Figure legends

FIGURE 1. Representative fundus photograph and swept source optical coherence tomography (SS-OCT) B-scan image of the macular intraretinal hemorrhage (IRH) and the associated "fluffy sign".

The patient is a 67-year-old woman with submacular hemorrhage (SMH) attributable to retinal arterial macroaneurysm (RAM) rupture. (**A**) Fundus photograph of SMH associated with ruptured RAM. The black arrow shows the RAM. Black arrowheads show the “fluffy sign”, a result of the hemorrhage spreading radially from the fovea. (**B**) B-scan image of SMH associated with ruptured RAM. (**C**) Schematic imaging of hemorrhagic area. The gray area shows the SMH, and the checked area shows the macular IRH. The white X shows the fovea, and the black line indicates the location corresponding to the B-scan image. In the B-scan image, the macular IRH is localized in the outer plexiform layer surrounding the macula. The white continuous lines indicate bilateral margins of the macular IRH, and the white dotted lines indicate the bilateral margins of the SMH. The fluffy hemorrhage (fluffy sign) in the color fundus photograph corresponds to the region of macular IRH without SMH that can be seen directly under the IRH in the SS-OCT B-scan image. The white arrows indicate the shortest distance from the internal limiting membrane to the subretinal hemorrhage at the fovea.

FIGURE 2. Graph showing the best-corrected visual acuity (BCVA) of patients with submacular hemorrhage (SMH) attributable to ruptured retinal arterial macroaneurysm (RAM) with and without preoperative macular intraretinal hemorrhage (IRH) at baseline, 1 month, and 6 months after surgery for SMH.

The preoperative BCVA values did not significantly differ between the IRH (+) and the IRH (-) group. Postoperative BCVA values differed significantly between the IRH (+) group and the IRH (-) group at both 1 month and 6 months. Between baseline and 1 month after surgery, both groups showed significant improvement in BCVA. Between 1 and 6 months after surgery, the IRH (-) group showed significant improvement, but the IRH (+) group did not. Error bars represent maximum and minimum values. logMAR, logarithm of the minimal angle of resolution; n.s. = not significant, *P < .05, **P < .01.

FIGURE 3. Scatterplot comparing best-corrected visual acuities (BCVAs) before surgery and 6 months after surgery in patients with submacular hemorrhage attributable to retinal arterial macroaneurysm.

● shows cases with macular intraretinal hemorrhage (IRH). X shows cases without macular IRH. logMAR = logarithm of the minimal angle of resolution.

FIGURE 4. Representative results of submacular hemorrhage (SMH) displacement in a 63-year-old woman with SMH and macular intraretinal hemorrhage (IRH) attributable to retinal arterial macroaneurysm (RAM).

(**A**, **B**) Fundus photograph at initial visit showing SMH, preretinal hemorrhage (PRH, black dotted area) adjacent to RAM (white arrowhead), and fluffy sign (black arrowheads) spreading radially from the fovea (white X). The black line indicates the location corresponding to the B-scan section shown in (**F**). (**C**) Fundus photograph at 1 month after surgery showing that the PRH and SMH had moved to the inferior periphery. (**D**) Fundus photograph at 6 months after surgery showing complete

disappearance of hemorrhage. (**E**, **F**) Swept source optical coherence tomography (SS-OCT) image at initial visit showing dense SMH (white asterisk) and macular IRH localized in the outer plexiform layer around the macula (black asterisks). The distance from the internal limiting membrane to the hemorrhage is 23 μm. (**G**, **H**) SS-OCT image at 1 month (**G**) and 6 months (**H**) after surgery showing disappearance of SMH and IRH. The fovea had atrophied and the retinal outer layer structure of the fovea had become disrupted (white arrow). The best-corrected visual acuity was improved from 20/502 before surgery to 20/200 at 1 month after surgery and 20/100 at 6 months after surgery.

FIGURE 5. Representative results of submacular hemorrhage (SMH) displacement in an 86-year-old woman with SMH without macular intraretinal hemorrhage attributable to retinal arterial macroaneurysm (RAM).

