

Frosted branch angiitis with penetrating ocular trauma and retained intraocular foreign body

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A 54-year-old male sustained ocular trauma with a projectile. Examination of the right eye revealed an intraocular foreign body (IOFB) adjacent to the optic nerve head, vitritis, vitreous hemorrhage, and translucent perivascular sheathing of the retinal vessels in all quadrants suggesting frosted branch angiitis (FBA). The patient underwent vitrectomy with removal of the IOFB and silicone oil tamponade under steroid cover. With continued use of systemic and topical steroids after surgery, complete resolution of FBA and improvement in vision were noted in a week. Prompt resolution of FBA after IOFB removal points toward a strong association between the presence of IOFB and FBA.

Key words: Frosted branch angiitis, intraocular foreign body, penetrating ocular trauma, vitrectomy

Frosted branch angiitis (FBA) is an immune-mediated disorder of the retinal vasculature. The term has been coined to denote a striking resemblance of the exudation around the retinal vessels to ice-covered branches of a tree in winter. FBA has been attributed to many infective, inflammatory, or neoplastic causes.^[1] Although there are reports of retinal vasculitis after blunt eye trauma and after removal of an intraocular foreign body (IOFB),^[2,3] the literature has no reports of FBA in association with IOFB. We present a case where FBA was noted after penetrating ocular injury with a retained IOFB.

Case Report

A 54-year-old male presented to the emergency department with complaints of pain, watering, and redness in the right eye (OD) for a day. He gave a history of injury with a small metallic projectile from an iron rod while working on it with a hammer and chisel. He had no recent prodromal illness, past ocular complaints, or other systemic illness. On examination, the visual acuity (VA) in OD was 20/250 and in the left eye was 20/20. Clinical examination of OD revealed circumcorneal

congestion and a small entry wound over the inferonasal conjunctiva pointing toward a pars plana route of entry. The cornea was clear. Examination of the anterior chamber (AC) showed AC cells Grade 1+ and AC flare Grade 1+. The iris and lens were normal. Grade 1+ cells were noted in the anterior hyaloid face. Posterior segment examination showed vitritis and vitreous hemorrhage [Fig. 1]. An oblong grayish foreign body was noted in front of the optic nerve head (ONH) [Fig. 1, arrow]. The margins of the ONH were hyperemic with adjacent retinal hemorrhages. Detailed evaluation of the ONH was not possible due to vitritis and vitreous hemorrhage. Extensive retinal commotio and hemorrhages were noted in all quadrants. There was vascular sheathing in all quadrants, which mimicked FBA [Fig. 1, arrowheads]. There was no apparent retinal break. The left eye was clinically normal. The IOFB was seen on ultrasound imaging as a single high reflective echo anterior to the ONH. Besides, multiple low reflective dot echoes suggestive of vitreous hemorrhage were made out. The retina was attached in all quadrants. The patient underwent X-ray imaging, and the presence of other foreign bodies was ruled out. His full blood count and differential count were normal. Serology for Hepatitis B, Hepatitis C, and human immunodeficiency virus was negative. Mantoux skin test did not show induration. The

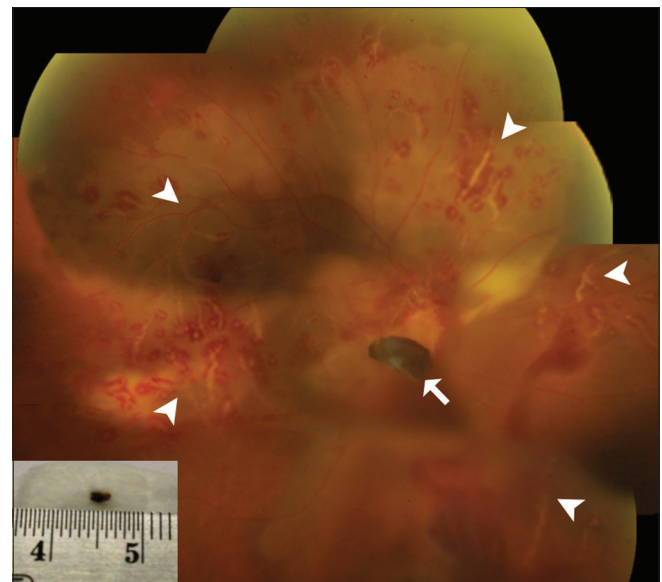


Figure 1: Montage of the right eye after penetrating ocular trauma shows the retained metallic foreign body in front of the optic nerve head (arrow). Vitritis, vitreous hemorrhage, and retinal commotio can also be seen. Retinal hemorrhages in all quadrants and extensive perivascular sheathing giving rise to a picture of frosted branch angiitis are striking (arrowheads). A metallic foreign body measuring 2.5 mm × 1.5 mm was removed during surgery (inset)

