

Ocular Trauma

Alex Villarreal

08/18/2020

RAD 4001

Special thanks to Sandy Scott PGY2



Clinical History CC: “I cannot see out of my left eye”

- HPI: The patient is a 34-year-old male with a MHX of multiple abdominal surgeries due to moto-cross accident who presented to the ER with L eye injury and pain. The patient was using a grinder and the machine malfunctioned and the wheel flew under his face shield and hit his L eye. The patient has decreased visual acuity and severe pain.
- ROS:
 - Eye:
 - Positive: Decreased VA, pain OS
 - Negative: floaters, diplopia, photophobia, tunnel vision OU
 - Systemic: Negative tingling, weakness, SOB, abd pain

Physical Exam

- Vital signs stable
- Ocular
 - OD: 20/20 Unremarkable
 - OS: 20/70, swollen shut, bruised, laceration in upper eyelid, blood and clear fluid draining from eye, blood in anterior chamber, Seidel Test negative, 3 punctate foreign bodies near laceration
- Rest of PE was unremarkable
- CT Head w/o Contrast

Relevant Imaging

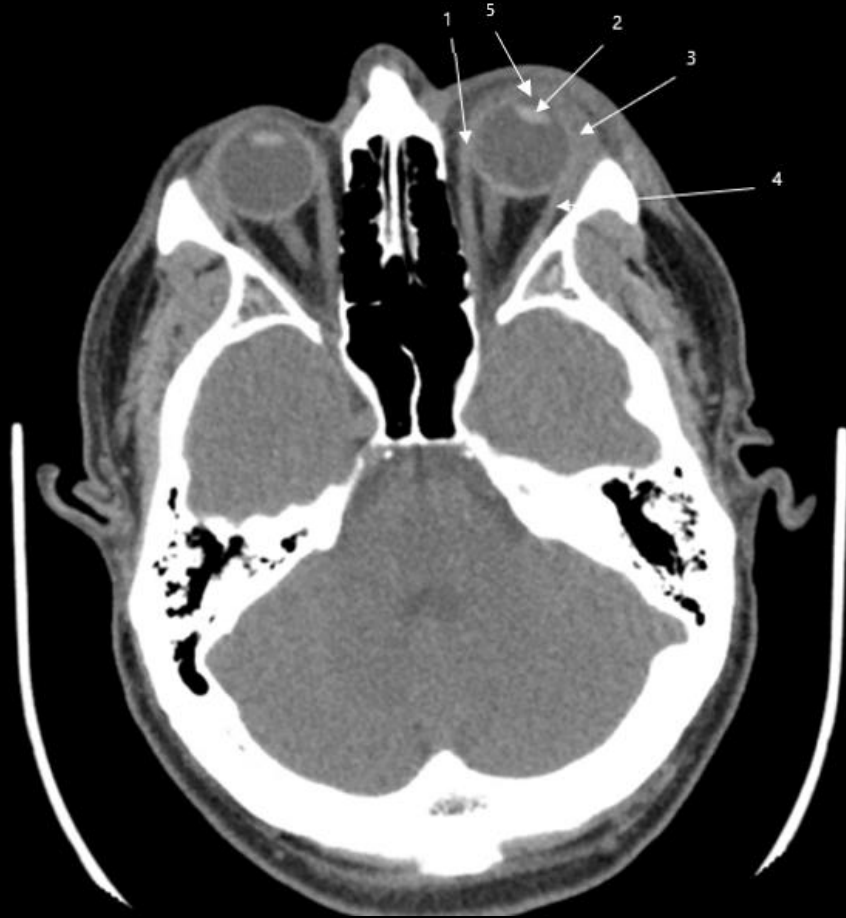


<https://radiopaedia.org/cases/normal-ct-scan-of-the-orbits>

1. Nasal Septum
2. Vitreous body
3. Sclera
4. Lacrimal Gland
5. Left periorbital soft tissue swelling
6. Punctate radiopaque foreign body
7. Ethmoid Sinus
8. Sphenoid Sinus
9. Optic Nerve

