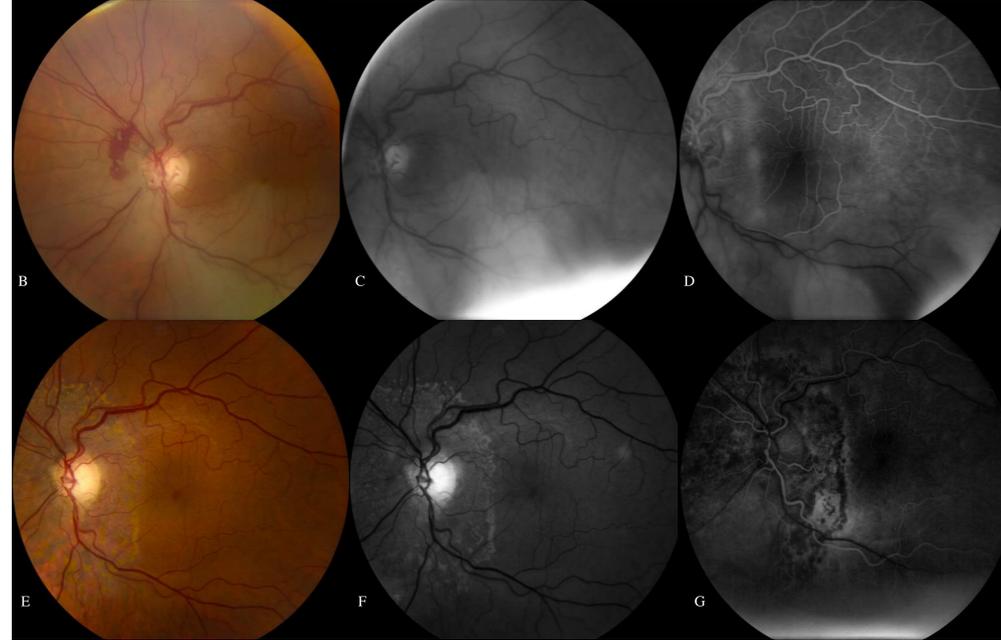
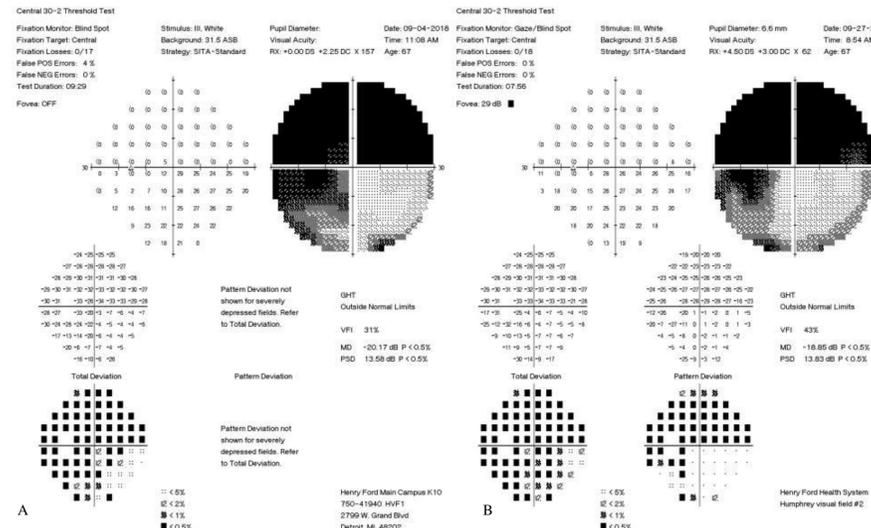


Figure 2. One week (A) and one-month (B) postoperative 30-2 HVF show a complete superior altitudinal defect



