Macular buckling versus vitrectomy on macular hole associated macular detachment in eyes with high myopia: a randomised trial

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ABSTRACT
Aim To compare the efficacy of macular buckling (MB) and pars plana vitrectomy (PPV) for full-thickness macular holes (FTMH) and associated macular detachment (MD) in highly myopic eyes.
Methods Prospective interventional case series of eyes undergoing PPV or MB for FTMH and MD.
Main outcome measures Best-corrected visual acuity (BCVA) at postoperative month 24. Other measured outcomes include the initial surgical success rate, macular hole closure rate and the progression of myopic maculopathy.
Results A total of 53 eyes from 53 participants were included in this study (26 participants receiving MB and 27 participants receiving PPV), and finally 49 eyes from 49 participants (25 participants in the MB group and 24 participants in the PPV group) were analysed. At postoperative month 24, the BCVA had improved significantly in those that underwent either MB (p<0.001) or PPV (p=0.04). The difference between the groups was not significant (p=0.653). The surgical failure rate after the primary treatment was significantly higher in the PPV group than the MB group (25.00% vs 4.00%, respectively; p=0.04). The macular closure rate was higher in the MB group compared with the PPV group (64.00% vs 58.33%, respectively; p=0.45). Myopic maculopathy development may be more severe following PPV than following MB surgery.
Conclusion Patients with high myopia obtained anatomical and functional improvements from either MB or PPV. However, MB achieved a significantly higher success rate in retinal reattachment compared with PPV.
Trial registration number NCT03433547.

INTRODUCTION
Macular hole (MH) associated macular detachment (MD) is a common vision-threatening complication that is difficult for vitreoretinal surgeons to treat. The surgical success rate is reported to be limited for MHS in highly myopic eyes, possibly due to mechanical traction of the posterior staphyloma, poor function of the retinal pigment epithelium (RPE), a long axial length (AL) and choroidal degeneration. Many surgical approaches to treat MH-associated MD have been proposed, including intravitreal gas injections and pars plana vitrectomy (PPV) with or without internal limiting membrane (ILM) peeling using gas or silicone oil as an internal tamponade. Macular buckling (MB) with scleral imbrications has been established as a successful treatment that increases the success rate of surgery for MH-associated MD. MB is necessary to release both the anteroposterior traction caused by the posterior staphyloma and the tangential traction exerted by the vitreous cortex. Recent studies have shown that MB achieved better visual improvement and anatomic recovery than vitrectomy in highly myopic eyes with macular hole-related retinal detachment (MHRD). Although this newer procedure appears to be promising for the management of MHRD, the effectiveness of the MB technique has not been definitively determined, and further case-control studies are needed.

METHODS
Trial design This trial was a prospective, randomised, parallel assignment, single site, open-label trial. This study was registered on the website ClinicalTrials.gov. Patients with high myopia who had MH and concurrent MD were recruited between August 2015 and October 2017 at Zhongshan Ophthalmic Center in Guangzhou, China. Patients who met the inclusion criteria and signed informed consent were randomly assigned to either the MB group or the PPV group.
Surgical failure was defined as the presence of postoperative MH and MD, which required a secondary surgery. It was assumed that the 1 month surgical failure rate would be 2.5% after receiving MB and 36% after receiving PPV, with 85% statistical power and a two-sided test. Thus, to allow for a 4% loss during follow-up, a total of 50 participants were required to participate in this study, with 25 patients in each arm (calculated using G-Power V.3.1.9.2 software).
Inclusion and exclusion criteria The eligibility criteria for the study included highly myopic patients aged from 18 years to 70 years; AL greater than 26.5 mm or a refractive error (spherical equivalent) less than −8.0 dioptres; presence of full-thickness macular hole (FTMH) and MD on
optical coherence tomography (OCT); and clinical evidence of posterior staphyloma that involves the macular area. The exclusion criteria included MD, which extended to the peripheral retina (ie, extension beyond the major vascular arcades in more than one quadrant), a history of PPV or scleral buckling, an active intraocular haemorrhage or inflammation and any media opacity that precluded imaging or clinical evaluation of the macula.

Participants
A total of 61 patients with high myopia who showed FTMH and MD on OCT imaging were screened for this study. Five patients were excluded because they did not meet the eligibility criteria, and three patients refused to participate. Finally, a total of 53 patients were enrolled for randomisation (figure 1).

