

Cessation of ocular hypertensive attacks following iStent trabecular micro-bypass stent implantation in a patient with Posner-Schlossman syndrome: a case report

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Abstract

Background: Posner-Schlossman syndrome (PSS) is an ocular condition with self-limiting recurrent episodes of markedly elevated intraocular pressure (IOP) and non-granulomatous anterior chamber inflammation. Surgical treatment is indicated if medical therapy fails to control IOP.

Case presentation: A 58-year-old male presented with intermittent attacks of blurred vision and pain in the right eye for 6 months. Examination revealed keratic precipitates with IOP of 56 mmHg in the right eye. Gonioscopy revealed open angles in both eyes. Erythrocyte sedimentation rate was within normal limits, while aqueous tap for viral PCR, rapid plasma reagent test, and Mantoux test were negative. IOP was in the high-teens (inappropriate) on 2 topical antiglaucoma medications and the patient developed ocular surface problems. iStent was implanted. IOP remained stable within the mid-teens with no further episodes of raised IOP in the following 6 months.

Conclusion: This case showed cessation of ocular hypertensive attacks in PSS after iStent implantation.

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Keywords: intraocular pressure, iStent, Posner-Schlossman syndrome, secondary glaucoma

Implantasi stent mikro-pintasan trabecular iStent berjaya menghentikan serangan hipertensi okular dalam pesakit sindrom Posner-Schlossman: satu laporan kes

Abstrak

Latar belakang: Sindrom Posner-Schlossman (PSS) merupakan masalah okular yang berkaitan dengan kenaikan tekanan intraokular (IOP) tinggi mendadak secara berulang dan keradangan ruang anterior bukan granulomatous. Rawatan pembedahan diperlukan jika terapi perubatan gagal mengawal IOP.

Pembentangan kes: Seorang lelaki berumur 58 tahun mengalami serangan berulang dimana penglihatan menjadi kabur dan sakit pada mata kanan selama 6 bulan. Pemeriksaan mendapati terdapat mendakan keratik dengan IOP 56mmHg pada mata kanan. Gonioskopi menunjukkan sudut terbuka pada kedua-dua belah mata. Kadar pemendapan eritrosit berada dalam had biasa, manakala pemeriksaan humor akueus untuk mengesan kehadiran virus secara tindakbalas berantai polimerase, ujian reagen plasma pantas dan ujian Mantoux adalah negatif. Tekanan IOP berada pada paras bacaan belasan yang agak tinggi walaupun dirawat dengan dua ubat titis antiglaukoma dan pesakit mula mengalami masalah permukaan okular. Implantasi iStent telah dilakukan, dimana IOP kekal stabil dalam paras bacaan pertengahan belasan dan tiada lagi episod peningkatan IOP dalam tempoh 6 bulan berikutnya.

Kesimpulan: Kes ini menunjukkan keberkesanan implantasi iStent bagi menamatkan serangan hipertensi okular dalam pesakit PSS.

Kata kunci: glaukoma sekunder, iStent, sindrom Posner-Schlossman, tekanan intraokular

Introduction

Posner-Schlossman syndrome (PSS), also known as glaucomatocyclitic crisis, is a condition characterised by unilateral recurrent episodes of acute elevated intraocular pressure (IOP) accompanied by mild non-granulomatous anterior

chamber (AC) inflammation. IOP can be as high as 60 mmHg during these attacks, with minimal AC inflammation and open angles. The aetiology and pathophysiology of these attacks are not fully understood but factors such as viral infection, autoimmune dysregulation, vascular endothelial dysfunction, and allergic conditions have been proposed as possible contributors to the cause.¹

The symptoms of PSS are self-limiting and IOP usually normalises in between attacks. However, repeated attacks over time may lead to secondary glaucoma with progressive visual field defects. Treatment of PSS aims at controlling inflammation and IOP elevation with anti-inflammatory eye drops and IOP-lowering agents. In instances where patients do not respond to medical treatment, surgical options may be indicated. We aim to report the outcome of a case of PSS with secondary glaucoma treated with iStent (Glaukos Corporation, Laguna Hills, CA) implantation.

