

A Rare Case of Postoperative Uveitis and Obstructive Peripheral Anterior Synechiae Following Combined OMNI Canaloplasty and Hydrus Microstent Implantation

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Received on: 01 March 2024; Accepted on: 27 March 2024; Published on: 30 March 2024

ABSTRACT

Purpose: This study seeks to highlight and explore the occurrence of uveitis with obstructive peripheral anterior synechiae (PAS) after a combined OMNI canaloplasty and Hydrus microstent implantation with phacoemulsification, particularly in a patient with a background of psoriatic arthritis.

Observations: A 56-year-old male with a medical history of psoriatic arthritis (in remission for 10 years) and primary open-angle glaucoma (POAG) underwent a combined OMNI canaloplasty and Hydrus microstent with phacoemulsification. The surgical procedure was uncomplicated. However, within 2 weeks postsurgery, the patient presented with severe symptoms, including uveitis, elevated intraocular pressure (IOP), and a significant reduction in best-corrected visual acuity (BCVA). This postoperative response was unexpected, especially given the lack of any past history of uveitis in the patient. The complication, potentially influenced by the patient's history of psoriatic arthritis, led to the need for additional interventions, including the implantation of an Ahmed glaucoma valve.

Conclusion: This case underscores the potential for postoperative complications, specifically uveitis with obstructive PAS, following combined OMNI canaloplasty and Hydrus microstent with phacoemulsification, especially in patients with a history of autoimmune diseases. Careful preoperative history, postoperative monitoring, and a nuanced approach to surgical planning are crucial. The association between systemic inflammatory conditions and ocular complications warrants deeper exploration to ensure optimal patient care.

Keywords: Case report, Hydrus microstent, Obstructive peripheral anterior synechiae, OMNI canaloplasty, Phacoemulsification, Psoriatic arthritis, Uveitis.

Journal of Current Glaucoma Practice (2024): 10.5005/jp-journals-10078-1436

INTRODUCTION

The incidence and risk factors of postoperative obstructive peripheral anterior synechiae (PAS) following combined OMNI canaloplasty and Hydrus microstent implantation with phacoemulsification have not been thoroughly studied. Some research has reported focal PAS in and around the Hydrus microstent in approximately 10–20% of cases.^{1–3} However, these instances were generally not associated with device efficacy, changes in intraocular pressure (IOP), or the use of glaucoma medication. In this case report, we present a patient with a medical history of primary open-angle glaucoma (POAG) and psoriatic arthritis, which has been in remission for 10 years. The patient, who has no history of uveitis, received a routine ab interno canaloplasty and Hydrus microstent with phacoemulsification. The surgery was unremarkable, without any complications. Within 2 weeks, the patient experienced uveitis with obstructive PAS, spikes in IOP, and a significant worsening of best-corrected visual acuity (BCVA). This case report adheres to the principles of the Declaration of Helsinki and the Health Insurance Portability and Accountability Act.

CASE DESCRIPTION

A 56-year-old male with a past medical history significant for psoriatic arthritis in remission for a decade and no prior episodes of uveitis or history of prior surgery presented to our clinic for treatment of bilateral moderate POAG. Despite being on the maximum tolerated medical therapy and having undergone bilateral selective laser trabeculoplasty, his right eye IOP remained uncontrolled, above the target IOP of 16. Upon