(**A**, **B**) Fundus photograph at initial visit showing SMH and preretinal hemorrhage adjacent to RAM (white arrow head). The edge of the SMH is smooth and the fluffy sign cannot be detected. The white X shows the fovea and the black line indicates the location corresponding to the B-scan section shown in (**F**). (**C**) Fundus photograph at 1 month after surgery showing that almost all of the SMH had moved away from the macula. (**D**) Fundus photograph at 6 months after surgery showing complete disappearance of the hemorrhage. (**E**, **F**) Swept source optical coherence tomography (SS-OCT) image at initial visit showing dense SMH (asterisk). The distance from the internal limiting membrane to the hemorrhage is 138 μm. IRH cannot be detected. (**G**) SS-OCT image at 1 month after surgery showing almost complete disappearance of the SMH. The retinal outer layer structure at the fovea

was continuous (white arrow). (**H**) SS-OCT image at 6 months after surgery showing that the retinal outer layer structure at the fovea had maintained continuity (white arrow). The best-corrected visual acuity improved from 20/132 before surgery to 20/40 at 1 month after surgery and 20/22 at 6 months after surgery.

FIGURE 6. Schematic drawings showing the speculated pathological mechanism of submacular hemorrhage (SMH) with macular intraretinal hemorrhage (IRH) and the fluffy sign.

Black arrowheads show the retinal macroaneurysm (RAM). X marks show the fovea. Gray areas show the SMH and black areas show the IRH. White arrows show the flow of blood. (**A**, **E**) Ophthalmoscopic and vertical B-scan OCT images of the eye show the RAM located superior to the fovea. (**B**, **F**) The RAM ruptures and the blood flows vigorously into the subretinal space. The pressure applied to the retina from the subretinal space increases with increasing SMH volume. (**C**, **G**) The pressure from the subretinal space keeps increasing, and this leads to the subretinal blood penetrating the outer layer of the fovea and flowing into the intraretinal space. (**D**, **H**) Blood that flows into the intraretinal space spreads radially from the fovea due to the pressure from subretinal bleeding.

FIGURE 7. Schematic drawings showing the speculated pathological mechanism of submacular hemorrhage (SMH) with macular intraretinal hemorrhage (IRH) and the fluffy sign.

Black arrowheads show the retinal macroaneurysm (RAM). X marks show the fovea. Gray areas show the SMH, and black areas show the IRH. White arrows show the

flow of blood. (**A**, **E**) Ophthalmoscopic and vertical B-scan OCT images of the eye show the RAM located superior to the fovea. (**B**, **F**) Oozing of blood occurs in the intraretinal space around the RAM. (**C**, **G**) The RAM ruptures, and consequent subretinal bleeding compresses the preexisting intraretinal blood from below. (**D**, **H**) As the volume of subretinal bleeding increases, the pressure from the subretinal space increases and the intraretinal hemorrhage spreads radially to the peripheral retina.