Case presentation

A 58-year-old male with underlying diabetes mellitus, hypertension, and dyslipidaemia presented with intermittent attacks of blurry vision and pain in the right eye for 6 months. He described the attacks as a dull aching pain, accompanied by mild generalised blurring of vision that lasted for a few hours before subsiding spontaneously. These attacks occurred at rest, without any exacerbating factor, and not associated with any eye redness, nausea, or vomiting. He sought treatment when the attacks became more frequent. Otherwise, the patient was symptom-free in between attacks. He had low myopia. There was no family history of glaucoma. He denied any eye trauma, surgery, or eye drop use prior to presentation.

The patient's visual acuity was 6/6 in both eyes. Both pupils were equally round and reactive with no relative afferent pupillary defect. Slit-lamp examination revealed fine keratic precipitates and pigments on the anterior lens capsule OD. The IOP was 56 mmHg OD and 16 mmHg OS. The anterior chamber was deep and quiet with no iris atrophy, transillumination defect, or heterochromia OU. Gonioscopy revealed open angles OU with intermittent peripheral anterior synechiae in the superior quadrant OD.

Fundus examination revealed a palish optic disc with cup-to-disc ratio (CDR) of 0.8 OD and pink optic disc with CDR of 0.6 OS. Both optic discs were slightly tilted without any notching. Optical coherence tomography of the retinal nerve fibre layer showed borderline thinning in both eyes. Humphrey visual field test demonstrated inferior field defect OD and normal field OS.

He was prescribed topical timolol, latanoprost, and brimonidine eye drops, as well as oral acetazolamide 250 mg 4 times a day. Four days later, IOP was 10 mmHg OD and oral acetazolamide and brimonidine eye drop were discontinued.

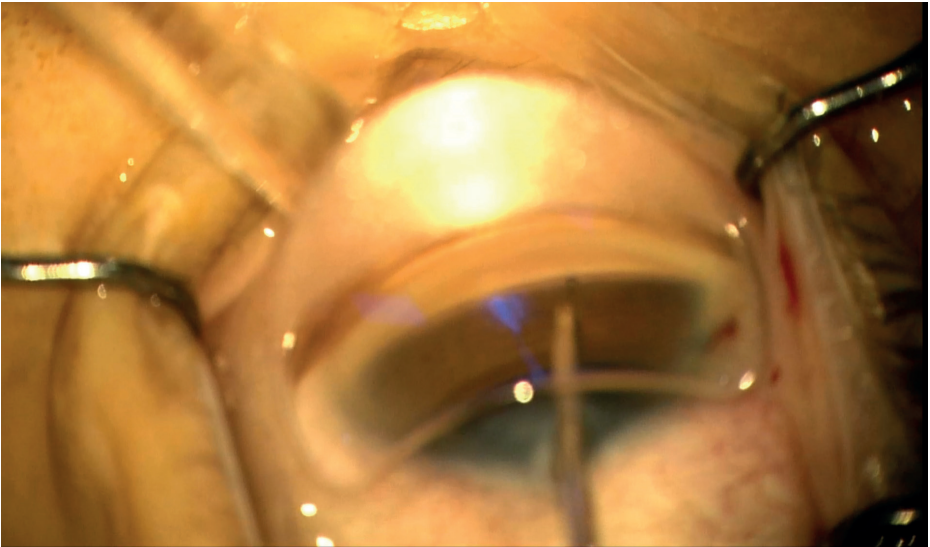


Fig. 1. A G2 iStent inject W implanted at the pigmented trabecular meshwork via a clear corneal incision and ab interno approach under gonioscopy.

Investigations revealed normal levels of erythrocyte sedimentation rate and negative rapid plasma reagent and Mantoux test. Aqueous tap for cytomegalovirus, herpes simplex virus 1 and 2, and varicella zoster virus polymerase chain reaction were all negative. The diagnosis of PSS with secondary glaucoma was made.

IOP remained in the high-teens on timolol and latanoprost eye drops OD, but the patient developed diffuse superficial punctate keratopathy even after changing the medications to tafluprost 0.0015%/timolol 0.5% and brinzolamide eye drops. He was therefore counselled for iStent implantation under local anaesthesia. The first G2 iStent inject W device was inserted at the 4 o'clock position (Fig. 1). The second G2 iStent device was not ejected when deployed from the injector. Hence another G1 iStent device was inserted at the 2 o'clock position of the angle chamber angle (Fig. 2).