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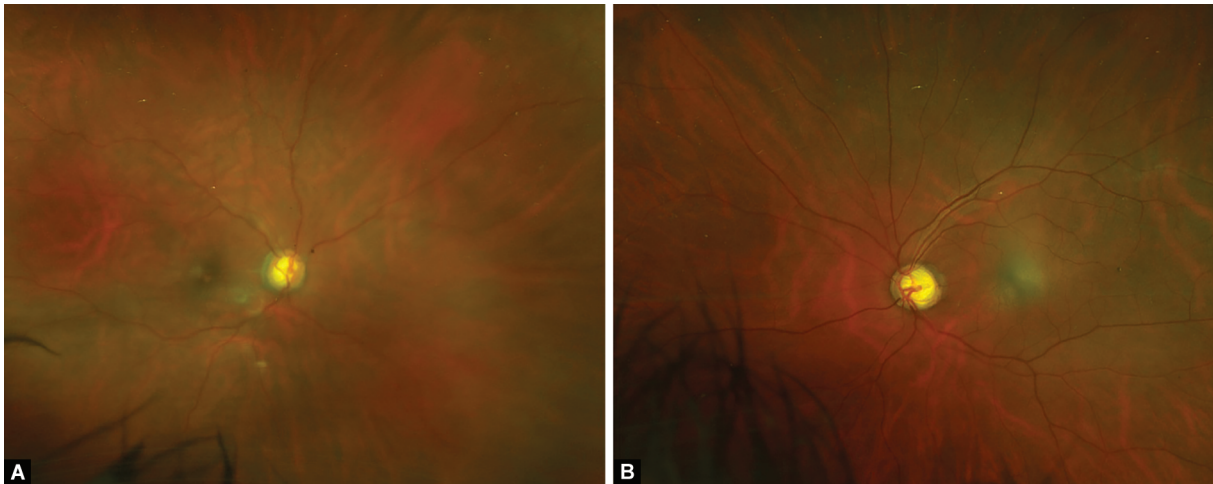
How to cite this article: Dossantos J, An J. A Rare Case of Postoperative Uveitis and Obstructive Peripheral Anterior Synechiae Following Combined OMNI Canaloplasty and Hydrus Microstent Implantation. *J Curr Glaucoma Pract* 2024;18(1):37–41.

Source of support: Nil

Conflict of interest: None

Patient consent statement: The author(s) have obtained written informed consent from the patient for publication of the case report details and related images.

physical examination, his BCVA was 20/20 in both eyes, with an IOP of 30 mm Hg in the right eye and 14 mm Hg in the left. The slit lamp examination was largely unremarkable, save for bilateral 1+ nuclear sclerosis of the lens. Gonioscopy revealed Shaffer grade 4 open angles without PAS throughout the full 360°. A fundus examination revealed a cup-to-disk ratio of 0.9 in both eyes (Fig. 1). Visual field testing showed an MD of 1.91 in the right eye and 0.03 in the left eye (Fig. 2). Retinal nerve fiber layer



Figs 1A and B: Fundoscopic image revealing the cup-to-disk ratio (0.9) of the right and left eye

