CASE REPORT OLGU SUNUMU

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Closure Without Surgery: A Report of Two Cases with Spontaneous Idiopathic Small Full-Thickness Macular Hole Closure

Ameliyatsız Kapanma: İdiyopatik Küçük Tam Kat Makula Deliğinin Spontan Kapanmasıyla İlgili İki Olgunun Sunumu

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ABSTRACT Full-thickness macular hole (FTMH) is a complete defect of the neurosensory retina located in the central fovea. Spontaneous closure incidence in idiopathic FTMHs ranges from 3-15%. Of these cases, 62.7% were female, with a mean age of 67.5 years. Contrary to the existing literature, 2 rare cases of small FTMH with a predominance of male patients are presented. The common features observed in the spectral-domain optical coherence tomography images of both cases include small (≤250 µm) FTMH, schisis at the edges of the hole, the presence of an operculum associated with recently detached posterior vitreous from the fovea, and elevation of the ellipsoid zones at the margins of the macular hole.

Keywords: Full-thickness macular hole; operculum; optical coherence tomography; schisis; spontaneous closure

ÖZET Tam kat makula deliği (TKMD), merkezi foveada bulunan nörosensoriyel retinanın tam kat defektidir. İdiopatik TKMD'lerde spontan kapanma insidansı %3-15 arasında değişmektedir. Bildirilen vakaların %62,7'si kadındır ve ortalama yaş 67,5'tir. Mevcut literatürün aksine, burada erkek hastalarda görülen 2 nadir küçük TKMD vakası sunulmaktadır. Her iki vakada da spektral-domain optik koherens tomografi görüntülerinde ortak özellikler gözlenmiştir. Küçük boyutlu TKMD (≤250 µm), deliğin kenarlarında şizis (ayrılma), foveadan yeni ayrılmış arka vitreusa bağlı operkulum varlığı ve makula deliğinin kenarlarında ellipsoid bölgelerin elevasyonu bu özelliklerdendir.

Anahtar Kelimeler: Tam kat makula deliği; operkulum; optik koherens tomografi; şizis; spontan kapanma

A full-thickness macular hole (FTMH) is a complete defect of the neurosensory retina located in the central fovea. While macular holes (MH) may arise secondary to trauma or macular edema, most cases are primary and occur without a known cause (idiopathic).[1] The prevalence of FTMH was documented as 0.2 per 1,000 individuals in Australia and 3.3 per 1,000 in the United States.[2,3] According to a separate study, the incidence rate of MH was found to be 7.8 cases per 100,000 person-years.[4] Idiopathic FTMH holes increase with age, are more common in females, and are not associated with systemic or ocular disorders.[1]

Gass reported that the underlying mechanism of MH development is vitreous traction to the fovea.[5] Implementing spectral-domain optical coherence tomography (SD-OCT) provides high-resolution, cross-sectional imaging that is pivotal for elucidating the structural complexities and pathophysiology of vitreomacular interface disorders in ophthalmology.

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In 2013, the International Vitreomacular Traction Study (IVTS) group proposed an OCT-based anatomical classification of vitreomacular interface disorders as vitreomacular adhesion, vitreomacular traction (VMT), and FTMH.[6]

Spontaneous closure of idiopathic FTMH is less frequent than for secondary traumatic MH, yet more prevalent than for myopic macular holes, which exhibit a rare tendency for spontaneous resolution.[7] In a retrospective review of cases at our retina clinic over the past 5 years, we observed spontaneous closure in 2 out of 151 idiopathic FTMH patients who were either treated or followed conservatively. The purpose of this study is to present these 2 cases of spontaneous closure of idiopathic, small-size FTMH and to analyze the common clinical and imaging characteristics observed in these cases.

