International Journal of Scientific Research in Dental and Medical Sciences

www.ijsrdms.com

Corneal Dellen and Scleral Melt Induced following Phacoemulsification Surgery and Bare Sclera Pterygium Excision: A Case Report

Prachi Shukla[a, *], Pankaj Tyagi[b], Suman Bhartiya[a], Kopal Mithal[a], Megha Gupta[a], Prerna Jagdish[a]

[a] *Department of Ophthalmology, Muzaffarnagar Medical College, Atal Bihari Vajpayee Medical University, Lucknow, India*

[b] *Department of Pathology, Venkatashwara Institute of Medical Sciences, Shri Venkateshwara University, Gajraula, India*

ARTICLE INFO

Article history:
Received 19 January 2023
Received in revised form 27 February 2023
Accepted 02 March 2023
Available online 06 March 2023

Keywords:
Autoimmune Disease
Phacoemulsification
Pterygium
Sclera
Scleral Disease

ABSTRACT

Scleral thinning and delayed conjunctival regeneration can be found after bare sclera pterygium excision. A 63-year-old male was admitted in our department for left eye cataract and grade II nasal pterygium surgery in the same sitting. Pterygium excision was done without putting graft or adjuvant treatment. After two weeks of surgery, the patient presented with scleral thinning and corneal dellen at the site of the pterygium excision. The scleral thinning was deep enough to show the uveal tissue through its base. Successful management was done with topical and oral medications for six weeks. Bare sclera pterygium excision should not be practiced along with cataract surgery. It should be performed in two different sittings, or conjunctival autograft or amniotic membrane graft should cover the bare area. Steroid drops may also slow healing and induce iatrogenic scleral necrosis leading to dreaded consequences.

1. Introduction

It is well-known that scleral necrosis can occur after cataract extraction, trabeculectomy, squint, or retinal surgeries.[1, 2] Pterygium excision may also lead to scleral melting if the adjuvant treatment has been used, such as beta irradiation,[3] thiotepa,[4] Mitomycin C.[5] Obliteration of end arteries is the mechanism for causing scleral thinning after beta irradiation[3] versus the anti-mitotic action of MMC.[5] Thiotepa[4] is responsible for inhibiting endothelial and conjunctival regeneration leading to delayed surgical site healing. Bare sclera pterygium excision with vascular cauterization can also potentiate the possibility of scleral and corneal dellen formation.[6]

2. Case Presentation

A 63-year-old male was admitted to complaining of a diminution of vision and foreign body sensation in the left eye. Nothing was remarkable in the history except the right eye cataract surgery, done three years back. His best-corrected vision in his right and left eyes was 6/6 and 6/36, respectively, and IOP was 11 and 12 mm Hg with an applanation tonometer. The ocular findings in the right eye were within normal limits. On examination, the left eye had grade II nuclear sclerosis, central posterior subcapsular cataract, and grade II nasal pterygium. Phacoemulsification was performed under the peribulbar block for the left eye, and pterygium was excised after that. Injection of Lignocaine 2% with adrenaline 1:200,000, was injected sub-conjunctival beneath the pterygium to balloon and separate it from the tissue underlying. The head of the pterygium was held with tooth forceps and lifted to gently avulse it against the surface. After that, small blunt-tipped scissors were used to dissect the body to free it from the underlying tissue. The pterygium was excised taking care of the medial rectus, and the crescent knife was used to shave off the uneven tissue from the cornea. There was no adjuvant treatment like Mitomycin-C, thiotepa, conjunctival autograft, irradiation therapy after pterygium excision. Two small bleeders at the site of pterygium excision were cauterized lightly using bipolar cautery to stop the bleeding.

Post-operatively patient has been prescribed a Tablet of Ciprofloxacin 500 mg BD for five days, a Tablet of Ibuprofen 400 mg BD for three days, and a Tablet of Acetazolamide 250 mg BD for one day from the day of surgery. The next day after eye-patch removal, the cornea was clear, and the pterygium excision site appeared normal with no unusual findings. The patient had an unaided vision of 6/9, and IOP was 17 mm Hg. Combined