Figure1

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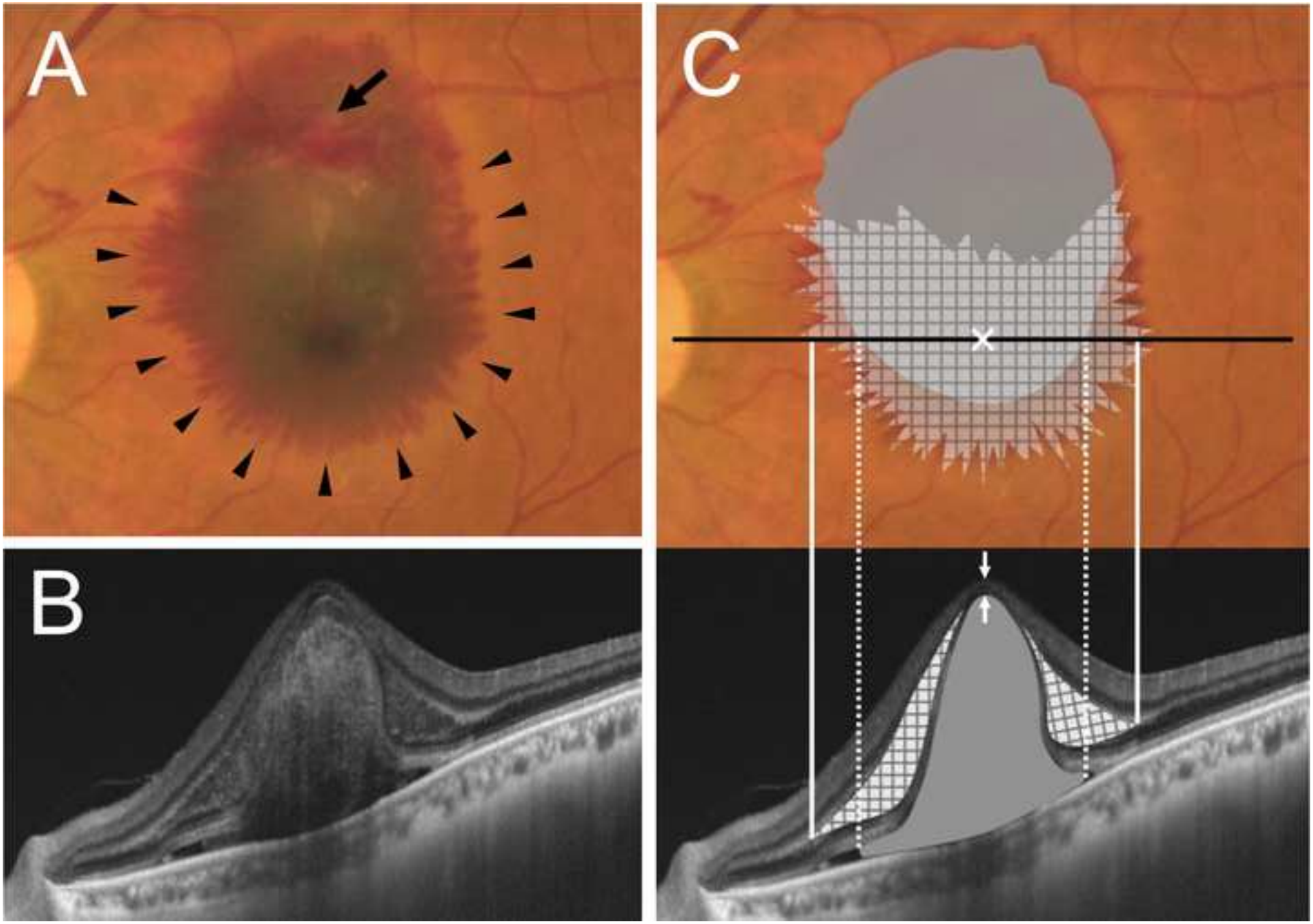

