

Iron in the Eye-Ocular Siderosis due to Intraocular Foreign Body

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Abstract

Background: Ocular siderosis is a rare condition in which pigmentary and degenerative changes can occur in the eye due to a retained iron-containing intraocular foreign body. In this case study, we present a case of devastating sequelae of a retained intraocular foreign body and the positive visual outcome following its removal.

Case Report: A 32-year-old male presented to the clinic with chief complaints of floaters and a diminution of vision in the left eye for 2 months. The patient had a history of trauma to the left eye with an iron particle 3 years back, for which he took some local treatment. On ocular examination, the anterior segment of the right eye was within normal limits with visual acuity of 6/6 and projection of rays accurate in all quadrants, while the visual acuity of the left eye was finger counting close to face with projection of rays inaccurate in the nasal quadrant. There was a linear inferonasal corneal opacity (2x1 mm in size) with an iris hole of the same dimensions at the 8 o'clock position of the left eye 2 mm from the limbus in the left eye. There was yellow-brown pigment deposition on the lens capsule with broken posterior synechiae of 5 clock hours, from 4 o'clock to 9 o'clock in the left eye. On USG, old vitreous hemorrhage was seen in the left eye and CECT revealed a foreign body of size 3.2 x 2.8 mm in size in the left eye. The patient underwent cataract extraction and PPV followed by removal of the iron particle using a 20 G magnet, IOL implantation and cryopexy in the left eye. Postoperative best corrected visual acuity of the patient in the left eye was 6/18.

Conclusion: This case emphasizes the importance of conducting a detailed investigation, especially in the working-age population and those in occupations where penetrating injuries cause retention of intraocular foreign bodies. Prompt diagnosis and early intervention can help in achieving a favorable visual outcome.

Keywords: Ocular siderosis, Intraocular foreign body (IOFB), Trauma, Pars plana vitrectomy (PPV), Visual acuity.

INTRODUCTION

It is estimated that about intraocular foreign bodies can be found in 18 to 41% of open globe injuries.¹ Ocular trauma is considered to be a major cause of ocular morbidity in the working population.² Penetrating ocular injury with retained intraocular foreign body can often have devastating outcomes and can even lead to blindness or other severe complications.³ Siderosis bulbi is one such complication that can occur due to a retained iron-containing foreign body. It is a condition in which deposition of iron molecules occurs in the ocular tissues, leading to pigmentary and degenerative changes in the eye.⁴ Ocular features of ocular siderosis include iris heterochromia, pupillary mydriasis, cataract, secondary glaucoma, arteriolar attenuation, pigmentary degeneration of the retina, hyperemia or swelling of the optic disc, and cystoid macular edema.⁵⁻⁷ Moreover, if a thorough investigation of the eye is not done, intraocular foreign bodies can be

missed in patients with small self-sealing wounds. Computed tomography (CT) and ultrasonography are considered the gold standard investigations for detecting intraocular foreign bodies.⁸ In this case report, we discuss a working personnel who presented with clinical ocular siderosis, with no detectable intraocular foreign body on ultrasonography. The patient had a positive visual outcome after the successful removal of the foreign body.

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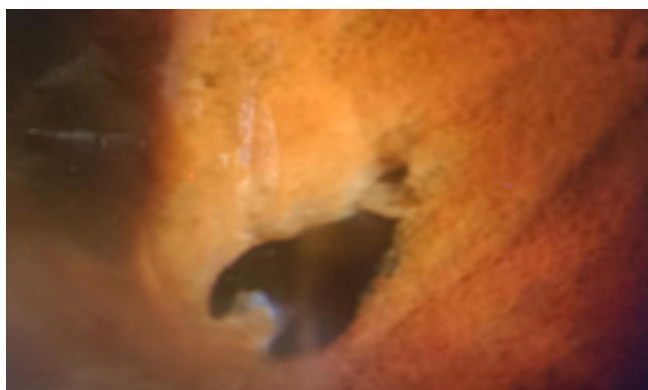


