Pigment dispersion syndrome diagnosed after photorefractive keratectomy—A case report

Tulika Chauhan, Sanchi Vohra, Sagarika Patyal

Pigment dispersion syndrome predominantly affects young myopes. It is not uncommon for such patients to seek refractive surgery. It may also be encountered after an uneventful refractive surgery. We report a case of a young myopic male who presented with bilateral pigment dispersion syndrome 9 months after an uneventful photorefractive keratectomy. A meticulous ocular examination is the cornerstone of a successful refractive surgery. Through this report, we highlight the need for gonioscopy to be included as a routine examination in screening for refractive surgery.

Key words: Gonioscopy, photorefractive keratectomy, pigment dispersion syndrome

Laser vision correction enjoys vast demand as a cosmetic procedure as well as a means of complying with occupational vision standards.[1] It is an elective procedure and most patients seeking refractive surgery have high expectations from the procedure. The onus of patient selection lies in the surgeon and necessitates meticulous examination to ensure a successful surgery and a happy patient. The majority of patients presenting for refractive surgeries are young myopes.[1] However, pigment dispersion syndrome (PDS) is another uncommon condition that is prevalent in a demographically similar population.[2,3] PDS is characterized by the presence of pigments on the corneal endothelium, an increase of pigmentation of the trabecular meshwork, and mid-periphery transillumination defects of the iris.[2,4] Pigment deposition on the trabecular meshwork can lead to increased intraocular pressure (IOP) eventually leading to glaucomatous optic neuropathy known as pigmentary glaucoma (PG), a form of secondary open-angle glaucoma.[5] PDS typically occurs in patients between 20 and 40 years of age and a majority of them are myopes; the more myopic the eye, the more likely it is to develop PDS.[2,5] It is not uncommon for these patients to seek opinions for refractive surgery. Since PDS can progress to a potentially sight-threatening condition (PG), it is essential for a refractive surgeon to be aware of its clinical features to ensure that this condition is diagnosed and monitored appropriately. We report a case of a myopic male, who presented with PDS 9 months after an uneventful PRK.

Access this article online

Quick Response Code:

Website: www.ijo.in

DOI: 10.4103/ijo.IJO_2706_20

Centre for Sight Eye Institute, Dwarka, New Delhi, India

Correspondence to: Dr. Sanchi Vohra, Centre for Sight Eye Institute, Dwarka, New Delhi, India. E-mail: Sanchivohra2808@gmail.com

Received: 20-Aug-2020 Revision: 08-Sep-2020
Accepted: 12-Sep-2020 Published: 23-Nov-2020

Case Report

A 23-year-old Indian male presented with complaints of recurrent episodes of mild pain and blurring of vision OU after performing the strenuous physical exercise for the past 2 months. These episodes resolved on their own after rest. On clinical evaluation, his visual acuity OU was 20/20 and IOP measured with Goldmann applanation tonometry was 14 and 16 mmHg in RE and LE respectively. Central corneal thickness (CCT) measured with Anterior Segment OCT was 479 and 475 microns in RE and LE respectively. Slit-lamp biomicroscopy OU revealed clumps of fine pigmentation on corneal endothelium (Krukenberg spindle) [Fig. 1a and 1b], a quiet anterior chamber, and pigmentation on the posterior lens capsule (Zentmayer line) in RE [Fig. 2]. Gonioscopy OU showed the presence of dense trabecular pigmentation in all quadrants (Sampaolesi line) and a concave configuration of the iris [Fig. 3]. On fundus examination, the optic nerves appear normal in both eyes. [Fig. 4a and b]. He underwent PRK 9 months ago with excellent postoperative uncorrected visual acuity (UCVA) OU 20/20. Prior to PRK, a detailed ocular examination showed a clear cornea with no pigments, a clear lens, normal IOP (with Goldmann applanation tonometry), a normal fundus and corneal tomography (Pentacam, Oculus) was within normal limits in BE. However, gonioscopy was not performed since IOP, anterior chamber depth and fundus examination were within normal limits. His UCVA was maintained at 20/20 OU until his last follow-up visit with a refractive surgeon. For evaluating early glaucomatous changes, Humphrey visual field (HVF) analysis using SITA Standard 24-2 and Optical coherence tomography retinal nerve fiber analysis (OCT-RNFL) (Carl Zeiss Meditec, Dublin, CA) were assessed and found to be within normal limits. A diagnosis of PDS was made and he was asked to follow up for IOP monitoring and clinical optic nerve head evaluation every 3 months. Also, HVF and OCT-RNFL will be repeated regularly as deemed appropriate.