Discussion

- Our case report and previous studies support the role of embolectomy/embolysis to restore anatomical retinal perfusion in patients with fovea involving BRAOs with retinal emboli present on the optic disc. Postoperative fluorescein angiogram (FA) confirmed reperfusion. Visual acuity returned to near normal baseline. However, the patient did retain a significant superior altitudinal defect.
- There are currently 17 published surgical embolectomy cases for treatment of BRAOs⁹⁻¹⁷. The median time of symptoms prior to surgery was 29 hours. Median pre-operative visual acuity was 20/400. 14 out of 17 patients had a successful embolus removal (82.4%). All patients had an attempted arteriotomy with a MVR blade or scissors, and most utilized gripping forceps to remove the embolus. 15 out of 17 patients had vitreous hemorrhage during the procedure. At a mean and median of six month follow-up, post-operative visual acuity improved to 20/30. FA confirmed reperfusion in 13 of 14 patients (92.9%). The improved visual outcomes in unsuccessful embolectomies were believed to be secondary to retinochoroidal anastomoses and/or improved circulation via embolus disruption.
- Over the last few decades, the medical field has revolutionized the time to diagnosis and treatment of neurologic thromboembolic events, leading to vastly improved patient outcomes. Medical education is dedicated to healthcare providers regarding stroke symptoms, management, and urgent neurologic evaluation and intervention. As the retina develops ischemic damage in a similar time frame to the brain, we can foresee future education to healthcare providers regarding ischemic retinal symptoms, management, and urgent ophthalmologic evaluation and intervention. In particular, the development of user friendly smart phone technology to collect high quality fundus photographs can be sent to ophthalmologists within minutes of patient presentation in rural and emergency settings. If an embolus is visualized, quick surgical evaluation by a vitreoretinal surgeon can be made for consideration of embolectomy/embolysis, resulting in improved visual outcomes.
- Our one case and others previously reported demonstrate the ability to perform surgical embolectomies for visually threatening RAOs. We believe large, multicentered prospective studies are needed to evaluate the efficacy of surgical embolectomy for the acute management of fovea involving BRAO.

References

- Hayreh SS, Kolder HE, Weingeist TA. Central retinal artery occlusion and retinal tolerance time. *Ophthalmology* 1980;87:75-8.
- Hayreh SS, Podhajsky PA, Zimmerman MB. Branch retinal artery occlusion: natural history of visual outcome. *Ophthalmology* 2009;116:1188-94.e1-4.
- Hayreh SS. Acute retinal arterial occlusive disorders. *Progress in retinal and eye research* 2011;30:359-94.
- Fraser SG, Adams W. Interventions for acute non-arteritic central retinal artery occlusion. *The Cochrane database of systematic reviews* 2009;Cd001989.
- Sharma RA, Dattilo M, Newman NJ, Bioussé V. Treatment of Nonarteritic Acute Central Retinal Artery Occlusion. *Asia-Pacific journal of ophthalmology (Philadelphia, Pa)* 2018;7:235-41.
- Oguz H, Sobaci G. The use of hyperbaric oxygen therapy in ophthalmology. *Survey of ophthalmology* 2008;53:112-20.
- Agarwal N, Gala NB, Karimi RJ, Turbin RE, Gandhi CD, Prestigiacomo CJ. Current endovascular treatment options for central retinal arterial occlusion: a review. *Neurosurgical focus* 2014;36:E7.
- Schrag M, Youn T, Schindler J, Kirshner H, Greer D. Intravenous Fibrinolytic Therapy in Central Retinal Artery Occlusion: A Patient-Level Meta-analysis. *JAMA neurology* 2015;72:1148-54.
- Almeida DR, Mammo Z, Chin EK, Mahajan VB. Surgical embolectomy for fovea-threatening acute retinal artery occlusion. *Retinal cases & brief reports* 2016;10:331-3.
- Brunner S, Binder S. Surgical embolus excision in retinal artery occlusion - two case reports. *Acta ophthalmologica* 2013;91:e652-3.
- Garcia-Arumi J, Martinez-Castillo V, Boixadera A, Fonollosa A, Corcostegui B. Surgical embolus removal in retinal artery occlusion. *The British journal of ophthalmology* 2006;90:1252-5.
- Lin CJ, Su CW, Chen HS, Chen WL, Lin JM, Tsai YY. Rescue vitrectomy with blocked artery massage and bloodletting for branch retinal artery occlusion. *Indian journal of ophthalmology* 2017;65:323-5.
- Lytvynchuk L. Embolectomy for branch retinal artery occlusion: a case report. *Acta ophthalmologica* 2017;95:e428-e9.
- Matonti F, Hoffart L, Nadeau S, Hamdan J, Denis D. Surgical embolectomy for central retinal artery occlusion. *Canadian journal of ophthalmology Journal canadien d'ophtalmologie* 2013;48:e25-7.
- Mota SEH, Garcia-Aguirre G, Velez-Montoya R. Cilioretinal artery branch avulsion secondary to surgical embolectomy: management and outcome. *Case report. Arquivos brasileiros de oftalmologia* 2018;81:429-32.
- Ramchandran RS, Fekrat S. Embolectomy for branch retinal arterial occlusion. *Retinal cases & brief reports* 2010;4:116-9.
- Peyman GGC. Surgical removal of a branch retinal artery embolus: a case report. *International Ophthalmology* 1990;29:5-8.