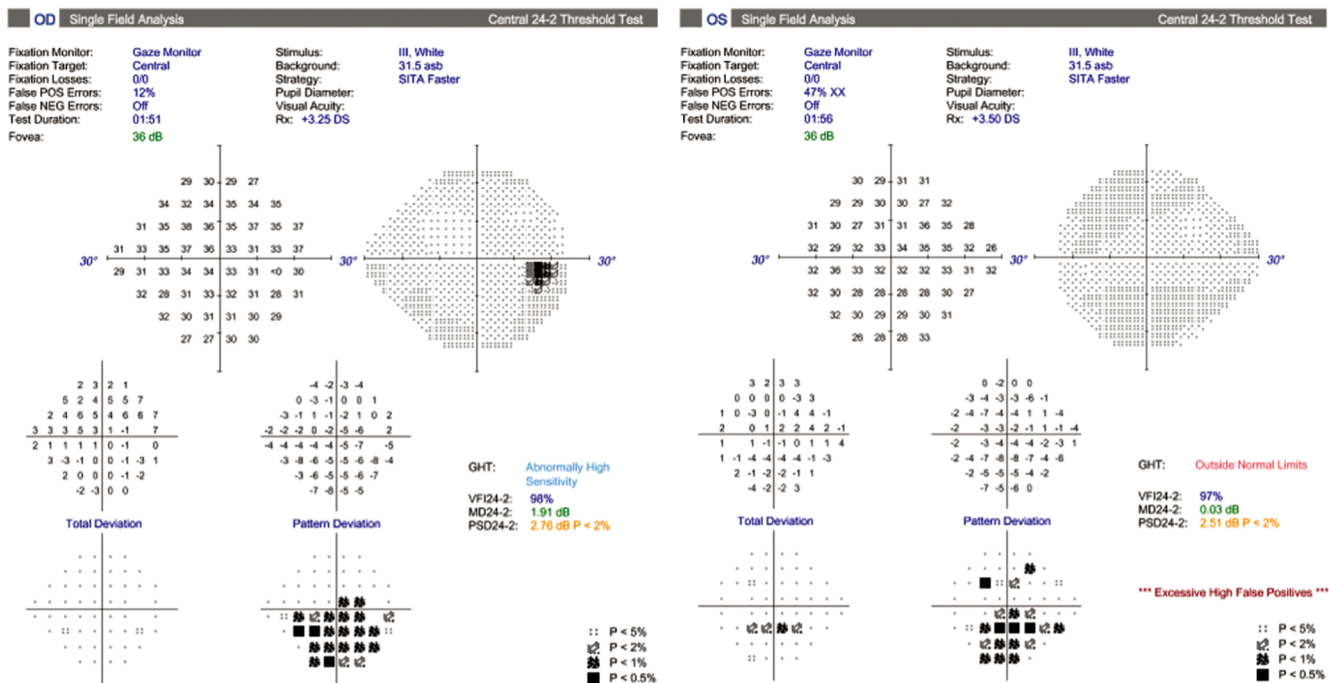


Fig. 2: Visual field test results revealing an MD of 1.91 in the right eye and 0.03 in the left eye

(rNFL) optical coherence tomography (OCT) revealed a superior defect in the right eye with an average rNFL thickness of 55 μ m and a superior and inferior defect in the left eye with an rNFL thickness of 42 μ m. Ganglion cell analysis showed an average ganglion cell layer thickness of 62 μ m in the right eye and 59 in the left eye (Fig. 3). Filtering surgery was discussed. However, he was unable to take >2 weeks off work, which made him hesitant about undergoing filtering surgery. After a thorough discussion of the various treatment options, he decided to proceed with combined OMNI canaloplasty and Hydrus microstent implantation with phacoemulsification in his right eye.

The surgeries were carried out without any intraoperative complications, and the patient was discharged on a routine tapering regimen of prednisolone steroids, continuing with latanoprost, cosopt, and brimonidine. One day after the surgery, the patient had

a BCVA of 20/25 and IOP of 12 mm Hg in the right eye, with well-seated Hydrus in the nasal quadrant of Schlemm’s canal. However, 2 weeks postprocedure, he presented with symptoms of severe right eye pain, photosensitivity, redness, and vision loss. His BCVA in the right eye had deteriorated to 20/400, and tonometry revealed an elevated IOP of 40 mm Hg. A slit lamp examination showed microcystic edema of the cornea with 1+ cells without keratic precipitates or flare in the deep anterior chamber (AC). Gonioscopy revealed extensive, broad PAS over the Hydrus, with no visible angle structures in the nasal quadrant (Fig. 4), and scattered PAS with all angle structures visible in the temporal, superior, and inferior (Fig. 5) quadrants. An AC tap was performed, and the patient was put on oral acetazolamide. The patient’s vision, IOP, and AC cells improved shortly after initiating oral prednisone of 40 mg by mouth four times a day. The patient ultimately required Ahmed’s glaucoma