Randomisation and masking
Using a random number generator, the included participants were randomised with a 1:1 ratio to undergo either the PPV or MB surgical procedures. Given that the patients needed to understand the details of the procedure they were undergoing and any potential complications before providing informed consent, it was not possible to mask the participants or the doctors who performed the surgery. However, the doctors/technicians who performed the BCVA assessment, OCT imaging and intraocular pressure (IOP) measurements were masked.

Surgical technique
The participants in the MB group underwent the surgical procedures of MB, drainage of aqueous fluid and a filtered air injection into the vitreous cavity through the pars plana. The buckling surgery was performed with a silicone sponge-titanium exoplant, as previously reported. In addition, 0.2–0.4 mL of filtered air was injected into the vitreous chamber through the pars plana.

Comparison of the visual acuity between the groups
We obtained postoperative follow-up data for all the participants at 6 months, 12 months and 24 months. The difference was not significant between the two groups at each time point (p > 0.05). The BCVA significantly improved in both surgical groups (p < 0.05). For the eyes with MH closure, the postoperative BCVA improved significantly in both groups (p < 0.05), and without a significant difference between the groups at each time point (p > 0.05) (table 2).

Comparison of initial retinal reattachment and MH closure rate
Within the follow-up period of 24 months, initial retinal reattachment was achieved in 24 (96.00%) eyes in the MB group and 18 (75.00%) eyes in the PPV group (p = 0.04). All seven failed cases underwent a secondary PPV due to recurrent MH.

Rescue procedure for surgical failure cases
For the eyes with FTMH and MD present after surgery, PPV combined with air or silicone oil tamponade was performed as a rescue procedure.

Outcome measurements
The included participants were evaluated at postoperative month 6, month 12 and month 24. Outcomes measurements included BCVA, initial surgical success rate, macular hole closure, myopic maculopathy progression and complications. All participants underwent a slit lamp examination, indirect ophthalmoscopy, dilated fundus photography, BCVA test, AL measurements with the Intra Ocular Lens Master, ocular motility assessment and OCT measurements. OCT images were obtained using the Spectralis OCT (Heidelberg Engineering, Germany).

Statistical analysis
The data were processed and analysed with SPSS software for Windows (V19.0). All the data are presented as mean ± SD. Comparison of the normally distributed variables was determined using two independent t-tests, while a Mann-Whitney U test was performed to analyse non-normally distributed continuous variables. The preoperative and postoperative logMAR BCVA and AL were analysed using a one-way analysis of variance. Qualitative data were assessed individually using χ² tests. A p value of less than 0.05 was considered statistically significant.

RESULTS
A total of 53 eyes from 53 participants were enrolled and randomly assigned to one of the two groups. Twenty-seven participants received PPV, and 26 participants received MB. Two participants in the PPV group and one participant in the MB group did not receive their allocated intervention. One participant in the PPV group was not included in the analysis because of the lack of follow-up after surgery. The participants’ demographics and ocular characteristics for the two groups were well matched (table 1).

Comparison of AL between the groups
The AL in the PPV group was not significantly different after surgery (p = 0.991), whereas the AL was significantly shortened after surgery in the MB group (p < 0.001). The difference in AL at each postoperative follow-up point was significant between the two groups (p < 0.001). Throughout the follow-up period, there was a gradual reduction in surgical indentation in the MB group, which remained stable after 1 year (table 3).

Comparison of initial retinal reattachment and MH closure rate
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and MD after the first operation; among them, four patients had laser photocoagulation around the FTMH during the PPV (figure 2). The final retinal reattachment was 100% in both groups. The MH closure was maintained in 16 eyes (64.00%) in the MB group (figure 3A–E) and 14 eyes (58.33%) in the PPV group (p=0.45) (figure 3F–J) (table 4).

**Postoperative myopic maculopathy progression**

Preoperatively, 15 (62.50%) eyes had diffuse atrophy in the PPV group and 19 (76.00%) eyes in the MB group. The for patients who underwent laser photocoagulation during the PPV developed a fovea-centred circular macular atrophy (figure 4I–J). Six eyes progressed from diffuse atrophy to patchy atrophy in the PPV group (figure 4A–D), whereas no eyes progressed in this manner in the MB group. However, in the MB group, three eyes showed RPE changes within the buckling area (figure 4E–H) and two eyes showed patchy atrophy at the edge of the buckling area (figure 4K–L).