Discussion

It is important for refractive surgeons to be aware of the increased prevalence of PDS in young myopes.[2,5] Doane *et al*. reported that out of the 637 eyes, screened for refractive surgery, 165 (25.9%) eyes were diagnosed with PDS.[6] Other than common features such as young age and myopia, the authors attributed this higher prevalence to the fact that clinical signs suggestive of PDS were actively looked for on slit-lamp biomicroscopy in subjects screened for refractive surgery.

Cite this article as: Chauhan T, Vohra S, Patyal S. Pigment dispersion syndrome diagnosed after photorefractive keratectomy—A case report. Indian J Ophthalmol 2020;68:3041-3.

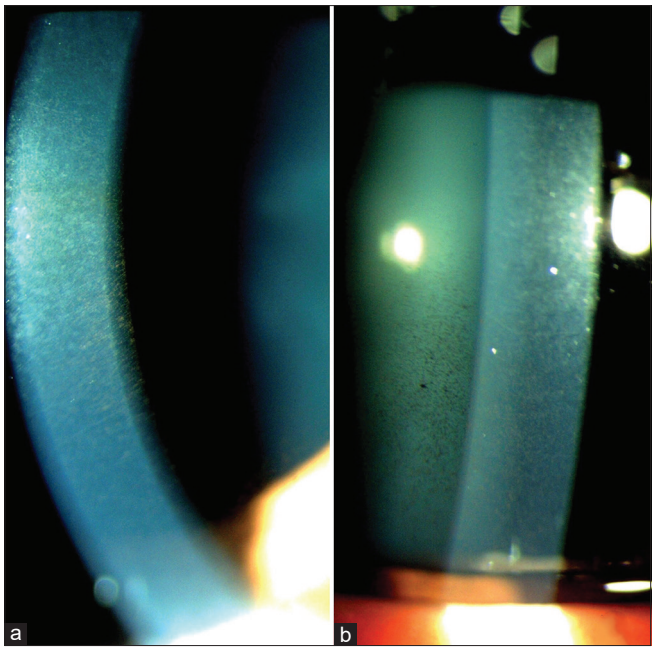

Figure 1: (a and b) Corneal examination shows pigment deposition on posterior corneal endothelium (Krukenberg spindle) in both eyes

Figure 3: Gonioscopy of both eyes shows dense pigmentation of trabecular meshwork and a concave iris configuration

Gonioscopy was not included their routine examination and, hence, was not performed.[6] In a study published by Siddiqui *et al*. 18% of patients diagnosed with PDS had only one clinical sign which was heavily pigmented trabecular meshwork.[7] Therefore, in patients planned for refractive surgery, gonioscopy should be part of the clinical examination to exclude PDS. In addition, careful assessment for the presence of any one of these signs including, iris trans-illumination defects, Krukenberg spindle or Zentmayer's line should alert the surgeon regarding the possibility of PDS.[6,7]

The presence of features suggestive of a concomitant ocular condition often presents as a red flag to the ophthalmologist considering refractive surgery in a patient. However, refractive surgery has not been found to have a deleterious effect on visual outcomes in patients with PDS.[8,9] A study by Jabbur *et al*. compared the outcome of Laser *in-situ* keratomileuses (LASIK) in patients with PDS. They concluded that corneal findings of PDS did not affect the intraoperative or postoperative outcomes of LASIK. However, patients who have PG may experience a less predictable visual outcome.[8] Another study by Bower *et al*. reported excellent UCVA and low incidence of adverse effects 1 to 2 years after surgery. However, they mentioned that despite good visual outcomes, long-term safety and efficacy outcomes of PRK in patients with PDS remain speculative.[9] It needs to

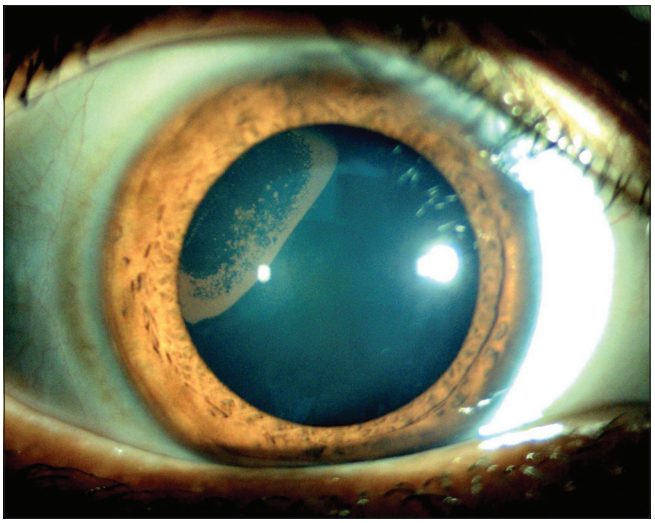

Figure 2: Dilated examination in right eye shows pigmentation on posterior capsule of lens (Zentmayer line)