* *Corresponding author. Prachi Shukla*
E-mail address: *prachipankajtyagi@gmail.com*
Department of Ophthalmology, Muzaffarnagar Medical College, Atal Bihari Vajpayee Medical University, Lucknow, India
https://doi.org/10.30485/IJSRDMS.2023.380907.1427

moxifloxacin 0.5% and Prednisolone acetate 1% drop six times a day, Nepafenac 0.1% drop thrice a day, and carboxymethyl cellulose sodium 0.5% drops a day thrice were added along with the oral medications. The patient was reviewed after one week, his left eye was quiescent, and his vision improved to 6/6 after cataract and pterygium surgery. The five days course of oral medications was over, antibiotic-steroid (Moxifloxacin 0.5% and prednisolone acetate 1%) eyedrop was tapered weekly, and Nepafenac and lubricant eyedrops were continued on the same dosage for the next five weeks. The patient was called after one month, but he came after three days with a complaint of black discoloration on the site of pterygium excision. His vision was maintained. On slit-lamp examination, the scleral bed at the site of the pterygium excision showed a focal area of significant dry thinning measuring approximately $2 * 4$ mm, through which uveal tissue was visible (Fig. 1). The adjacent cornea was also thinned out though fully epithelized. There was mild ciliary injection with no papillary or follicular reaction at the palpebral conjunctiva. No reaction was found in the anterior chamber, and B-scan was normal. The patient's best-corrected vision was still maintained at 6/6. The associated complaint, along with these findings, was of itching and scratching sensation in the left eye on the nasal side. The patient was seated in the eye OPD, and frequent Sodium hyaluronate and D panthenol drops were instilled in his left eye. He was instructed to keep his eyes closed, and surprisingly the uveal show disappeared after repeated drop instillation for an hour (Fig. 2).

Fig. 1. Near total scleral & corneal thinning ten days after surgery.

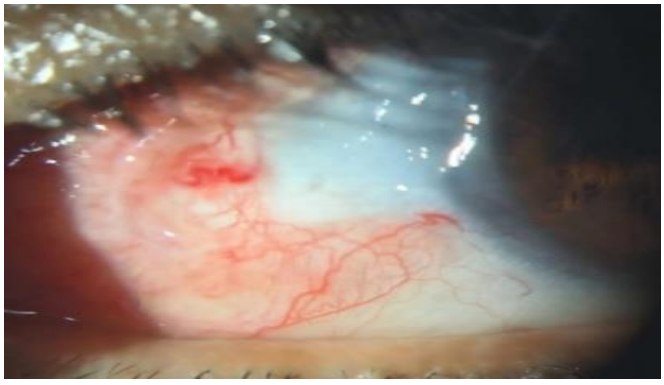

Fig. 2. Uveal show disappeared after intensive treatment.

The antibiotic-steroid combination eyedrops were stopped, and preservative-free topical moxifloxacin 0.5% was started in a QID dose. Carboxymethylcellulose drop was changed with sodium hyaluronate and D-panthenol ophthalmic solution at least six times daily. Topical pressure-lowering drops, Brimondine and timolol combination BD were prescribed, and the patient was returned. Two days later, the patient presented similar findings of scleral melting and uveal show in the left eye again. He gave the history that the eye was perfectly normal when he woke up after 6-7 hours of sleep at night, but after a few hours of waking up, the itching started, and the black spot appeared again. Examination of the slit lamp revealed similar findings of scleral and peripheral corneal thinning and uveal show (Fig. 3). This time the left eye was patched with a preservative-free moxifloxacin eyedrop, D Panthenol gel, and Sodium Hyaluronate drop. Oral Doxycyclin 100 mg BD and Vitamin C tablets 500 mg BD was prescribed for 14 days. A cough suppressant was also given as the patient complained of a cough. The next day after the removal of the patch, the size of scleral necrosis and the uveal show was grossly reduced (Fig. 4). Eye patching with the above-mentioned treatment was done for the next five days.

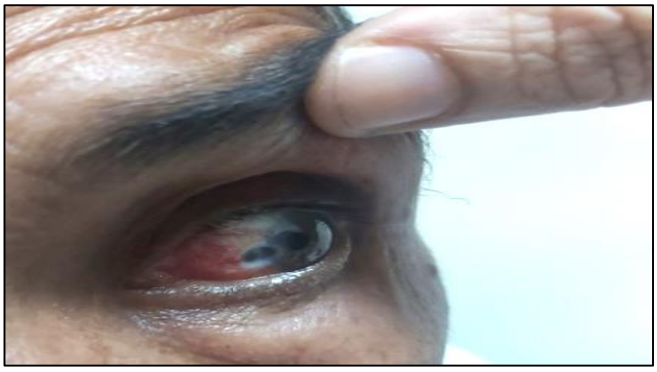

Fig. 3. Recurrence of scleral & corneal thinning 13 days after surgery.

Fig. 4. Resolution of thinning after patching the eye (Day 14 after Surgery).