Postoperatively, the topical medications were tapered gradually while maintaining IOP in the mid-teens. On the last visit 6 months later, the patient's visual acuity was 6/6 bilaterally, IOP was 16 mmHg OD with no signs of active anterior chamber inflammation while only on tafluprost 0.0015%/timolol 0.5% eyedrop. Interestingly, there were no further episodes of raised IOP in the 6 months post-surgery.

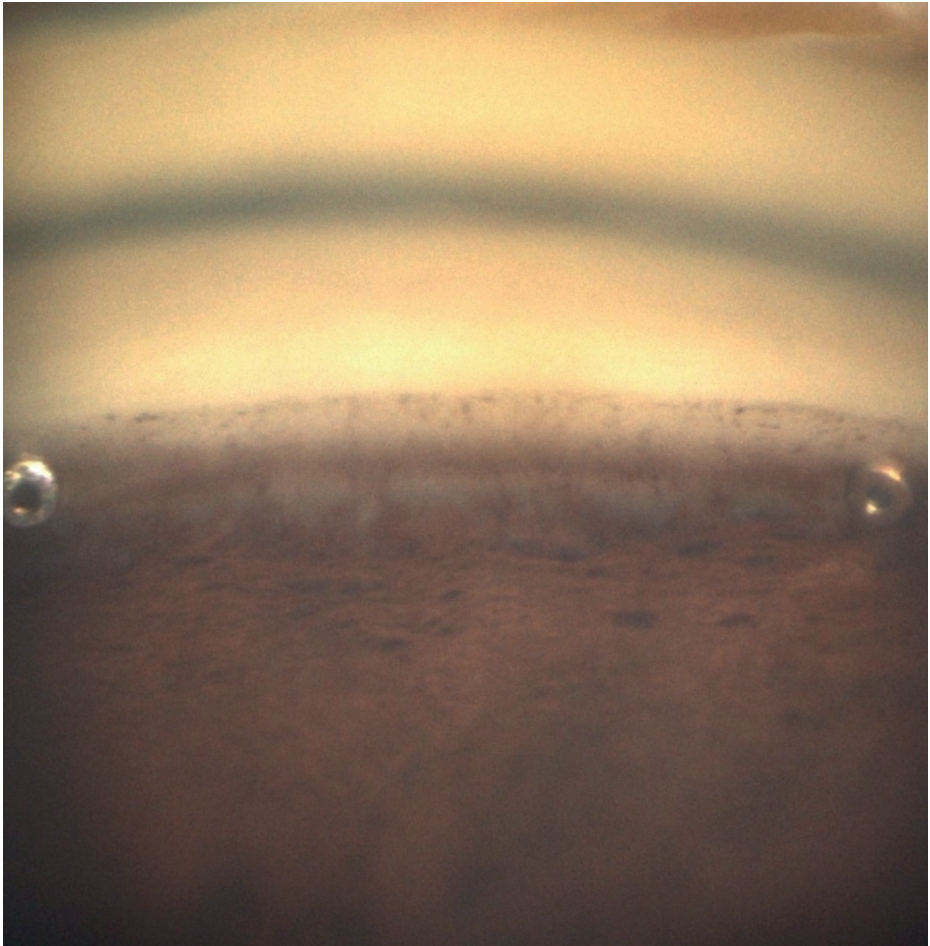


Fig. 2. Postoperative gonioscopic view of the iStent devices implanted in the trabecular meshwork of the nasal quadrant of the right eye, where collector channel density is the highest.