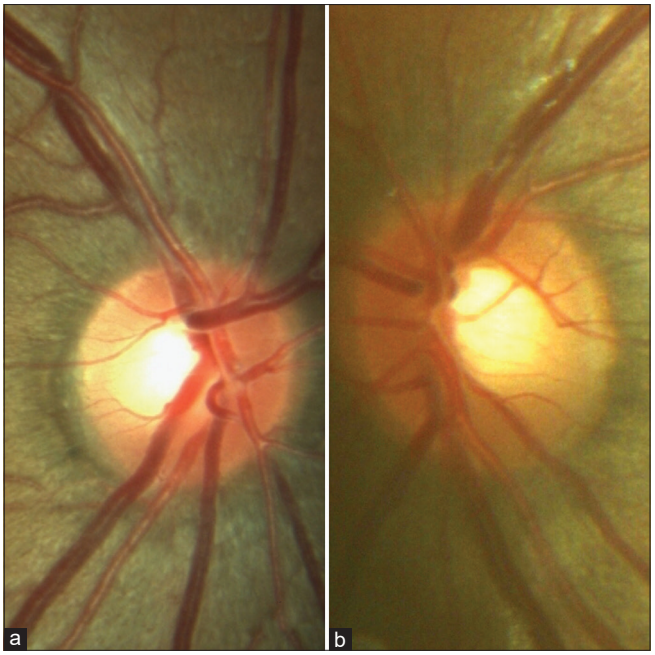

Figure 4: (a and b) Posterior segment examination of both eyes shows a cup disc ration of 0.3:1 with normal macula

be pointed out that as many as 20% of patients with PDS may go on to develop PG.[7] Additionally, since refractive surgery induces changes in corneal thickness, hysteresis, and curvature, the post-operative measurement of IOP may be falsely low and misleading and may need adjustment according to the postoperative CCT.[10] Also, the quality of vision may get affected in the future due to PDS. These issues need to be discussed with the patients prior to the procedure since long-term monitoring will require a careful exclusion of glaucomatous optic neuropathy in addition to IOP measurements.

Conclusion

Gonioscopy should be included in the routine preoperative examination of patients undergoing kerato-refractive

procedures. PDS patients undergoing laser vision correction should be counseled well about the need for regular follow-up to diagnose early signs of pigmentary glaucoma.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

References

1. Clare G, Pitts JA, Edgington K, Allan BD. From beach lifeguard to astronaut: Occupational vision standards and the implications of refractive surgery. Br J Ophthalmol 2010;94:400-5.
2. Ritch R. A unification hypothesis of pigment dispersion syndrome. Trans Am Ophthalmol Soc. 1996;94:381-405.
3. Gillies WE, Brooks A. Clinical features at presentation of anterior segment pigment dispersion syndrome. Clin Exp Ophthalmol 2001;29:125-7.
4. Farrar SM, Shields MB. Current concepts in pigmentary glaucoma. Surv Ophthalmol 1993;37:233-52.
5. Scuderi G, Contestabile MT, Scuderi L, Librando A, Fenicia V, Rahimi S. Pigment dispersion syndrome and pigmentary glaucoma: A review and update. Int Ophthalmol 2019;39:1651-62.
6. Doane JF, Rickstrew JJ, Tuckfield JQ, Cauble JE. Prevalence of pigment dispersion syndrome in patients seeking refractive surgery. J Glaucoma 2019;28:423-6.
7. Siddiqui Y, Richard TH, Cameron JD, Hodge DO, Johnson DH. What is the risk of developing pigmentary glaucoma from pigment dispersion syndrome? Am J Ophthalmol 2003;135:794-9.
8. Jabbur NS, Tuli S, Barequet IS, O'Brien TP. Outcomes of laser *in situ* keratomileusis in patients with pigment dispersion syndrome. J Cataract Refract Surg 2004;30:110-4.
9. Bower KS, Sia RK, Ryan DS, Mines MJ, Stutzman RD, Kuzmowych CP, *et al*. Visual and IOP outcomes after PRK in pigment dispersion syndrome. J Refract Surg 2011;27:686-90.
10. Mardelli PG, Piebenga LW, Whitacre MM, Siegmund KD. The effect of excimer laser photorefractive keratectomy on intraocular pressure measurements using the Goldmann applanation tonometer. Ophthalmology 1997;104:945-8.