Figure 1: Iris Hole Measuring 2 Mm X 1 Mm

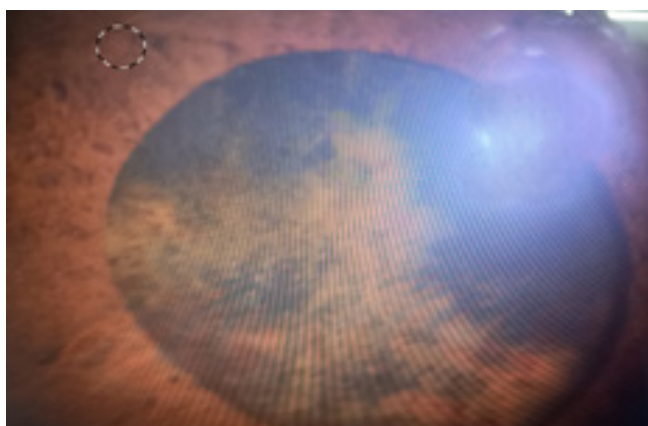


Figure 2: Siderotic Cataract

CASE REPORT

32-year-old male, an ironsmith by profession, came to the Ophthalmology OPD with chief complaints of diminution of vision in the left eye for 2 months, which was insidious in onset, painless and progressive in nature. The patient also gave a history of experiencing floaters for 6 months. On investigating further, the patient revealed that he had a history of trauma to the left eye with an iron particle while working. The patient did not consult any doctor and had started using certain drops on his own. On general examination, the vitals were normal, and the patient was conscious and well-oriented to time, place, and person. On ocular examination, there was no abnormality in

the right eye. However, in the left eye, the visual acuity was finger counting close to face with projection of rays accurate in all quadrants, with a linear, inferonasal corneal opacity of size 2 x 1 mm, about 1 mm away from the limbus at the 8 o'clock position. An iris hole of similar dimensions was noted at the 8 o'clock position (Figure 1). There was loss of pattern in some parts of the iris and deposition of iris pigments on the lens capsule (Figure 2). There were posterior synechiae covering 170 degrees, extending from 4 o'clock to 9 o'clock inferiorly. Lenticular opacity was also seen. Visual evoked potential (VEP) revealed normal amplitude and P100 latency in the right eye, while a prolonged P100 latency was seen in the left eye with reduced P100 amplitude. On ultrasonography, vitreous hemorrhage was seen in the posterior segment, but no evidence of a foreign body was found in the left eye (Figure 3). Contrast-enhanced computed tomography was advised, which revealed the presence of an intraocular foreign body of size 3.2 x 2.8 mm in the vitreous cavity of the left eye (Figure 4). The patient was planned for cataract extraction surgery as well as intraocular foreign body removal from the left eye. Manual small incision cataract surgery was planned, and the intraocular foreign body was located. After performing pars plana vitrectomy, the intraocular foreign body was removed using a 20 G intravitreal magnet. Since the size of the foreign body was more than 2 mm, it was first brought into the anterior chamber using vitrectomy forceps (Figure 5). Cryopexy was done to repair the tears in the peripheral retina. A sulcus-fixated intraocular lens was implanted in the left eye, followed by instillation of antibiotic drops and steroid ointment. On postoperative day 2, the best corrected visual acuity of the patient in the left eye was 5/60. The patient had striate keratopathy and anterior uveitis in the left eye (Figure 6). The patient was followed up after 15 days and the best corrected visual acuity was 6/60 in the left eye. Posterior segment did not show any abnormality (Figure 7).

DISCUSSION

Ocular siderosis is a clinical presentation that can occur due to retained intraocular iron foreign body leading to changes in the iris (iris heterochromia, 58.33%) and lens (cataract, 95.83%).⁹ Additionally, in 58.33% of the cases, pigmentary degeneration may be found in the retina as well.⁸⁻¹⁰ Cataract is considered to be one of the hallmark indicators of early