It was observed that corneal and scleral thinning gradually reduced in depth and area. The growth of conjunctiva over the bare scleral area started after three days of patching, which was associated with the advancement of the vessel toward the limbus (Figs. 5 and 6).

Fig. 5. Fully gained scleral and corneal thickness (Day 16 after surgery).

Fig. 6. Conjunctival growth towards limbus started after three days of patching.

After five days of topical patching, medications were continued for one month. By the end of the fourth week, the sclera was fully covered with normally vascularized conjunctiva, and corneal thinning was completely reversed (Figs. 7, and 8). After prescribing the near vision glasses and a lubricant eyedrop for both eyes, the patient was finally discharged.

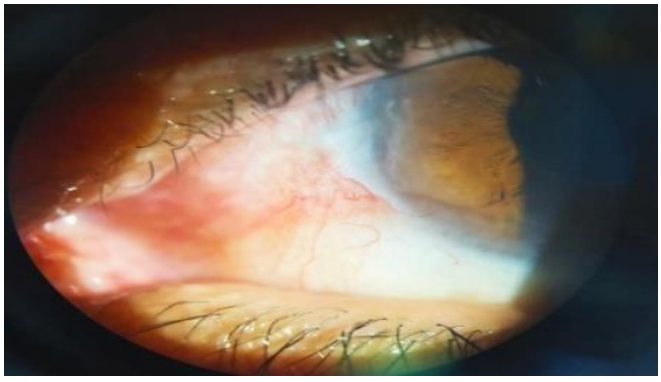

Fig. 7. Conjunctival growth nearly reached the limbus after three weeks of treatment.

Fig. 8. Completely healed lesion with vascularized conjunctiva after 4 weeks.

3. Discussion

We present a complicated scleral necrosis case after uneventful bare sclera pterygium excision and phacoemulsification surgery. In this case, no adjuvant treatment was given; instead, cauterization of two minor bleeders of the scleral bed after pterygium excision was done. Multiple factors like adjuvant treatment (MMC, beta irradiation, thiotepa), autoimmune disorders, or hypersensitivity are responsible for delayed healing.[7] Systemic disorders can also be associated with delayed collagen synthesis, such as rheumatoid arthritis or collagen vascular disorder.[8, 9] Proper history-taking and pre-operative assessment are of utmost importance before any intraocular or extra-ocular surgery. In bare sclera pterygium surgery, scleral dellen can be a post-operative complication due to delayed wound closure in the early post-operative period.[10, 11] The uneven spread of tear film leading to the dry eye could also be unsupportive for healing and formation of scleral or corneal dellen. It is possible to have disturbed tear film after bare sclera pterygium excision, though the exact mechanism is not fully determined.[11, 12] Some studies have proposed the possibility of dellen formation due to conjunctival edema, and granulation tissue edges causing discontinuity of tear film leading to desiccation of the area.[12, 13]

Further, scleral necrosis or dellen formation can occur after excessive cauterization.[6] In this case, two small bleeding vessels were cauterized using minimal power, which might also contribute to delay healing. Sharma et al.,[14] have documented that use of steroids is another culprit for the scleral dellen formation. We had to prescribe frequent topical steroids as phacoemulsification was also done. Our patient had no pain or discomfort in his eyes except for mild itching. There was no pain, so surgically induced necrotizing scleritis was ruled out. None of the conditions predisposing to poor wound healing, like vascular disorders, autoimmune disorders, or tear film abnormality, was found. The considerable factors leading to this situation may be cauterization of the scleral vessels, non-application of conjunctival autograft, and frequent instillation of steroid drops post-operatively which was required after phacoemulsification.

4. Conclusion

Scleral melt though rare, can lead to grave consequences. Cauterization of the scleral bed bleeders should be done cautiously in the bare sclera pterygium excision method. A conjunctival autograft or amniotic membrane graft should be placed if cauterization is done to stop the bleeding. Conservative treatment can be helpful in the management of scleral thinning. Oral Vitamin C, Doxycycline, and frequent topical D panthenol and Sodium Hyaluronate are beneficial, though large-scale studies are required to prove the efficacy. Pressure-lowering agents should be prescribed to prevent the globe rupture.

Conflict of Interest

The authors declared that there is no conflict of interest.

Acknowledgements

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

References

[1] Madanagopalan VG, Shivananda N, Krishnan T. Surgically induced necrotizing scleritis after retinal detachment surgery masquerading as scleral abscess. GMS Ophthalmology Cases. 2019;9. https://doi.org/10.3205/oc000107.