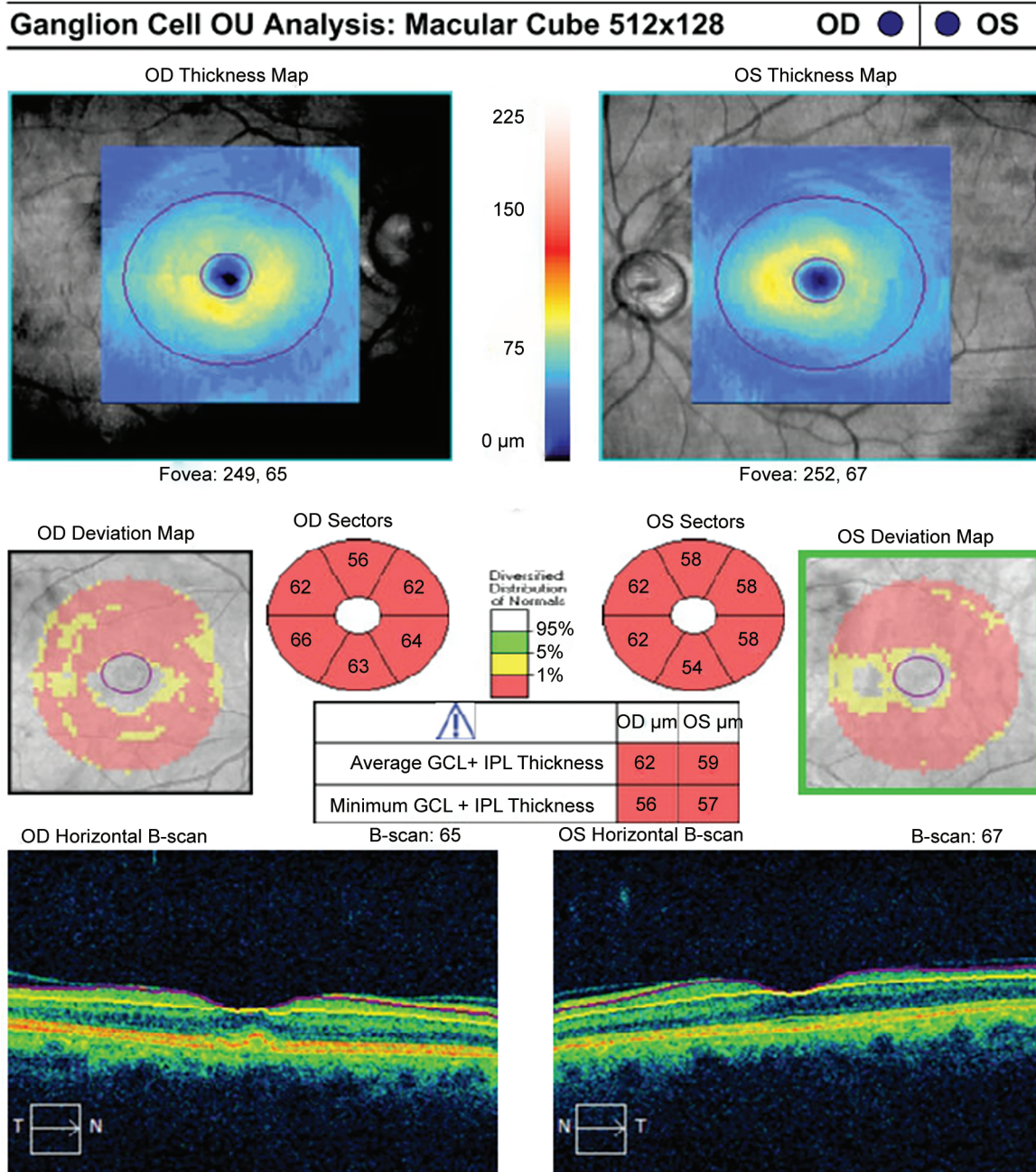


Fig. 3: Ganglion cell analysis revealing an average ganglion cell layer thickness of 62 μm in the right eye and 59 μm in the left eye

valve implant to better control his IOP. He suffered early hypotony and large choroidal detachment, requiring AC reformation in the 1st postoperative week and early hyperencapsulation in the 3rd postoperative week, which was treated with maximum aqueous suppressant. A total of 3 months after surgery, his IOP stabilized within target on three classes of medication, and he regained his preoperative vision without significant worsening of the visual field in the right eye.

DISCUSSION

This case underscores the potential for secondary angle closure following an angle-based surgery in patients with a history of

autoimmune disease, even without evidence of prior uveitis. Data from the HORIZON trial indicates an incidence of obstructive PAS of 3.5% in patients 2 years post-Hydrus microstent implantation, escalating to 5.4% after 5 years.⁴ Similarly, the COMPARE study revealed an incidence of obstructive PAS of 6.8% within 1 year.⁵ While some research suggests that obstructive PAS can occur following isolated Hydrus microstent implantation, other studies have reported no instances of obstructive PAS in isolated OMNI canaloplasty and trabeculectomy⁶ or in combined OMNI and Hydrus microstent implantation.⁷ Notably, these reports have not included or discussed patients with autoimmune disease, leaving a gap in the literature regarding the potential impact of this medical history on the efficacy of these devices.

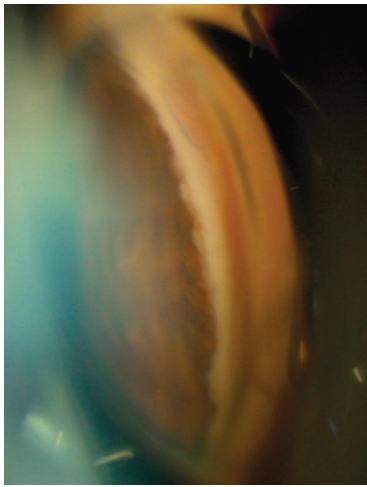


Fig. 4: Anterior chamber (AC) angle as observed through gonioscopy with nasal quadrant showing complete obstruction of the Hydrus stent by PAS

