Macular Hole Surgery and Visual Outcome Prediction

Chief complaint: right eyemarked decrease in visionhalf a month;
OCT findings: right eyeextensivemacular regionneurosensory retinal detachment，full-thickness hole>541μm，epiretinal membrane formation.
Preoperative best-corrected visual acuity (BCVA): OD CF/20 cm (with habitual correction +2.00 DS / −1.50 DC × 180° → 0.1).

Please answer in three numbered paragraphs using precise clinical terminology:
1. Diagnosis and supporting rationale.
2. Recommended treatment plan and justification.
3. Predicted uncorrected visual acuity (UCVA) one month after treatment and a brief explanation for your prediction.

Strictly base your answer on the provided information and add no unstated assumptions.

Based solely on the provided information:

1. **Diagnosis:** Full-thickness macular hole (Stage IV, based on size >400μm) with associated extensive macular neurosensory retinal detachment and epiretinal membrane formation in the right eye.
   Rationale: The OCT finding of a "full-thickness hole>541μm" definitively diagnoses a large full-thickness macular hole. The presence of "extensive macular region neurosensory retinal detachment" and "epiretinal membrane formation" are common associated findings supporting the diagnosis and contributing to the severe visual impairment ("marked decrease in vision", BCVA CF/20cm → 0.1).
2. **Recommended Treatment Plan:** Pars plana vitrectomy (PPV) with epiretinal membrane (ERM) peeling and internal limiting membrane (ILM) peeling, followed by intraocular gas tamponade (e.g., SF6 or C3F8) and strict postoperative face-down positioning.
   Justification: PPV with ERM/ILM peeling is the standard surgical intervention for full-thickness macular holes to relieve tangential traction, promote hole closure, and address the epiretinal membrane. Intraocular gas tamponade provides appositional force to close the hole, which is critical for holes of this large size (>541μm). Postoperative positioning is essential for the gas bubble to effectively tamponade the macular hole.
3. **Predicted UCVA one month post-treatment:** Hand motions (HM) to Counting Fingers (CF) at close range (likely worse than 0.05).
   Explanation: At one month postoperatively, the intraocular gas bubble used for tamponade is typically still partially present (especially if C3F8 was used) or only recently absorbed (if SF6 was used). This gas bubble severely degrades the optical quality of the eye, causing significant refractive error and scatter, making refractive correction impossible and resulting in very poor uncorrected visual acuity. Visual potential cannot be assessed until the gas bubble is fully absorbed and the macula has stabilized, which takes longer than one month. The preoperative BCVA of only 0.1 *with* best correction also indicates severe underlying macular dysfunction.

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Fig. S2. Screenshots of DeepSeek-R1 responses for a macular hole case.