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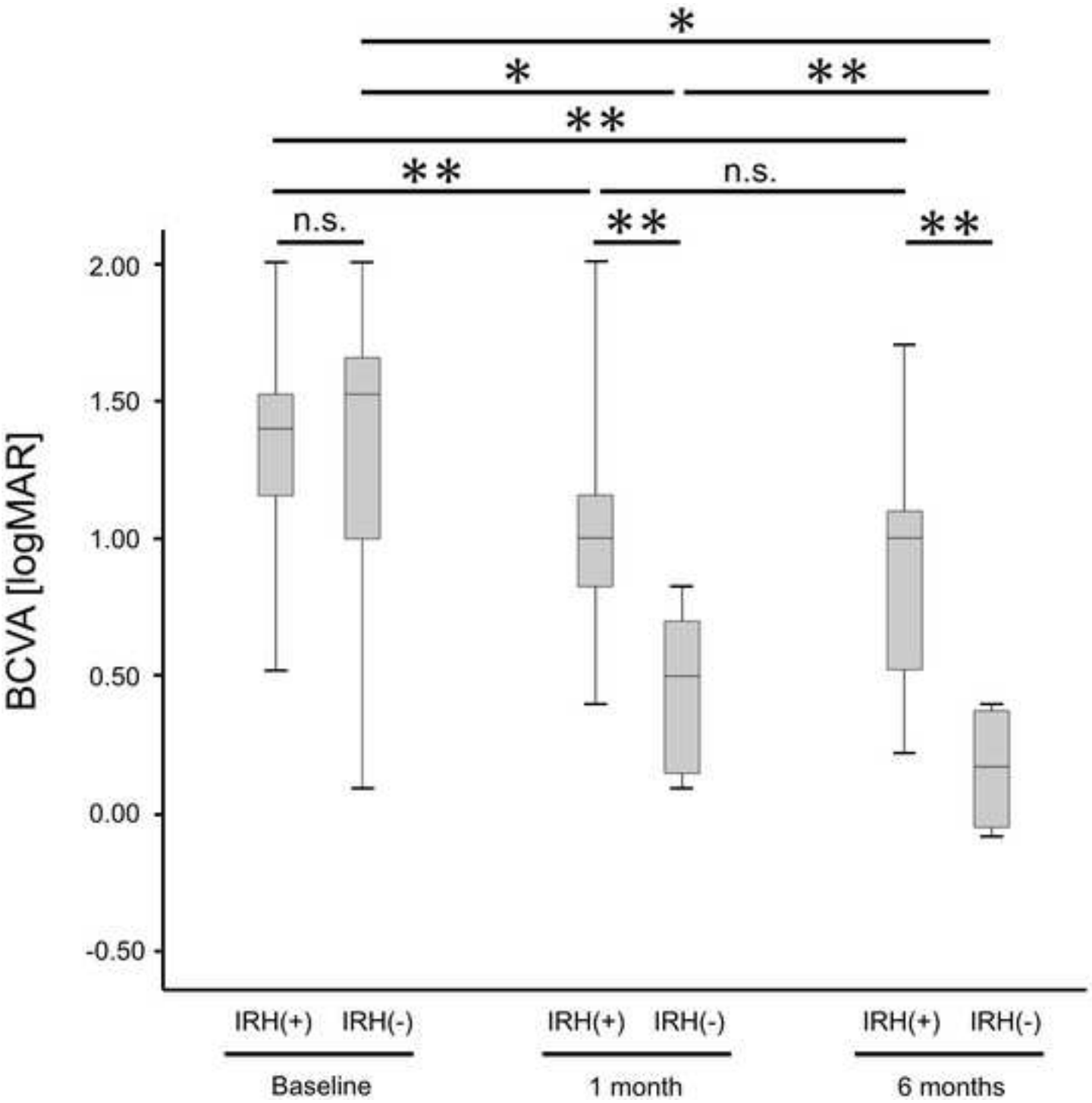

