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Longitudinal Observation of Two Giant Peripheral Atrophic Retinal Holes Left Untreated

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ABSTRACT: In this report, two rare cases of large atrophic peripheral retinal holes are described. Both patients presented during a routine visit without reporting any ocular symptoms. The holes did not exhibit significant risk factors for progression to rhegmatogenous retinal detachment: No signs of posterior vitreous detachment, vitreoretinal tractions, or retinal degeneration were visible. For such asymptomatic cases, international guidelines recommend a strict follow-up schedule; however, the unusual size of the holes raised significant concerns about the management of these retinal breaks. The advantages and disadvantages of laser photocoagulation treatment were discussed, ultimately favoring a watch-and-wait strategy.

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Peripheral retinal breaks are well-known risk factors for rhegmatogenous retinal detachment (RRD), along with peripheral retinal degenerations, posterior vitreous detachment (PVD), RRD in the fellow eye, cataract surgery, myopia, and trauma.[1] However, asymptomatic breaks were identified in approximately 6% of eyes in both clinical and autopsy studies, while only a small percentage of these retinal lesions progressed to retinal detachment.[2] Based on morphology and the presence of vitreous traction, retinal breaks are classified into atrophic round holes, with or without opercula; flap or horseshoe tears; and giant retinal tears.[3]

Recently, the therapeutic management of atrophic retinal holes has changed significantly. Epidemiological studies and clinical evidence have led to a considerable decrease of peripheral argon laser treatments, now primarily recommended for symptomatic retinal breaks or asymptomatic breaks in the context of PVD, vitreoretinal tractions or other significant risk factors.[1,4,5]

THE CASES

Two patients, a 56-year-old woman and a 53-year-old man, presented to our clinic for routine ophthalmological screening, with a best-corrected visual acuity of 20/20 and normal intraocular pressure in both eyes. Slit lamp biomicroscopy of the anterior segment was unremarkable.

Fundus examination of the woman revealed a large peripheral retinal hole in the superotemporal sector of the right eye, about 4.0 × 5.0 mm (wide by tall) in diameter; the man was diagnosed with a retinal hole in the inferotemporal sector of the left eye (4.0 mm in diameter). The holes were not identified in previous visits, and the fellow eyes were normal. Both patients were asymptomatic. Recent history was negative for traumas, eye surgery, or any relevant ophthalmological disease.

The retinal hole of the woman was photographed with a traditional fundus camera (**Figure 1**), then both holes were photographed with a widefield device (Zeiss Clarus 500, Carl Zeiss Meditec, Jena, Germany; **Figures 2 and 3**). The margins of the holes were flat and sclerotic, showing a white-grayish color; they did not detach upon scleral buckling. No operculum or signs of vitreous tractions were visible. The vitreous body was confirmed to be completely adhering to the retina by B-scan ultrasonography. Optical coherence tomography highlighted the presence of a full-thickness retinal defect in the region of the holes. Lattice

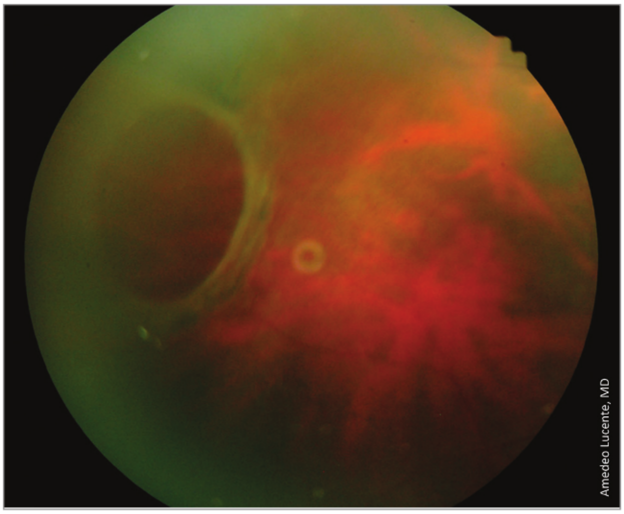

Figure 1. Retinography of the superotemporal retinal hole in the right eye of the female patient, obtained with a traditional fundus camera.