CASE REPORT

CASE-1

A 64-year-old male patient presented with a 4-month history of decreased visual acuity and metamorphopsia in his right eye. He had no history of trauma, and his systemic and medical history was unremarkable. The best-corrected visual acuity (BCVA) was 20/200 in the right and 20/20 in the left. The anterior segment examination was unremarkable. An MH was present in the right eye and an epiretinal membrane (ERM) in the left eye, with normal optic discs. The OCT B-scan demonstrated an FTMH, measuring a narrowest diameter of 137 µm, with a formed operculum and cystic formation. Basal hole size was 452 µm, and parafoveal retinal thickness was 349 µm. Surgical treatment was recommended to the patient; however, he did not accept it for personal reasons and continued to be followed up regularly. Three months later, he had spontaneous FTMH closure with BCVA improvement to 20/80. Further follow-up and continued healing showed closure of the FTMH; however, he had lamellar MH and ERM with 20/50 BCVA in the 12th month of the follow-up period (Figure 1).

CASE-2

A 65-year-old male patient presented with complaints of low vision and central scotoma in the left eye for approximately 3 months. He had no history of trauma

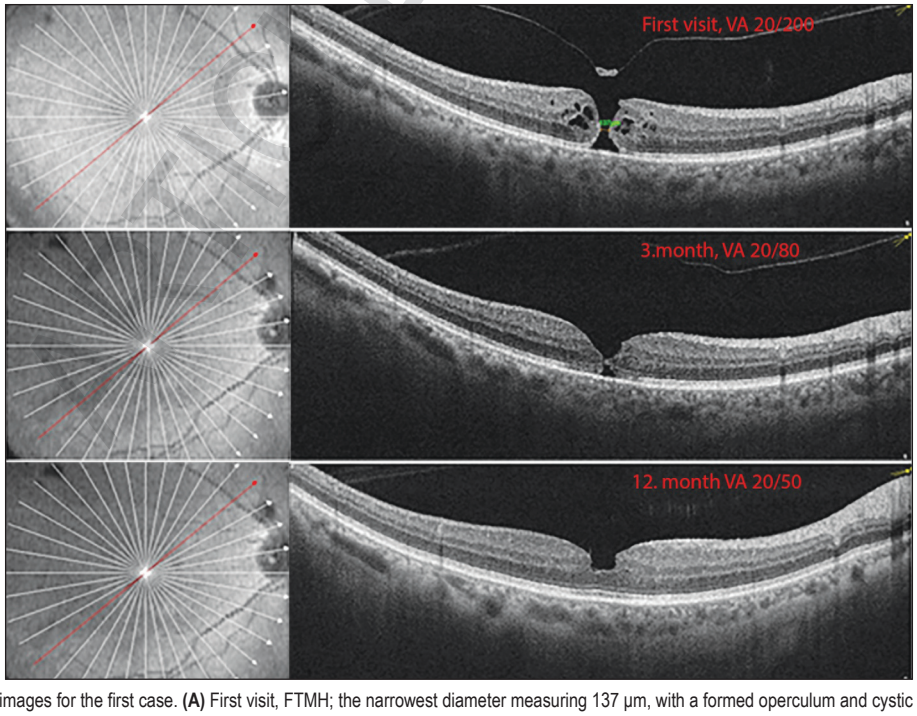

FIGURE 1: SD-OCT images for the first case. **(A)** First visit, FTMH; the narrowest diameter measuring 137 µm, with a formed operculum and cystic formation; **(B)** Third month, spontaneous FTMH closure; **(C)** Twelveth Month, MH is closed, but the lamellar MH and ERM remained.VA:

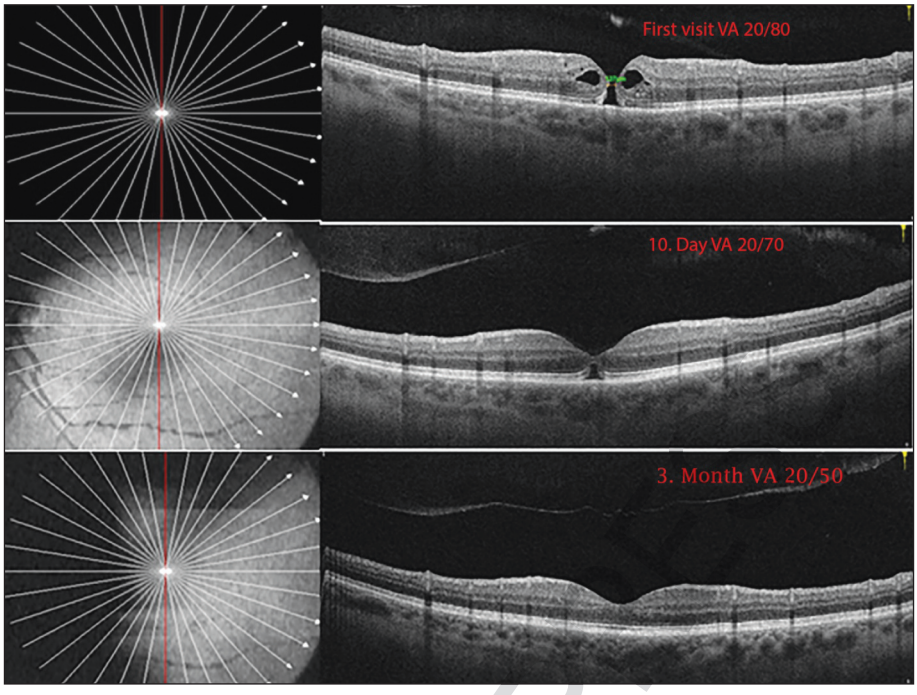

FIGURE 2: SD-OCT images of the 2nd case. **(A)** First visit, FTMH, a narrowest diameter measuring 137 µm, with a formed operculum and schisis of the hole lips; **(B)** Tenth Day, spontaneous MH closure; **(C)** Third Month, normal foveal anatomy was restored.

and no other relevant ophthalmological or medical history, except for early-stage heart failure. BCVA was 20/30 in the right eye and 20/80 in the left eye. There was bilateral mild nuclear sclerosis on anterior segment examination. While the fundus examination of the right eye was normal, there was an MH in the left eye. OCT B-scan demonstrated FTMH, measuring the narrowest diameter of 137 µm, with a formed operculum and schisis of hole edges. Basal hole size was 276 µm, and parafoveal retinal thickness was 330 µm. Surgical treatment was planned for the patient. While systemic examinations were being performed for surgery, it was observed that the MH in the left eye appeared to be closed on the 10th day after the first visit with improved visual acuity. Three months later, he experienced spontaneous FTMH closure with BCVA improvement to 20/50 (Figure 2).

For this case study, a written informed consent form was obtained from the patients.

DISCUSSION

Spontaneous closure of MH is thought to occur secondary to posterior vitreous detachment (PVD). This hypothesis is supported by documented cases.[8,9] Surgical interventions such as cataract surgery may also accelerate this process.[10] Nonetheless, PVD alone appears insufficient to elucidate the mechanism of spontaneous MH closure fully. Remarkably, FTMH closure was documented in the presence of persistent VMT or adhesion, as well as in post-vitrectomy eyes exhibiting delayed anatomical closure over extended periods.[11] Another of the most commonly suggested mechanisms involves the proliferation of retinal cells, forming a tissue bridge across the MH. While there is ongoing debate about which cells are involved in proliferation, it is generally believed that glial cells, particularly Müller cells, are the primary contributors.[12]

According to a review, spontaneous closure incidence in idiopathic FTMH ranges from 3-15%. Of these cases, 62.7% were female, with a mean age of 67.5 years.[13] In a retrospective review of cases at our retina clinic over the past 5 years, we observed spontaneous closure in 2 out of 151 idiopathic FTMH patients (1.32%) treated or followed conservatively. Both of our patients were in their 6th decade of life. Contrary to the literature, both of our patients were

male, but we cannot generalize this result because our sample size was very small. In our series, FTMH in the 1st patient closed at approximately 4 months, while closure occurred within the 1st month in the 2nd patient. Previous reports indicate that the mean time to spontaneous closure for small MH is approximately 3.3±2.6 months.[13]