Discussion

This patient presented with clinical features of an acute ocular hypertensive attack typically seen in PSS. The natural course of PSS is that of recurrent severe IOP elevation with mild AC inflammation, similar to the features seen in this patient. PSS is a diagnosis of exclusion, after excluding any infective cause for an acute hypertensive uveitis attack, although viral PCR has been isolated in approximately 30% of cases.²

IOP is normally sufficiently controlled with topical or systemic IOP-lowering medications. Glaucoma surgery is warranted when the recurrent hypertensive episodes have cumulatively caused glaucomatous disc damage with accompanying visual field defect as seen in this patient. The IOP in our patient was somewhat controlled with topical IOP-lowering medications, but he developed intolerable ocular surface problems necessitating surgical intervention. Considering the patient's baseline IOP was in the high-teens while on subtolerable topical IOP-lowering agents, his target IOP was predicted to be achievable with iStent inject, hence the decision to implant an iStent device.

The iStent is a minimally invasive glaucoma surgery (MIGS) device that allows aqueous humour to drain directly from the anterior chamber into Schlemm's canal by bypassing an obstructed trabecular meshwork. The iStent device is well studied and established as a safe and effective option for patients with open-angle glaucoma.³ Prior reports have also demonstrated that the insertion of multiple stents can provide additional IOP reduction.⁴ The second generation of iStent device is preloaded with 2 smaller stents for insertion and was created with 4 lateral outlet lumens on each stent, allowing for multidirectional outflow in Schlemm's canal to access more collector channels. When compared to conventional glaucoma surgeries such as trabeculectomy, iStent implantation is favoured by many surgeons and patients for its safety profile and shorter recovery period.⁵

The iStent lowers IOP by bypassing the resistance in the trabecular meshwork and thereafter uses the physiologic flow of aqueous humour through the conventional route of collector channels and aqueous veins. The effectiveness of this device depends on the integrity of the post-trabecular system comprising Schlemm's canal and collector channels. In secondary glaucoma due to increased trabecular resistance seen in pseudoexfoliative glaucoma, pigment dispersion syndrome, steroid-induced glaucoma, or angle recession glaucoma, where post-trabecular flow is assumed to be normal, the iStent inject has been shown to provide significant IOP reduction. Buchacra *et al.* reported IOP reductions of 28.6% (7.4 ± 4.9 mmHg) at 6 months and 27.3% (6.6 ± 5.4 mmHg) at 12 months in a cohort of 10 patients with secondary glaucoma undergoing iStent implantation alone. This study included 4 eyes with traumatic glaucoma, 4 eyes with steroid-induced glaucoma, 1 eye with pigmentary glaucoma, and 1 eye with pseudoexfoliative glaucoma.⁶

This case revealed an interesting observation of cessation of ocular hypertensive attacks in PSS after implantation of iStent. Pahlitzsch *et al.* also observed a similar finding in 7 cytomegalovirus-positive PSS patients after Trabectome surgery, another MIGS procedure. The patients were initially treated with oral valganciclovir for 3 weeks but continued to experience uncontrolled IOP elevation after treatment. Subsequently, they underwent Trabectome surgery. The authors then noticed a cessation of hypertensive attacks for up to 1 year. A significant reduction of IOP from 40 ± 10 mmHg to 13 ± 1 mmHg was also observed in these patients after 1 year.⁷

The prevalence of ocular surface disease in glaucoma patients is very high, particularly in patients with uncontrolled IOP on multiple topical medications.⁸ Timely surgical intervention along with reduction of topical IOP-lowering medications may result in improvement of the ocular surface.⁹ MIGS such as iStent and Trabectome provide minimal alteration to the ocular surface, in contrast to filtration surgery or drainage implants. Hence, it is of particular interest to patients suffering from severe ocular surface disease. Furthermore, the conjunctiva remains intact for possible future filtering procedures if so required.

Nevertheless, there are several possible postoperative complications related to the iStent procedure, including malposition of the iStent device, hyphema, obstruction of the iStent lumen by blood clots, or iris tissue plugging the stent orifice, which may affect the efficacy of this device.¹⁰ In general, luminal obstruction leading to impaired drainage decreases the efficacy of MIGS devices. Hence, patients with bleeding disorders or anticoagulation therapy should be managed accordingly prior to MIGS procedures to minimise the risk of postoperative hyphema. Patients with postoperative hyphema should be carefully monitored as stent blockage by red blood cell byproducts can cause a delayed rise in IOP. However, more evidence will be needed to determine if early therapeutic actions, such as an anterior chamber washout, could reduce the risk of developing stent obstruction.