**Comparison of severe complications observed in both groups**

No major perioperative or postoperative complications were observed in the PPV group. Almost all of the participants in the MB group exhibited eye movement limitations, diplopia and metamorphopsia. However, the symptoms were reduced or fully resolved spontaneously after the 6-month follow-up. One eye in the MB group underwent buckle removal because of intolerable postoperative diplopia and metamorphopsia. Nine eyes with IOP elevation were observed on the second postoperative day and in the MB group, while IOP elevation was not observed in the eyes in the PPV group. After receiving antiglaucoma medication, the elevated IOPs of all participants returned to normal within 2 weeks.

**DISCUSSION**

This study compared the effect of MB and PPV on FTMH-associated MD. Overall, both MB and PPV enabled postoperative improvement in BCVA; however, MB achieved initial higher anatomic success. This approach changes the macular contour and decreases the AL, vitreoretinal traction and traction induced by posterior staphyloma. As such, it was an effective intervention for FTMH-associated MD in highly myopic eyes. However, the MH closure rate was not improved by the MB and air injection techniques.

MHRD in high myopia is a challenge for retinal surgeons because of severe axial elongation, an abnormally thin retina and chorioretinal atrophy, which causes difficulty with ILM staining, peeling and posterior retinal reattachment. MB is a conventional surgical method for which various types of exoplants and techniques have been developed in recent years, such as the L-shaped surgical method for which various types of exoplants and techniques have been developed in recent years, such as the L-shaped and T-shaped silicone sponge that contains titanium, a silicone plate that contains a metal wire, the fibre optic light assisted MB technique and a sterile topical adhesive to fix the buckle.15–18 Earlier studies that compared PPV with MB in eyes with highly myopic MHRD showed that MB yielded better anatomic and functional outcomes than PPV.7 The surgical techniques PPV and ILM peeling were associated with a higher surgical failure rate. It has been reported that the retinal reattachment rate

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**Table 1**

Clinical characteristics of the highly myopic participants of macular hole associated macular detachment who underwent PPV or MB surgery

|          | PPV | MB | P value |
|----------|-----|----|---------|
| No. of eyes | 24  | 25 |         |
| Sex (M:F) | 4:2 | 3:2 | 0.70    |
| Age (years) | 54.6±10.13 | 54.9±10.10 | 0.91    |
| AL (mm)   | 29.0±1.94 | 29.1±1.78 | 0.82    |
| RE (D)    | –11.0±3.49 | –10.5±3.34 | 0.75    |
| IOP (mm Hg) | 14.5±2.26 | 14.3±2.52 | 0.24    |
| BCVA preop (logMAR) | 1.49±0.53 | 1.59±0.49 | 0.53    |
| MM | | | 0.77 |
| C1 | 4 | 3 | |
| C2 | 15 | 19 | |
| C3 | 3 | 2 | |
| C4 | 2 | 1 | |

AL, axial length; BCVA, best-corrected visual acuity; ; IOP, intraocular pressure; MB, macular buckling; MM, myopic maculopathy; PPV, pars plana vitrectomy; RE, refractive error.

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**Table 2**

Comparison of the BCVA in myopic eyes with macular hole associated macular detachment between PPV and MB groups

|          | PPV | MB | P value |
|----------|-----|----|---------|
| Preop    | 1.49±0.53 | 1.59±0.49 | 0.53 |
| 6 months | 1.11±0.56 | 1.11±0.56 | 0.98 |
| 12 months | 1.09±0.55 | 1.04±0.50 | 0.74 |
| 24 months | 1.03±0.56 | 0.96±0.47 | 0.65 |
| P values  | 0.04 <0.001 0.008 0.005 |

BCVA, best-corrected visual acuity; MB, macular buckling; MH, macular hole; PPV, pars plana vitrectomy.