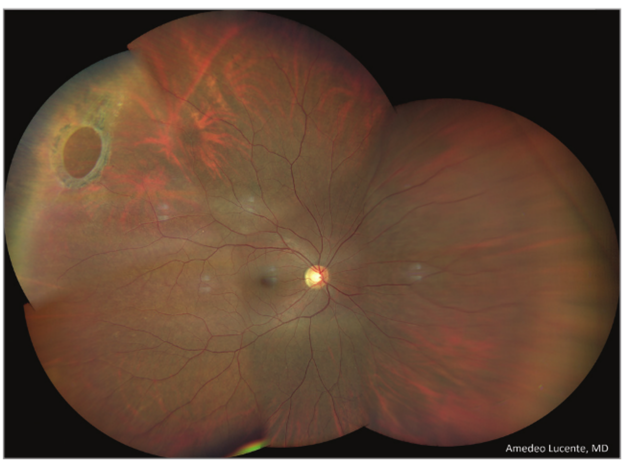

Figure 2. Retinography of the superotemporal retinal hole in the right eye of the female patient, obtained with a widefield device.

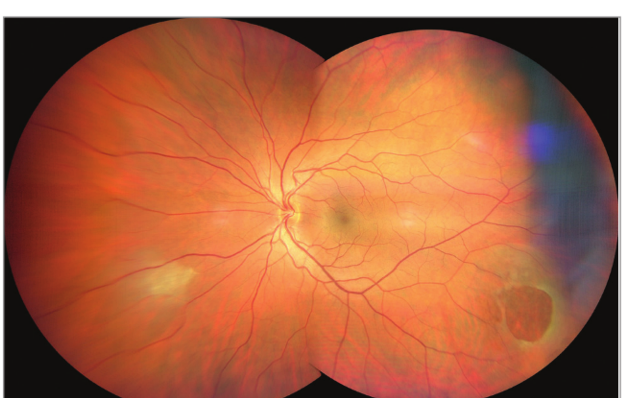

Figure 3. Retinography of the inferotemporal retinal hole in the left eye of the male patient, obtained with a widefield device. The hole is surrounded by an area of dystrophy of the retinal pigment epithelium, without detachment of the neuroretina.

or palisade degeneration was not visible in the surrounding retinal surface.

In addition to the questions about the pathogenesis of these retinal breaks, the immediate decision was whether or not to treat with argon laser photocoagulation. A conservative approach was chosen in both cases, planning a strict follow-up schedule. To date, the patients have been followed for 5 and 3 years respectively, with no significant changes to the morphology of the holes.

DISCUSSION

This report describes two similar cases of large peripheral retinal breaks (≥4.0 mm in diameter) diagnosed in asymptomatic patients, without anomalies of the vitreoretinal interface. The two atrophic retinal holes share many morphological features, including the large diameter and the absence of operculum. Although the holes were not reported in previous visits, the pathogenesis was arguably congenital, since no signs of retinal degenerations or vitreoretinal tractions were identified during fundus examination. Widefield imaging allowed much easier detection and characterization of the retinal holes compared with traditional fundus cameras.

According to the Preferred Practice Patterns® of the American Academy of Ophthalmology, an asymptomatic atrophic retinal break without evidence of PVD rarely requires treatment, because of the low incidence of progression to RRD (0% to 0.8%).[5] However, given the unusual size of these retinal holes, there was significant uncertainty about their management, questioning whether prophylactic photocoagulation treatment could be the optimal choice. First, the large diameter of the holes might suggest a higher risk of progression to RRD; furthermore, in case of RRD, the prognosis may be worse due to the wide area of the retinal break.

On the other hand, performing a photocoagulation treatment for such large retinal holes requires a very high number of spots. To simplify, the smaller hole can be considered as a circle with a mean diameter (RH_d) of 4.0 mm. The length of its circumference (RH_c) is calculated as:

$$RH_c = RH_d \times \varpi \approx 4.0\ \text{mm} \times 3.14 \approx 12.56\ \text{mm} \approx 12560\ \mu\text{m}$$

Choosing a spot size (RH_{ss}) of 100 µm, the number of spots in one circumferential row around the hole (RH_{sn}) would be approximately equal to:

$$RH_{sn} = RH_c / RH_{ss} = 12560\ \mu\text{m} / 100\ \mu\text{m} \approx 125\ \text{spots}$$

Considering four concentric circumferential rows of laser spots, approximately 500 spots may be required for a complete laser barrage. This is most likely an overestimation as laser spots are not perfectly adjacent. However, the high-energy absorption is certainly relevant and may induce dangerous vitreoretinal tensions and tearing leaks over time.

Considering all these factors, laser photocoagulation treatment was not performed. Instead, a strict follow-up schedule was planned (ie, every 3 months for the first year, then every 6 months), reserving the possibility to perform a laser barrage for later, in case of PDV or symptoms suggestive of vitreoretinal modifications.

CONCLUSION

Despite the unique anatomical characteristics of these retinal holes, the watch-and-wait strategy was arguably the most logical choice for this case, given the nontractional pathogenesis of the hole.

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