Conclusion

The treatment of PSS can be challenging, as repeated ocular hypertensive attacks can cause cumulative glaucomatous damage. The benefits of interventional glaucoma surgery will need to outweigh the associated risks for complications when deciding to operate on a patient with PSS for its normotensive intervals. This case highlights not only the IOP-lowering effect of the iStent implant in secondary glaucoma but also its unforeseen effect of seemingly delaying the recurrence of hypertensive attacks in PSS.

Declarations

Consent for publication

The patient provided informed consent for the use of the clinical images and data contained in this case report.

Competing interests

None to declare.

Funding

None to declare.

Acknowledgments

We thank Puan Nurul Azlina binti Omar (UKM Medical Center, Kuala Lumpur) for her help in providing the images contained in this report.

References

1. Jiang JH, Zhang SD, Dai ML, Yang JY, Xie YQ, Hu C, et al. Posner-Schlossman syndrome in Wenzhou, China: a retrospective review study. *Br J Ophthalmol*. 2017 Dec;101(12):1638–42. <https://doi.org/10.1136/bjophthalmol-2016-309863>
2. Chee SP, Jap A. Presumed fuchs heterochromic iridocyclitis and Posner-Schlossman syndrome: comparison of cytomegalovirus-positive and negative eyes. *Am J Ophthalmol*. 2008 Dec 1;146(6):883–9. e1. <https://doi.org/10.1016/j.ajo.2008.09.001>
3. Neuhann TH, Hornbeak DM, Neuhann RT, Giamporcaro JE. Long-term effectiveness and safety of trabecular microbypass stent implantation with cataract surgery in patients with glaucoma or ocular hypertension: Five-year outcomes. *J Cataract Refract Surg*. 2019 Mar;45(3):312–20. <https://doi.org/10.1016/j.jcrs.2018.10.029>
4. Belovay GW, Naqi A, Chan BJ, Rateb M, Ahmed IIK. Using multiple trabecular micro-bypass stents in cataract patients to treat open-angle glaucoma. *J Cataract Refract Surg*. 2012 Nov;38(11):1911–7. <https://doi.org/10.1016/j.jcrs.2012.07.017>
5. Chang TC, Vanner EA, Parrish RK. Glaucoma surgery preferences when the surgeon adopts the role of the patient. *Eye (Lond)*. 2019 Oct;33(10):1577–83. <https://doi.org/10.1038/s41433-019-0452-9>
6. Buchacra O, Duch S, Milla E, Stirbu O. One-year analysis of the iStent trabecular microbypass in secondary glaucoma. *Clin Ophthalmol*. 2011;5:321–6. <https://doi.org/10.2147/OPHTH.S15025>
7. Pahlitzsch M, Torun N, Gonnermann J, Maier AKB, Pleyer U, Bertelmann E, et al. Trabeculectomy ab interno (trabectome): yet another possibility in the treatment of uncontrolled glaucomatocyclitic crisis under systemic valganciclovir therapy? *Eye*. 2015 Oct;29(10):1335–9. <https://doi.org/10.1038/eye.2015.112>
8. Leung EW, Medeiros FA, Weinreb RN. Prevalence of ocular surface disease in glaucoma patients. *J Glaucoma*. 2008 Aug;17(5):350–5. <https://doi.org/10.1097/JG.0b013e31815c5f4f>

9. Dubrulle P, Labbé A, Brasnu E, Liang H, Hamard P, Meziani L, et al. Influence of Treating Ocular Surface Disease on Intraocular Pressure in Glaucoma Patients Intolerant to Their Topical Treatments: A Report of 10 Cases. *J Glaucoma*. 2018 Dec;27(12):1105–11. <https://doi.org/10.1097/IJG.0000000000001041>
10. Popovic M, Campos-Moller X, Saheb H, K Ahmed II. Efficacy and Adverse Event Profile of the iStent and iStent Inject Trabecular Micro-bypass for Open-angle Glaucoma: A Meta-analysis. *J Curr Glaucoma Pract*. 2018;12(2):67–84. <https://doi.org/10.5005/jp-journals-10008-1248>