MANAGEMENT OF INTRAOCULAR FOREIGN BODY:

CASE REPORT

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Abstract
Penetrating ocular injury caused by metal-striking-metal can result in severe damage to the eye, orbit or vision. However, signs and symptoms associated with such an injury can be subtle and may be missed if care is not taken during every aspect of the eye exam. This case is presented to emphasize the importance of thorough exam and prompt actions to prevent and recover any possible vision loss from penetrating foreign body injury.

Key words
Intraocular foreign body, CT scan, refractile body, safety eye wear, siderosis, chalcosis, MRI, commotio retinae, perforating injury, Seidel sign.

CASE REPORT:
A 32 year old, white male presented to our clinic with a chief complaint of being struck in the right eye by a metal object while hammering at work on the previous day. The patient also stated that his vision was blurry, with minimal foreign body sensation, tearing and photophobia. The rest of the history was non-contributory, with no medications taken and no known allergies.

His entering visual acuities were 20/25 O.D. and 20/20 O.S., unaided. Preliminary evaluations were normal with unrestricted extraocular muscle movement, full confrontation fields, and normal pupillary reaction without afferent pupillary defect. The right eye, upon slit lamp evaluation, revealed a 2mm inferior nasal corneal perforation (Fig. 1) near the limbus with positive Seidel sign under fluorescein staining, perforated iris (Fig. 2) revealed by retroillumination, and traces of pigment, cells and flare in the anterior chamber. Intraocular pressures were 12 mmHg O.D. and 16 mmHg O.S., with applanation tonometry. Direct ophthalmoscopy of the right eye revealed a commotio retinae (Fig. 3), a tear and a local retinal detachment, inferior to the macula and a refractile body below the inferior vascular arcade (Fig. 4).

The tentative diagnosis was metallic intraocular foreign body. A Fox shield was applied, and Ciloxan was applied q30min. The patient was immediately scheduled for a CT scan of the globe and orbit (Fig. 5). He was seen by an in-house retinal specialist, who confirmed the diagnosis. After reviewing all the data, including the CT scan, the decision was made to admit the patient into the hospital for surgery that evening to remove the foreign body.

The procedures performed were pars plana vitrectomy, forceps foreign body extraction, endolaser retina repair, gas/liquid exchange, and the administration of prophylactic intraocular antibiotics, Vancomycin and Amikacin. One stitch was used to close the corneal perforation site. Postop medications were Pred Forte q.i.d., Ciloxan q.i.d., and Scopolamine q.d. After an overnight stay, the patient was

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FIGURE 1. Gross external photo; nearly normal appearance.

FIGURE 2. High mag view of corneal laceration and underlying iris defect.

FIGURE 3. Posterior pole showing commotio retinae and localized retinal detachment.

FIGURE 4. View of metallic foreign body and localized retinal detachment.

FIGURE 5. CT of foreign body, O.D.; coronal slice.

FIGURE 6. CT later showing no residual foreign body.

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discharged. He was to return for postop evaluation four days later.

On the follow-up, four days postoperatively, the patient presented with slight pain in the right eye and a temporal headache. His unaided visual acuities were 20/400 O.D. and 20/20 O.S.; the IOP was 18 mmHg bilaterally. There was negative Seidel sign, the anterior chamber was deep with trace cells and flare. Dilated fundus exam revealed local hemorrhage in the area of the repaired commotio retinae, endolaser spots circumscribed a blanched retina where the metal particle had been, and a gas bubble occupying the upper half of the vitreous cavity. The combination of edema and the fluid/gas interface near the macula probably accounted for the decrease of VA at this visit. The plan was to discontinue the Scopolamine, continue with Ciloxan q.i.d. until it is empty, Vicodin q4-6h for pain, and a return visit was scheduled in one week for further follow-up.

The patient reported improved vision on the one week follow-up visit, and no other complaints. His VA's without correction were 20/200, improved with pinhole to 20/40 O.D. and 20/20 O.S. Pressures were 17/18 mmHg, OD/OS respectively. Fundus evaluation indicated the gas bubble to be 20% of the vitreous cavity, resolving edema and hemorrhage at the involved sites. During the posterior pole evaluation a glintting subretinal appearance next to the fovea was detected. B-scan ultrasonography and a second CT scan (Fig. 6) was ordered to further rule out any other foreign body previously missed; both scans were negative. Focal argon laser retinopexy was performed to augment the operative repair of the localized retinal detachment.