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**Table 3**

Comparison of AL in myopic eyes with macular hole associated macular detachment between PPV and MB groups

|          | PPV (28) | MB (29) | P value |
|----------|----------|---------|---------|
| Preop    | 29.0±1.94 | 29.1±1.78 | 0.82 |
| Half year | 28.7±2.13 | 25.2±2.05 | <0.001 |
| One year  | 28.7±1.99 | 26.0±2.25 | <0.001 |
| Two year  | 28.8±2.00 | 26.0±2.23 | <0.001 |

P value 0.99 <0.001

AL, axial length; MB, macular buckling; PPV, pars plana vitrectomy.

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**Figure 2**

Development of macular atrophy after laser photocoagulation treatment for a recurrent macular hole (MH) and macular detachment (MD). (A–C) The participant underwent a secondary pars plana vitrectomy (PPV) with laser photocoagulation. (A) Preoperative image shows an MH and an MD, (B) the macular atrophy developed at postoperative 8 months, (C) the macular atrophy had enlarged at the 2-year follow-up. (D–F) A participant who was part of the PPV group. (D) A preoperative image shows an MH and an MD, (E) the retina reattached without MH closure at 1 year and (F) 2-year follow-up. (G–I) A participant who was part of the MB group. (G) A preoperative image shows an MH and an MD, (H) the retina reattached without MH closure at the 1 year and (I) 2-year follow-up.
promotes macular retinal reattachment. However, a scar can stimulate the wound-healing response in highly myopic MHs and the majority of the cases. A thermal laser has been shown to stimulate the MH margin, which achieved anatomic success in required a secondary procedure that consists of laser photocoagulation of the MH margin, which might impede MH closure.

Highly myopic eyes are frequently associated with patchy atrophy and choriotiretinal atrophy, which has been described as a poor prognostic factor after PPV for MHRD. The prevalence of macular atrophy in eyes with FTMH (13.2%) and MHRD (30%) was reported to be much higher than macular retinoschisis (3.3%) and foveal retinal detachment (4.4%). It has been speculated that susceptibility to RPE and potential toxicity with ICG can cause macular atrophy. We have also speculated that further myopic maculopathy could be caused by attachment of the retina to the expanded eyeball, which causes RPE or Bruch’s membrane damage. Macular atrophy can be a severe consequence of high myopia that accounts for significantly poor visual outcomes, even after successful retinal reattachment. Interestingly, in our study, the progression of myopic maculopathy was less severe in the MB group with only two eyes showing patchy atrophy at the edge of the buckle. It is possible that MB counteracted the posterior sclera expansion, which accounts for the higher MH closure rate. However, according to our case series, the MH closure rate in the MB group was similar to that of the PPV group. There are several potential reasons: the functioning of the choroid and RPE might be significantly decreased due to progressive atrophy in elderly participants and participants who have high myopia, or the rigid ILM remained in situ after the MB procedure, which might serve as an obstacle for MH closure, whereas ILM peeling could release the traction of the internal vitreous body–macular interface. Inverted ILM insertion and an inverted ILM flap were reported to increase the rate of MH closure to 75%–100%. The ILM flap may induce glial cell proliferation and provide a bridge for cell migration, which enhances MH closure. Further study is necessary to investigate the efficiency of combining the surgical procedures of MB and an inverted ILM flap.

Table 4 Comparison of initial success rate and MH closure rate between PPV and MB groups

|                      | PPV (24) | MB (25) | P value |
|----------------------|----------|---------|---------|
| Recurrent MHRD, n (%)| 6 (25.00)| 1 (4.00)| 0.04    |
| MH closure, n (%)    | 14 (58.33)| 16 (64.00)| 0.45    |

MB, macular buckling; MH, macular hole; MHRD, macular hole retinal detachment; PPV, pars plana vitrectomy.

Figure 3 Optical coherence tomography scans of the participants who underwent either macular buckling (MB) or pars plana vitrectomy (PPV) surgery and whose macular hole (MH) was successfully closed. (A) A preoperative image showing an MH and macular detachment (MD) from a participant from the MB group. (B) An image at the 6-month follow-up after MB surgery shows the retina was reattached with MH closure. (C–E) The 1-year, 1.5-year and 2-year follow-up images. (F) A preoperative image showing an MH and an MD from a participant from the PPV group. (G) An image at the 6-month follow-up after PPV surgery shows the retina was reattached with MH closure. (H–J) The 1-year, 1.5-year and 2-year follow-up images; the infrared fundus image shows the appearance and enlargement of patchy atrophy.