CT Head w/o Contrast. 7/30/2020

More relevant imaging

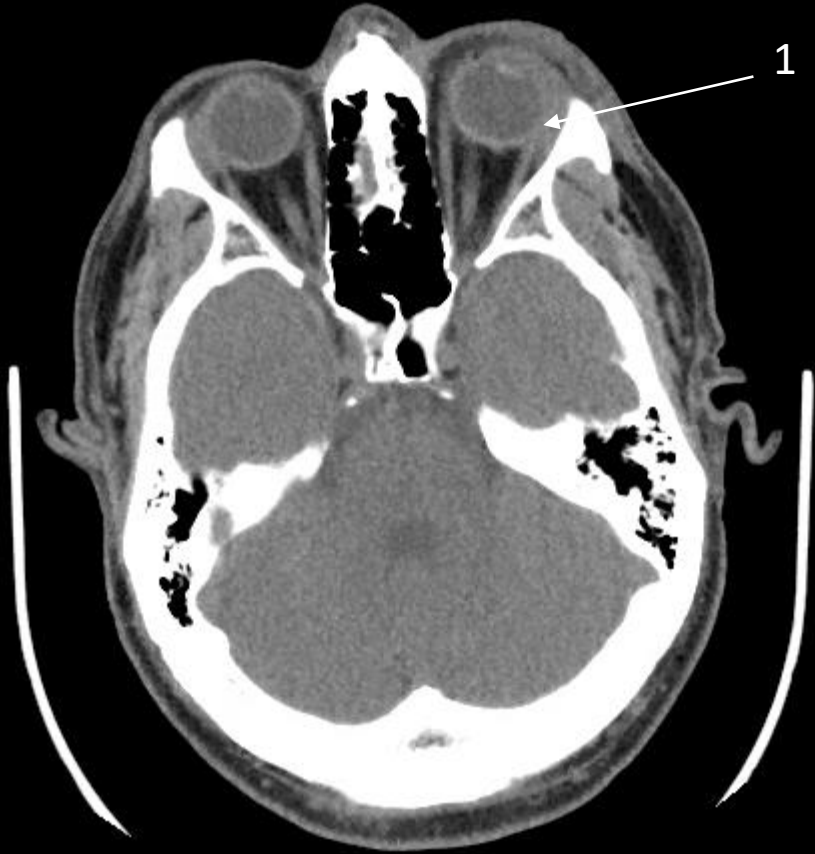


1. Medial Rectus
2. Lens
3. Left periorbital soft tissue swelling
4. Lateral Rectus
5. Focal Blurring of Left anterior cornea

CT Head w/o Contrast. 7/30/2020

More imaging

1. 2 mm density along posterior aspect of the left globe with mild proptosis of the left eye



CT Head w/o Contrast. 7/30/2020

Differential Diagnosis

- Full/partial thickness injury to the cornea
 - Full injury: “ruptured globe”, flat anterior chamber
 - Intensely painful, profusely lacrimation eye
 - Presence of foreign body
 - Seidel test
 - Eyelid hematoma
- Seroma/Hematoma
 - Collection of fluid that builds up under the surface of skin
 - Swollen lump and can be tender
 - Commonly occur during surgical procedures
- Endophthalmitis
 - Purulent inflammation of the intraocular fluids
 - Eye pain, discomfort, blurred vision
 - Swollen eyelids, chemosis, corneal edema, reduced VA
 - Hyperdensity of the vitreous humor, proptosis
- Retrobulbar hematoma
 - Bleeding into the retrobulbar space
 - Severe pain, proptosis, complete loss of vision and subconjunctival hemorrhage
 - Eyelid hematoma
 - CT scan will show blood in retrobulbar space with densities in posterior aspect of globe

Highlight and summarize key imaging findings

- Left periorbital soft tissue swelling with fluid collection under the left eyelid
Consistent with an eyelid hematoma
- Retained punctate radiopaque foreign body in the adjacent lateral soft tissues
Consistent with ocular pain, corneal damage
- Focal blurring of the left anterior cornea with increased density of the anterior chamber fluid
Consistent with hyphema, ocular pain, corneal damage, decreased VA
- 2 mm density along the posterior aspect of the left globe and proptosis
Consistent with retrobulbar hematoma, ocular pain, eyelid hematoma

Our patient

- Our patient hx of flying metal fragment to the L eye with intense pain and decreased visual acuity
- L eye swollen shut, bruised, laceration in U eyelid, blood in anterior chamber, foreign bodies on cornea, Seidel Test Negative
- CT: left periorbital soft tissue swelling, focal blurring of left anterior cornea, foreign body, density in retrobulbar space

Discussion: Partial thickness injury of cornea complicated by hyphema

- Partial thickness injury of cornea
 - Injury are numerous, with the most often recorded etiologies being flying metal fragments, sharp objects, fingernails, air-bag deployment, fireworks, and blunt force trauma
 - 25% of them occur at work
- Hyphema
 - Blunt force trauma is the most common cause
 - Blood in anterior chamber