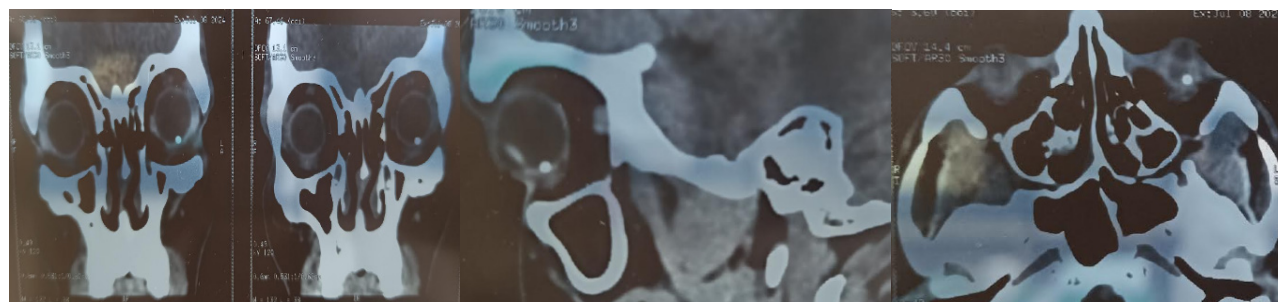


Figure 3: CT Scan Showing Intraocular Foreign Body

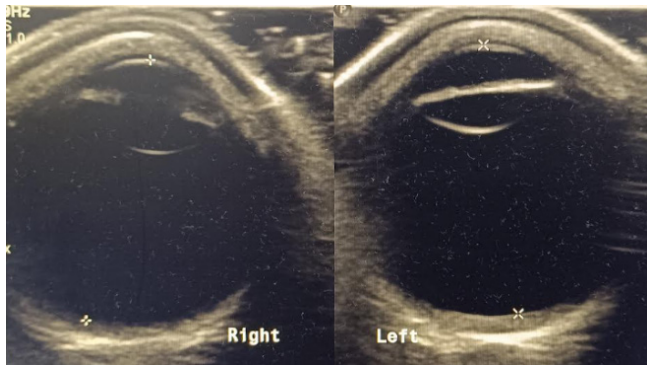


Figure 4: Ultrasonography did not reveal the presence of foreign body

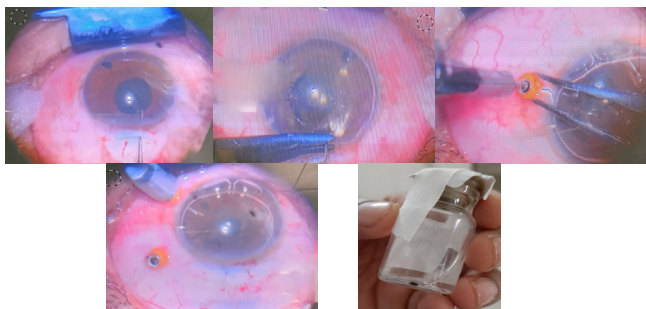


Figure 5: Intraop Photos

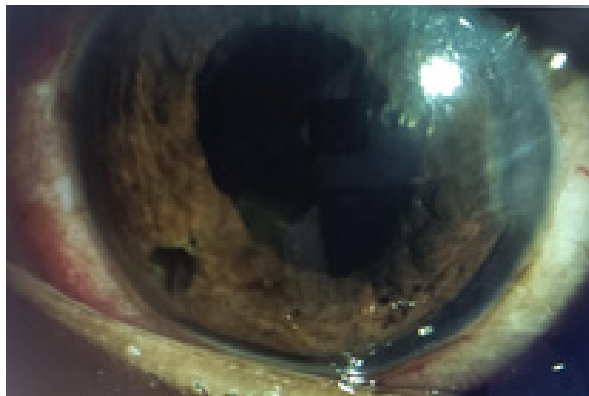


Figure 6: Post Operative Day 2



Figure 7: Fundus Photos of Right Eye and Left Eye (Post Operative)

siderosis. It can occur due to deposition of iron in the epithelial cells of the anterior capsule, resulting in numerous brownish spots or rusty spots. As the condition worsens, the entire lens can become deep yellow with rusty brown patches.⁹ Moreover, the changes that occur in siderosis become irreversible after a certain stage. Therefore, early detection of metallic foreign bodies and their removal is recommended for all patients. This can prevent further damage to the ocular tissues due to iron and can preserve ocular functions. Computed tomography is considered a gold standard for the early detection of foreign bodies.⁸ However, certain cases have been reported in which intraocular foreign bodies were missed on CT scan. This could be due to the small size of the foreign body, which can be missed in scans that produce contiguous 2 mm images. Ultrasonography is often helpful in detecting intraocular foreign body but its efficacy depends on the operator's skill. Moreover, chronic retention of iron can be difficult to identify as iron may undergo dissolution over time.¹⁰ Siderosis bulbi can also impair the function of all layers of the retina and can cause reversible damage in the early stages of the disease. Electrophysiology is considered to be a valuable tool in assessing retinal function and the extent of the damage.⁹ Pars plana vitrectomy is preferred to remove intraocular foreign bodies. An early intervention is recommended to prevent vision-threatening complications such as endophthalmitis and siderosis.⁹ A newer surgical technique known as "handshake technique" has been described to remove all sizes of intraocular foreign bodies by using two intraocular magnets.¹¹

CONCLUSION

Ocular siderosis may develop within a few days to several years depending on the dimensions of the intraocular foreign body, its shape, location, and associated tissue reaction. A complete ophthalmological examination is mandatory to get an accurate view of anterior and posterior segments. Despite clinical improvement, intraocular foreign bodies are often overlooked due to delayed presentation and missed diagnosis.

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