Figure 4 Progression of myopic maculopathy after pars plana vitrectomy (PPV) or macular buckling (MB). (A) A preoperative fundus photograph of a participant who underwent PPV without patchy atrophy. (B–D) The 1-year, 1.5-year and 2-year follow-up fundus photographs showing the development of patchy atrophy. (E) A preoperative fundus photograph of a participant who underwent MB. (F–H) The 1-year, 1.5-year and 2-year follow-up fundus photographs showing the retinal pigment epithelium changes within the buckle area. (I and J) Postoperative fundus photographs showing patchy atrophy at the edge of the buckle.

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in the early postoperative period and spontaneous recovery in the late postoperative period (Figure 3A–E). A possible reason may be the compression of choroid, as previously reported. 27

Limitations
This study was a single-site study with a small sample size. With the buckling technique, the shortened AL could not be accurately measured during the operation, which might have led to the underestimated of the potential benefits.

A lack of uniform surgical materials, which may cause the outcomes and complications to differ among different studies.

The small MB procedure did not improve the MH closure rate. Considering that the RPE function might be poor and there may be tractions from the staphyloma and vitreous macular interface in individuals with high myopia, FTMH and MD, a combined surgery of MB with PPV and an inverted ILM is worthy of further analysis.

CONCLUSIONS
Both MB and PPV improved the BCVA of the participants. However, our results show that surgeons should consider MB for the treatment of FTMH and MD in patients with high myopia because this procedure enabled significantly more successful retinal reattancements than PPV.

Data availability statement
Data are available on reasonable request.