Our cases were classified as having small-sized (≤250 microns) FTMH according to the IVTS classification and as Stage 4 based on the Gass classification system. Among studies utilizing the Gass classification system, only 2 out of 19 spontaneously closing FTMH (10.5%) were classified as Stage 4. In contrast, among studies employing the IVTS classification, 4 out of 11 spontaneously closed FTMH (36.4%) were categorized as small-sized holes without associated VMT.[13] This subgroup demonstrates a nearly 100% closure rate following vitrectomy and is also known to respond most favorably to pharmacologic vitreolysis with ocriplasmin.[14] Mansour et al. examined patients with idiopathic FTMH who had nonsurgical repair in 181 eyes, including 49 studies, and reviewed these holes' closure times and OCT biomarkers.[15] Median diameter of idiopathic FTMH was 166 μm, and 81.1% were categorized as small holes (<250 μm). They emphasized that the most important prognostic factor in idiopathic FTMH closure is "small size". The SD-OCT feature that supports spontaneous closure may be that both of our cases had small-sized FTMH (both of 137 μm). In the OCT sections of both cases, we observed that the posterior vitreous had recently detached from the fovea, the posterior hyaloid was close to the retinal surface, and even some retinal tissue (operculum) was separated. In these cases, it was observed that PVD likely contributed to the closure of MH. Another common OCT finding is schisis in the hole margins. In a study by Uwaydat et al. 66% of FTMH that closed without treatment and had no history of trauma presented with cystoid macular edema (CME) in the hole margins.[16] According to Elhusseiny et al. CME promotes spontaneous closure by bringing the MH's edges into proximity, effectively acting as a form of primary intention healing.[17]

In the second case, lamellar MH persisted following spontaneous closure of the FTMH, accompanied by a newly formed ERM. ERM is characterized by cellular proliferation and the accumulation of fibrous-like tissue on the inner retinal surface. FTMH closure and ERM formation share underlying pathophysiological mechanisms, notably anomalous PVD and subsequent cellular proliferation. In a study examining 750 patients with FTMH, spontaneous closure was reported in 23 cases, and ERM development was observed in 17.3% of these patients.[11] ERM development after MH closure can still exert traction on the fovea, potentially leading to future MH recurrence. Furthermore, the development of an ERM in MH patients detrimentally affects their postoperative visual acuity and the recovery of the outer retinal layers.[18]

This study analyzed 2 cases of spontaneously closed FTMH. Although spontaneous closure is rare, such cases may be encountered during observation or the preoperative period. The question of which patients may benefit from a pre-surgical observation phase remains unresolved. To provide guidance about the role of observation before surgery, there is a need for large-scale prospective studies that examine the clinical characteristics of spontaneously closing FTMH and compare visual outcomes with those achieved following surgical intervention in idiopathic cases.

Source of Finance

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Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

Idea/Concept: *Ayna Sariyeva Ismayilov;* ***Design:*** *Ayna Sariyeva Ismayilov, Berk Kadir Kaynar;* ***Control/Supervision:*** *Berk Kadir Kaynar, Mahmut Oğuz Ulusoy;* ***Data Collection and/or Processing:*** *Berk Kadir Kaynar;* ***Analysis and/or Interpretation:*** *Ayna Sariyeva Ismayilov, Mahmut Oğuz Ulusoy;* ***Literature Review:*** *Ayna Sariyeva Ismayilov;* ***Writing the Article:*** *Ayna Sariyeva Ismayilov, Berk Kadir Kaynar, Mahmut Oğuz Ulusoy;* ***Critical Review:*** *Mahmut Oğuz Ulusoy, Berk Kadir Kaynar;* ***References and Fundings:*** *Ayna Sariyeva Ismayilov;* ***Materials:*** *Ayna Sariyeva Ismayilov.*

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