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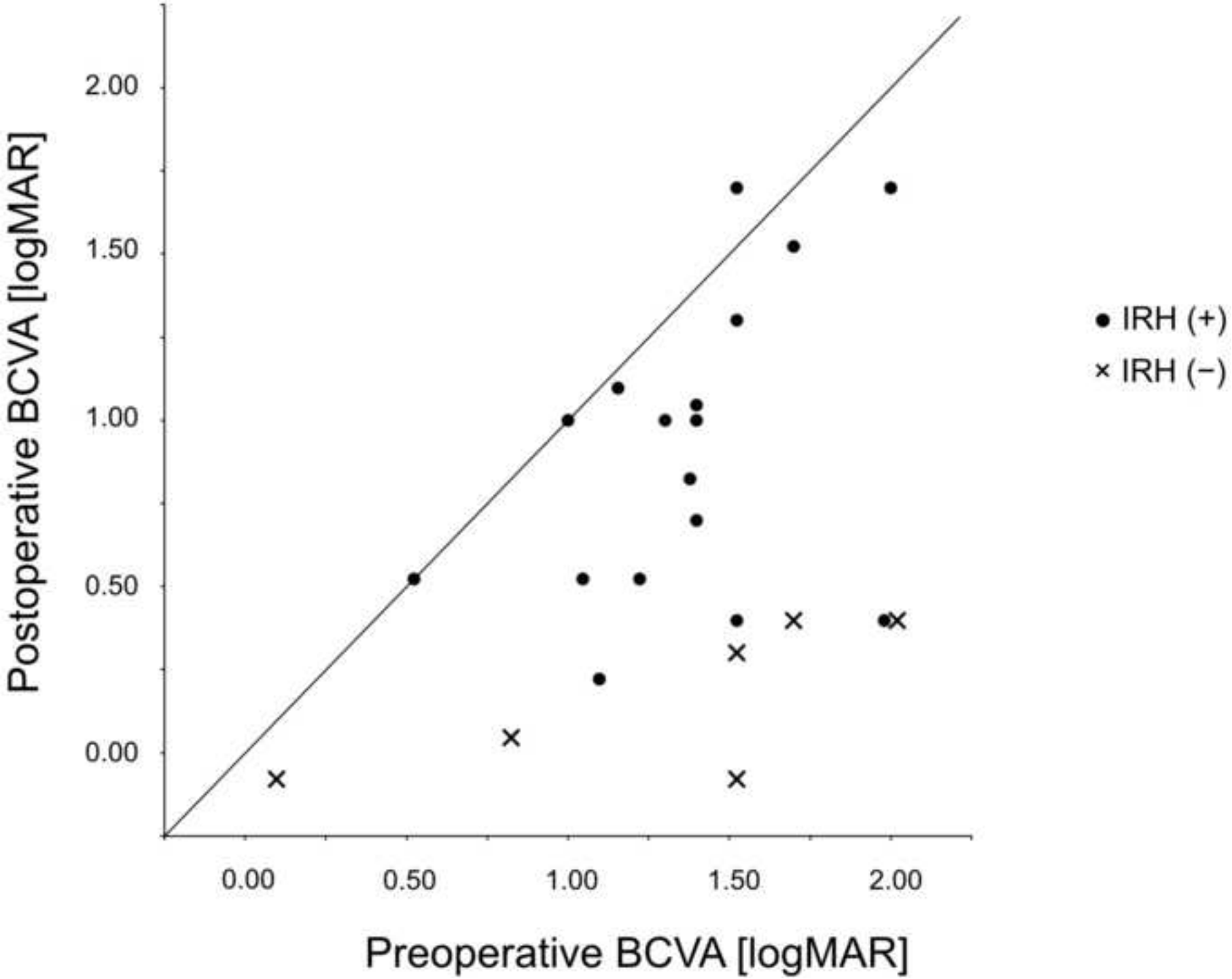