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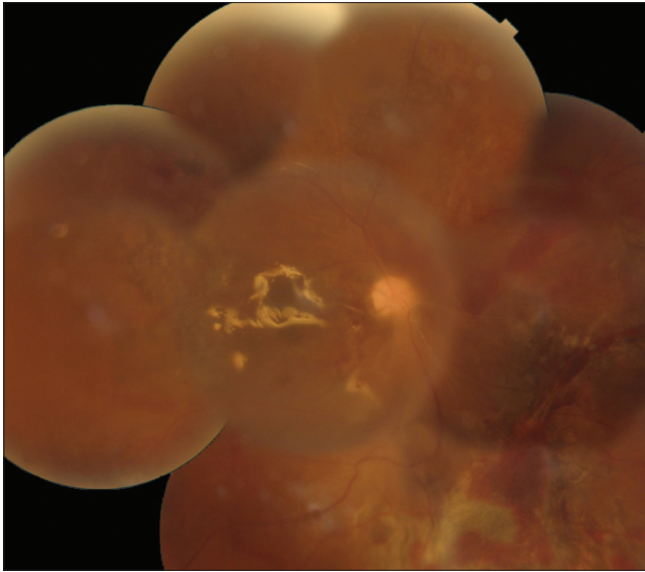


Figure 2: One week after surgery, the fundus view was hazy due to corneal edema and postoperative inflammation. However, complete resolution of frosted branch angiitis can be seen in the silicone oil-filled eye

patient was administered topical steroids (prednisolone acetate drops 2 hourly), cycloplegics (homatropine drops 3 times a day), and antibiotics (moxifloxacin drops 3 hourly). Systemic steroid (prednisolone 50 mg) was also given. On the 2nd day, he underwent vitrectomy and removal of the foreign body through the pars plana. An elongated rusted foreign body, which was probably made of iron, was retrieved [Fig. 1, inset]. Intraoperatively, a retinal break was noted inferior to the ONH. Laser photocoagulation was done around the break and silicone oil was used for tamponade. Vitreous biopsy did not reveal any organisms in microscopy or culture. One week after surgery, VA in OD was 20/200 with complete resolution of perivascular exudation [Fig. 2]. Topical and systemic steroids were gradually tapered over 6 weeks. At the last follow-up, 3 months after surgery, the patient had an attached retina with a VA of 20/200 in OD.

Discussion

FBA has been described as an immunological response to various antigens.^[4] The first case of FBA described by Ito *et al.* had panuveitis with extensive translucent perivascular exudation.^[5] FBA has been reported to follow viral prodromes. FBA has also been variously reported in association with viral retinitis, toxoplasmosis, sarcoidosis, multiple sclerosis, Behçet's disease, antiphospholipid antibody disease, lymphomas, leukemias, Crohn's disease, and endophthalmitis.^[1,6-8] FBA-like picture with retinal vasculitis has been noted following blunt ocular trauma.^[2,3] Kang *et al.* have described the occurrence of acute retinal toxicity and localized vasculitis after vitrectomy for the removal of a metallic foreign body.^[9] Besides, there are reports of retinal phlebitis being the presenting feature of endophthalmitis following occult scleral tear and endophthalmitis following vitrectomy.^[10]

We report the first case of FBA in association with penetrating ocular trauma and retained intraocular foreign body. In ocular trauma, increase in retinal vascular permeability

may be attributed to the presence of vitreous hemorrhage and introduction of proteins such as plasma kallikrein into the vitreous.^[11] Besides, trauma causes a breakdown of the blood-retinal barrier. The presence of a foreign body within the eye also elicits an intense inflammatory reaction.^[12] As a consequence, vitritis and retinitis are seen. The immunological response to the foreign antigens in tandem with severe intraocular inflammation and disrupted blood-retinal barrier causes increased permeability of the retinal vessels. Perivascular sheathing is, therefore, seen due to vascular exudation and immune complex deposition. Our patient did not have any other predisposition for FBA as seen with the systemic investigations. Analysis of the vitreous sample for microbes did not yield any organisms, thereby making a diagnosis of endophthalmitis unlikely. The temporal association of onset of FBA after the introduction of an IOFB by penetrating ocular trauma points toward a strong association between the presence of IOFB and FBA. The role of the retained foreign body in causing the vasculitis and FBA-like picture is emphasized by the resolution of perivascular sheathing after removal of the foreign body and use of steroids.

Conclusion

In summary, to the best of our knowledge, this is the first report of an association between retained IOFB and frosted branch angiitis. In all cases with trauma, early removal of a metallic foreign body is necessary to save the eye and prevent further complications. In our experience with this patient, such surgery along with systemic and topical steroids helped in resolution of frosted branch angiitis as well.

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.

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Conflicts of interest

There are no conflicts of interest.

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