[2] Doshi RR, Harocopos GJ, Schwab IR, Cunningham Jr ET. The spectrum of postoperative scleral necrosis. Survey of ophthalmology. 2013;58(6):620-33. https://doi.org/10.1016/j.survophthal.2012.11.002.

[3] Yamada T, Mochizuki H, Ue T, Kiuchi Y, Takahashi Y, Oinaka M. Comparative study of different β-radiation doses for preventing pterygium recurrence. International Journal of Radiation Oncology* Biology*

Physics. 2011;81(5):1394-8. https://doi.org/10.1016/j.ijrobp.2010.07.1983.

[4] Hovanesian JA, Starr CE, Vroman DT, Mah FS, Gomes JA, Farid M, Shamie N, Davidson RS, John T, Holland EJ, Kim T. Surgical techniques and adjuvants for the management of primary and recurrent pterygia. Journal of Cataract & Refractive Surgery. 2017;43(3):405-19. https://doi.org/10.1016/j.jcrs.2017.03.002.

[5] Kodavoor SK, Preethi V, Dandapani R. Profile of complications in pterygium surgery-A retrospective analysis. Indian Journal of Ophthalmology. 2021;69(7):1697-1701. https://doi.org/10.4103/ijo.IJO_3055_20.

[6] Sultan D, Alnema O, Sultan MN, Zahlouk N, Kayyali A. A case of resistant scleral thinning following uneventful pterygium surgery: A case report and a literature review. International Journal of Surgery Case Reports. 2022;95:107223. https://doi.org/10.1016/j.ijscr.2022.107223.

[7] Alrawashdeh HM, Al-Habahbeh O. Bilateral surgically induced necrotizing scleritis after pterygium excision with conjunctival autograft: a case report. Oman Medical Journal. 2022;37(4):e399. https://doi.org/10.5001/omj.2022.16.

[8] Okita S, Ishikawa H, Abe A, Ito S, Nakazono K, Murasawa A, Nishida K, Ozaki T. Risk factors of postoperative delayed wound healing in patients with rheumatoid arthritis treated with a biological agent. Modern rheumatology. 2021;31(3):587-92. https://doi.org/10.1080/14397595.2020.1790138.

[9] Kadota Y, Nishida K, Hashizume K, Nasu Y, Nakahara R, Kanazawa T, Ozawa M, Harada R, Machida T, Ozaki T. Risk factors for surgical site infection and delayed wound healing after orthopedic surgery in rheumatoid arthritis patients. Modern Rheumatology. 2016;26(1):68-74. https://doi.org/10.3109/14397595.2015.1073133.

[10] Accorinti M, Gilardi M, Giubilei M, De Geronimo D, Iannetti L. Corneal and scleral dellen after an uneventful pterygium surgery and a febrile episode. Case Reports in Ophthalmology. 2014;5(1):111-5. https://doi.org/10.1159/000362156.

[11] Linaburg T, Choi D, Bunya VY, Massaro-Giordano M, Briceno CA. Systematic Review: The Effects of Pterygium and Pingueculum on The Ocular Surface and the Efficacy of Surgical Excision. Cornea. 2021;40(2):258-67. https://doi.org/10.1097/ICO.0000000000002575.

[12] Fu-Shin XY, Lee PS, Yang L, Gao N, Zhang Y, Ljubimov AV, Yang E, Zhou Q, Xie L. The impact of sensory neuropathy and inflammation on epithelial wound healing in diabetic corneas. Progress in Retinal and Eye Research. 2022:101039. https://doi.org/10.1016/j.preteyeres.2021.101039.

[13] Chavhan P, Stephen M, Babu KR, Pragathi S. An unusual case of scleral thinning with uveal exposure following pterygium surgery and its management. Kerala Journal of Ophthalmology. 2021;33(1):75-7. https://doi.org/10.4103/kjo.kjo_45_20.

[14] Sharma B, Bajoria SK, Patnaik A, Barbhaya R. Resolution of corneal dellen after an uneventful pterygium surgery with punctal cautery. Cureus. 2020;12(5):e8250. https://doi.org/10.7759/cureus.8250.

How to Cite this Article: Shukla P, Tyagi P, Bhartiya S, Mithal K, Gupta M, Jagdish P. Corneal Dellen and Scleral Melt Induced following Phacoemulsification Surgery and Bare Sclera Pterygium Excision: A Case Report. International Journal of Scientific Research in Dental and Medical Sciences. 2023;5(1):57-60. https://doi.org/10.30485/IJSRDMS.2023.380907.1427.