The postoperative complication of uveitis and obstructive PAS, in this case, may have been influenced by the patient's medical history of psoriatic arthritis despite a decade of remission. Psoriatic arthritis, a systemic inflammatory condition, can precipitate ocular manifestations, notably uveitis. This association is observed in 7–25% of psoriatic arthritis patients, and interestingly, uveitis can precede the onset of psoriatic skin disease.⁸ The immunopathogenesis of uveitis, involving T-helper type 1 (Th1) cell and Th17,⁹ integral to the pathogenesis of psoriasis and psoriatic arthritis, suggests a primed immune response in these patients, potentially triggered by surgical interventions or other stressors. Thus, for this population of patients with a history of autoimmune disease and uncontrolled IOP on maximal medical therapy, one may reconsider proceeding with a trabecular stent.

In the management of uveitic glaucoma, glaucoma drainage implants frequently serve as the preferred strategy for IOP control. This approach, however, is not without its complications and can often result in hypotony.¹⁰ Current research is deficient in its exploration of the utilization of the Hydrus microstent and OMNI canaloplasty in the context of uveitic glaucoma. Yet, some experts in the field, such as Seow et al.,¹⁰ have hinted at the potential of the Hydrus device as either a primary or secondary conjunctiva-sparing surgery for uveitic glaucoma patients. The pioneering work of Haas with trabeculodialysis and the subsequent adoption of the Barkan goniotomy, particularly among children with conditions like juvenile rheumatoid arthritis (JRA), underscores the promise of angle-based surgeries.¹¹ Freedman's team reported a 75% success rate with the goniotomy, though its efficacy can be limited in eyes with extensive PAS.^{11,12} The Trabectome³ and Kahook dual blade goniotomy¹⁴ have also gained attention, with the latter showing a 62.5% success rate in a retrospective study. Canaloplasty, introduced more recently, exhibited a 73.7% complete success rate after 2 years with a significant 55% IOP reduction and a decrease in the average number of IOP-lowering medications from 3.7 ± 0.8 to 0.4 ± 1.0 .¹⁵ Given these findings, the Hydrus microstent and OMNI canaloplasty might hold promise for treating uveitic glaucoma. However, this inference remains speculative, and further research is needed to establish the safety and efficacy of both the Hydrus microstent and OMNI canaloplasty in this patient population.

This case underscores the value of meticulous preoperative history taking and postoperative monitoring. Particularly in patients

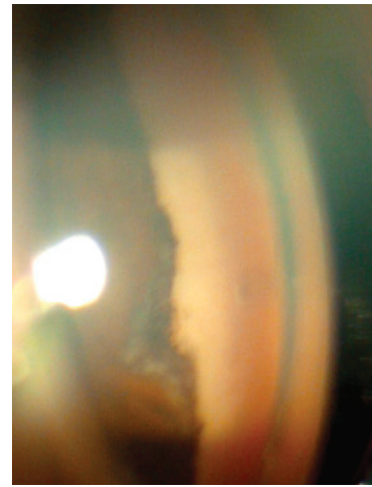


Fig. 5: Anterior chamber (AC) angle as observed through gonioscopy with inferior quadrant revealing broad PAS

with a history of autoimmune diseases, even if in remission, the risk profile may be altered, necessitating a tailored approach to surgical planning and management, such as consideration of systemic steroid or immunosuppressant peri- and postoperatively with longer topical steroid taper, with frequent postoperative gonioscopy to ensure the surgical site and the trabecular stent remain patent. The interplay between systemic inflammatory conditions and ocular manifestations, such as uveitis, warrants a comprehensive understanding of the patient's medical history and a nuanced approach to care.

CONCLUSION

This case highlights the potential complications of secondary angle closure after angle-based surgery in individuals with a history of autoimmune disease, even without prior uveitis evidence. Notably, obstructive PAS postsurgery might be influenced by autoimmune conditions such as psoriatic arthritis, even if in remission for long periods. Despite the potential benefits of the Hydrus microstent and OMNI canaloplasty, their application in patients with a history of autoimmune disorders requires further investigation. Meticulous preoperative history-taking and vigilant postoperative monitoring are crucial, especially in patients with autoimmune histories. This case suggests that clinicians should consider a tailored surgical plan, potentially integrating systemic steroids or immunosuppressants perioperatively for these patients.

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