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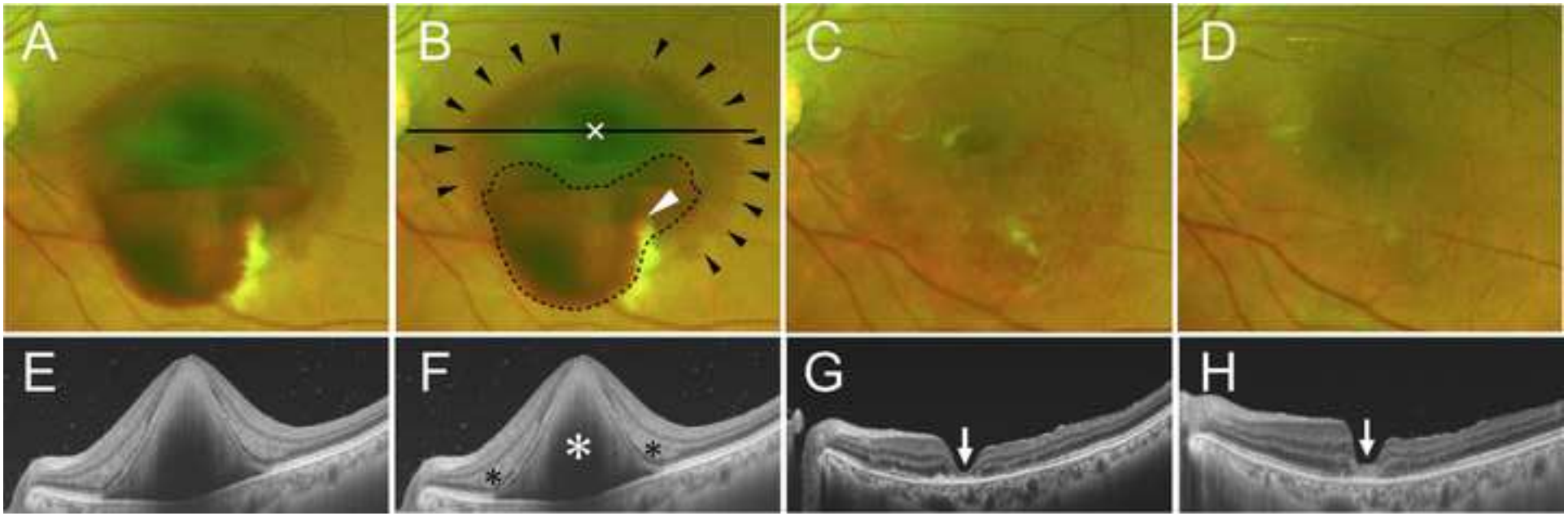

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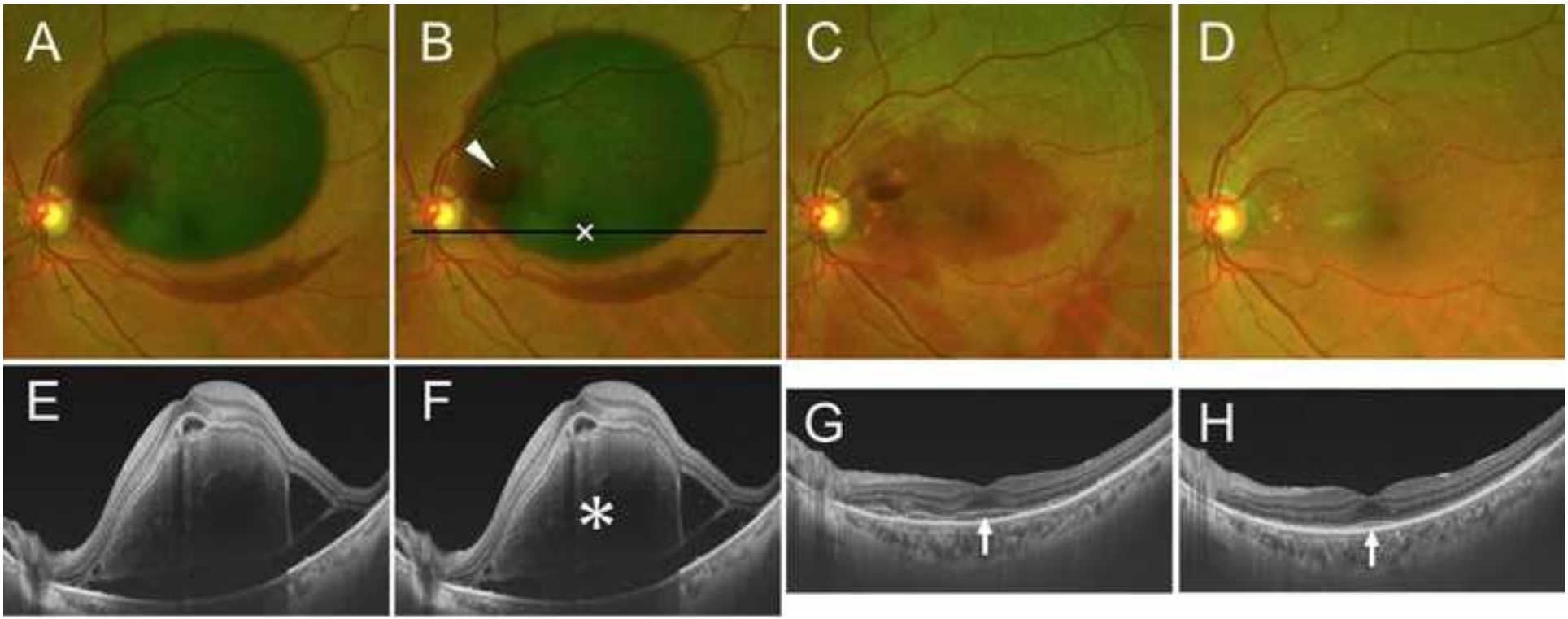