His VA's on the next follow-up visit were 20/30 O.D. and 20/20 O.S.; pressures were 20/21 mmHg, respectively. Slit lamp evaluation indicated a 2mm re-epithelialized corneal scar where the metal particle entered, and a patent peripheral iris hole. Fundus evaluation indicated a well healed posterior pole with trace of hemorrhage, scarred over retinal lesions with some pigmentary clumping, and intact peripheral retina.

At this point, the patient was given the O.K. to resume work with restricted activity. He was also informed of possible future retinal detachment and was instructed of symptoms to look for; proper safety eye wear and precautions were also discussed. The patient is to return in one month, or sooner if any visual change is noted, for a further follow-up.

DISCUSSION

The most common source of intraocular foreign body is from metal-striking-metal situation, and this patient is a prime example of what can occur in a working environment where safety eye wear is not employed. In a metal-striking-metal situation, the projectile, usually an iron alloy, can travel at tremendous speed and can be lodged anywhere within the orbit or globe. The usual sites are: 15% in the anterior chamber; 8% in the lens; 70% in the posterior pole; and 7% in the orbit.

Due to the size of the metal projectile, between 0.5 to 3 mm, in size, an extremely careful ocular examination is indicated. It includes a thorough case history of the chronology and circumstances surrounding the injury, with close attention to details of any evidence of injury; evaluate every structure of the eye, starting at the lids and work back to the posterior pole, noting every abnormality. Signs to look for, if a through-and-through is suspected are: (+) Seidel sign with fluorescein; iris transillumination; severe conjunctival edema and deepening or narrowing of the anterior chamber in cases of scleral rupture; refractile surface in the retina; retinal hemorrhage and commotio retinae.

SUMMARY

The physician must utilize the armamentarium of techniques available to evaluate injuries involving foreign bodies. These include slit lamp biomicroscopy, fundus lenses, gonioscopic mirrors, direct ophthalmoscopy, and BIO. The physician should be aware of possible multiple foreign bodies, and should rule that possibility out whenever a foreign body is detected. Once an intraocular foreign body is detected, accurate localization is necessary if surgery is required. Radiology, ultrasonography, and computer tomography are ancillary tests used in localization of foreign bodies. CT scan is the standard in localization of intraocular foreign bodies because of its ability to pick up foreign bodies of various constituents. A-scan and B-scan are also useful in locating intraocular foreign body due to their ability to detect non-radiopaque objects. B-scan also has the added advantage of being able to pick up retinal detachment and vitreous hemorrhage. X-rays are not often used since they cannot detect non-radiopaque objects. Magnetic resonance imaging (MRI) is one imaging technique that should be avoided unless there is 100% confidence that the foreign body is non-metallic. An iron or ferrous body in the middle of a rotating magnetic field can have a devastating outcome within the orbit or globe.

Even though each material reacts and decomposes differently, any foreign body encountered should be removed as soon as possible. Complications such as vitritis, uveitis, endophthalmitis, cataract or siderosis bulbi necessitate surgical intervention. These inflammatory processes occur due to bacteria or toxic chemical carried by the foreign body, or due to the decomposition of the various metals. Copper and iron can cause siderosis bulbi and other toxic reaction in the eye. The list of decreasing reactivity includes mercury, aluminum, nickel, zinc, lead, and various inert substances. Other complications that may be precipitated by the injury and foreign body include cataracts, glaucoma, vitreous and retinal detachment.

As in this case, this type of injury is not an uncommon event where hammering takes place, and safety eye wear is not utilized. Studies have shown that from 72 to 80% of intraocular foreign body injuries occur from hammering; all the injured did not wear protective eye wear. 69% of the injuries occurred on the job, and the rest were not job related. The Occupational Safety and Health Act (OSHA) of 1970 required employers to make available protective eye wear, meeting the American National Standard for Occupational and Educational Eye and Face Protection (Z87.1) for
their employees. The safety eye wear and conscientious precautions should not only apply to workers in industry and construction, but to everyone engaged in such activities.

REFERENCES

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