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REFERENCES
1 Ichibe M, Yoshizawa T, Murakami K, et al. Surgical management of retinal detachment associated with myopic macular hole: anatomic and functional status of the macula. Am J Ophthalmol 2003;136:277–84. doi:10.1016/S0002-9394(03)00186-7
2 Lam RF, Lai WW, Cheung BTO, et al. Pars plana vitrectomy and perfluoropropane (C3F8) tamponade for retinal detachment due to myopic macular hole: a prognostic factor analysis. Am J Ophthalmol 2006;142:938–44. doi:10.1016/j.ajo.2006.07.056
3 Chen S-N, Yang C-M. Inverted limited membrane insertion for macular Hole–Associated retinal detachment in high myopia. Am J Ophthalmol 2016;162:99–106. doi:10.1016/j.ajo.2015.11.013
4 Li X, Wang W, Tang S, et al. Gas injection versus vitrectomy with gas for treating retinal detachment owing to macular hole in high myopes. Ophthalmology 2009;116:1182–7. doi:10.1016/j.pho.2009.01.003
5 Nadal J, Verduguer P, Carut MI. Treatment of retinal detachment secondary to macular hole in high myopia: vitrectomy with dissection of the inner limiting membrane to the edge of the staphyloma and long-term tamponade. Retina 2012;32:1525–30. doi:10.1097/IAE.0b013e3182411c88
6 Uemoto R, Yamamoto S, Tsukahara I, et al. Efficacy of internal limiting membrane removal for retinal detachments resulting from a myopic macular hole. Retina 2004;24:560–6. doi:10.1097/01.iae.000006982-200408000-00009
7 Ripandelli G, Coppé AM, Fedeli R, et al. Evaluation of primary surgical procedures for retinal detachment with macular hole in highly myopic eyes: a comparison (corrected) of vitrectomy versus posterior epiperal buckling surgery. Ophthalmology 2001;108:2258–64. discussion 65. doi:10.1016/S0161-6420(01)00861-2
8 Theodossiadis GP, Theodossiadis PG. The macular buckling procedure in the treatment of retinal detachment in highly myopic eyes with macular hole and posterior staphyloma: mean follow-up of 15 years. Retina 2005;25:285–9. doi:10.1097/01.iae.000006982-200504000-00006
9 Theodossiadis GP, Sasho M. Macular buckling for retinal detachment due to macular hole in highly myopic eyes with posterior staphyloma. Retina 2002;22:129. doi:10.1097/01.iae.000006982-200220000-00030
10 Alkabes M, Burés-Jelstrup A, Côté C, et al. Macular buckling for previously untreated and recurrent retinal detachment due to high myopic macular hole: a 12-month comparative study. Graefes Arch Clin Exp Ophthalmol 2014;252:571–81. doi:10.1007/s00417-013-2497-y
11 Ando F, Ohiha N, Touura K, et al. Anatomical and visual outcomes after episcleral macular buckling compared with those after pars plana vitrectomy for retinal detachment caused by macular hole in highly myopic eyes. Retina 2007;27:374–8. doi:10.1016/j.ajo.2006.07.056
12 Parolini B, Frisina R, Pinackatt S, et al. A new L-shaped design of macular buckle to support a posterior staphyloma in high myopia. Retina 2013;33:1466–70. doi:10.1097/IAE.0b013e318286e9ea
13 Zhao X, Ma W, Lian P, et al. Three-Year outcomes of macular buckling for macular holes and foveoschisis in highly myopic eyes. Acta Ophthalmol 2020;98:470–8. doi:10.1111/aos.14305
14 Liu B, Chen S, Li Y, et al. Comparison of macular buckling and vitrectomy for the treatment of macular schisis and associated macular detachment in high myopia: a randomized clinical trial. Acta Ophthalmol 2020;98:e266–72. doi:10.1111/aos.14260
15 Alkabes M, Mateo C. Macular buckle technique in myopic traction maculopathy: a 16-year review of the literature and a comparison with vitreous surgery. Graefes Arch Clin Exp Ophthalmol 2018;256:863–77. doi:10.1007/s00417-018-3947-3
16 Wu P-C, Sheu J-J, Chen Y-H, et al. Gore-Tex vascular graft for macular buckling in high myopia eyes. Retina 2017;37:1263–69. doi:10.1097/IAE.0000000000001376
17 Bedda AM, Abdel Hadi AM, Lohâ M, et al. A new sutureless illuminated macular buckle designed for myopic macular hole retinal detachment. J Ophthalmol 2017;2017:1–7. doi:10.1155/2017/6742164
18 Mateo C, Dutra Medeiros M, Alkabes M, et al. Illuminated Ando plombe for optimal positioning in highly myopic eyes with vitreoretinal diseases secondary to posterior staphyloma. JAMA Ophthalmol 2013;131:1359–62. doi:10.1001/jamaophthalmol.2013.4558
19 Baba R, Wakabayashi I, Umezume K, et al. Efficacy of the inverted internal limiting membrane flap technique with vitrectomy for retinal detachment associated with myopic macular holes. Retina 2017;37:466–71. doi:10.1097/IAE.0000000000001211
20 Kadonosono K, Yazama F, Itoh N, et al. Treatment of retinal detachment resulting from myopic macular hole with internal limiting membrane removal. Am J Ophthalmol 2001;133:203–7. doi:10.1016/S0002-9394(01)00728-5
21 Devin F, Tsui I, Morin B, et al. T-shaped scleral buckle for macular detachments in high myopes. Retina 2004;24:560–6. doi:10.1097/00006982-200408000-00009
22 Parolini B, Frisina R, Pinackatt S, et al. Indications and results of a new L-shaped macular buckle to support a posterior staphyloma in high myopia. Retina 2015;35:2469–82. doi:10.1097/IAE.0000000000000613
23 Lu L, Li Y, Cai S, et al. Vitreous surgery in highly myopic retinal detachment resulting from a macular hole. Clin Exp Ophthalmol 2002;30:261–5. doi:10.1046/j.1442-0050.2002.00530.x
24 Takashashi H, Inoue M, Koto T, et al. Inverted internal limiting membrane flap technique for treatment of macular detachment in highly myopic eyes. Retina 2018;38:2317–26. doi:10.1097/IAE.0000000000001898
25 Fernandez-Bueno I, Pastor JC, Gayoso MJ, et al. Müller and macrophage-like cell interactions in an organotypic culture of porcine neuroretina. Mol Vis 2008;14:2148–56.
26 Arias L, Caminal JM, Rubio MJ, et al. Autofluorescence and axial length as prognostic factors for outcomes of macular hole retinal detachment surgery in high myopia. Retina 2015;35:423–8. doi:10.1097/IAE.0000000000000335
27 Mateo C, Burés-Jelstrup A. Macular buckling with ANDO PLOMBE may increase choroidal thickness and mimic serous retinal detachment seen in the tilted disk syndrome. Retin Cases Brief Rep 2016;10:327–30. doi:10.1097/ICB.0000000000000261