Figure6

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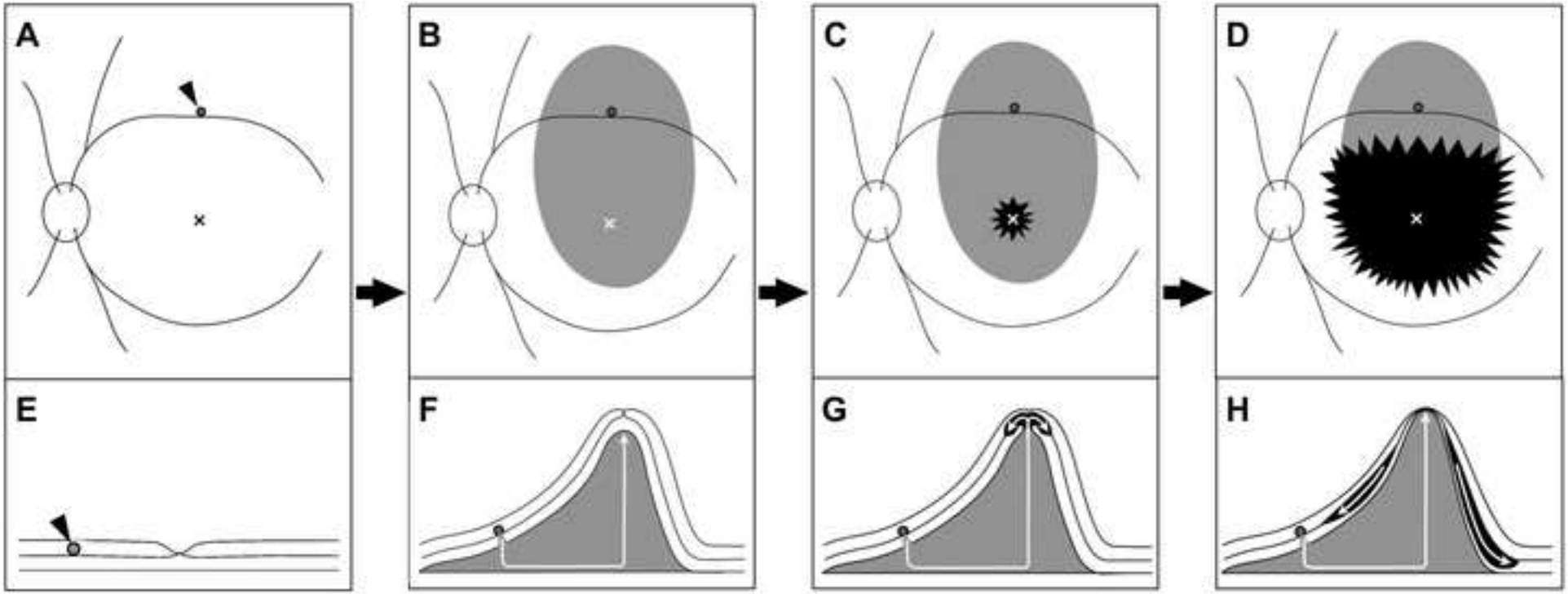

Figure7

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