Continued discussion

Corneal Laceration

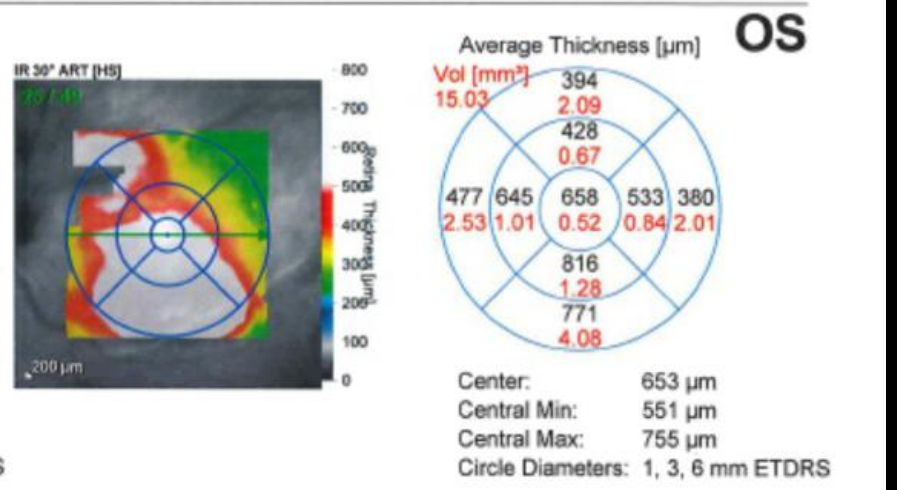
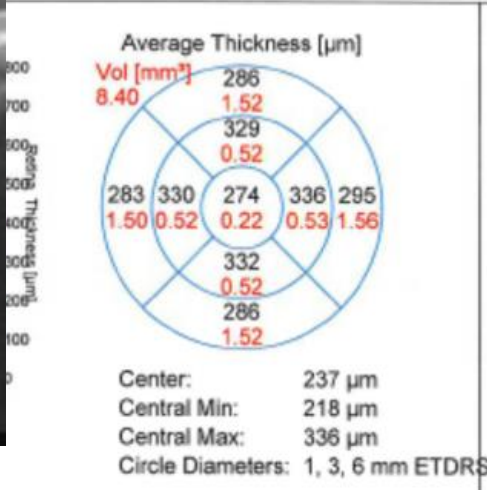
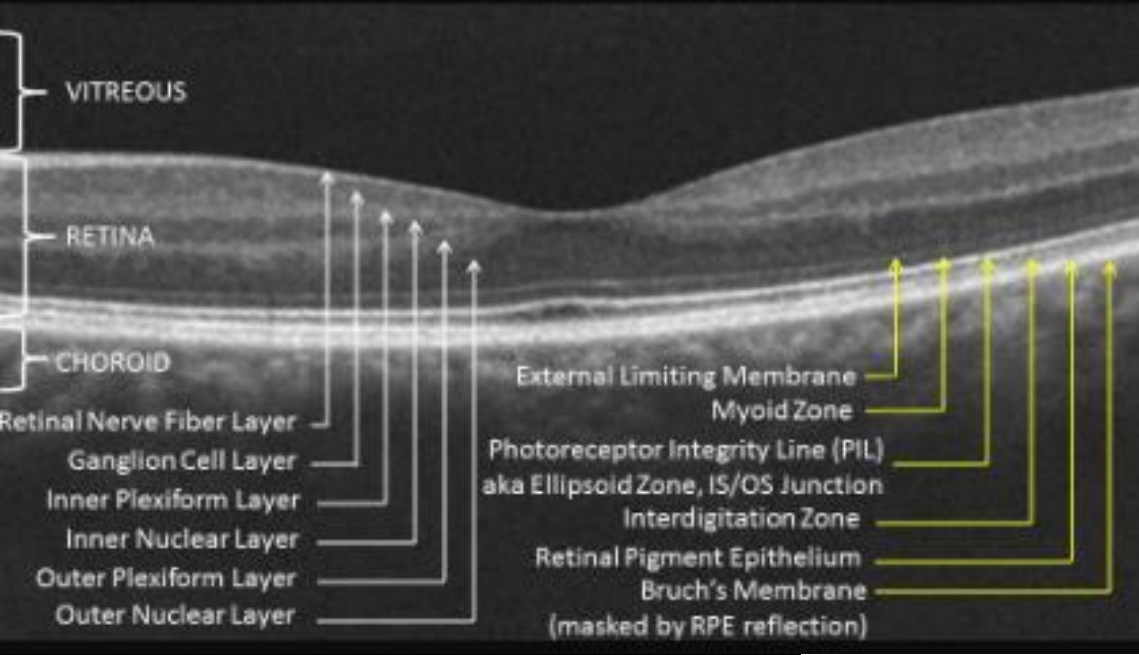
- Primary concern of corneal laceration is a full-thickness penetration aka ruptured globe
 - Many case studies with Seidel Test had a FN
 - Would require immediate surgery
- Partial thickness corneal lacerations are managed medically
- Type of foreign body
 - Metallic foreign bodies
 - Non-leeching plastics
- Fibrin glue
 - Single case report

Hyphema

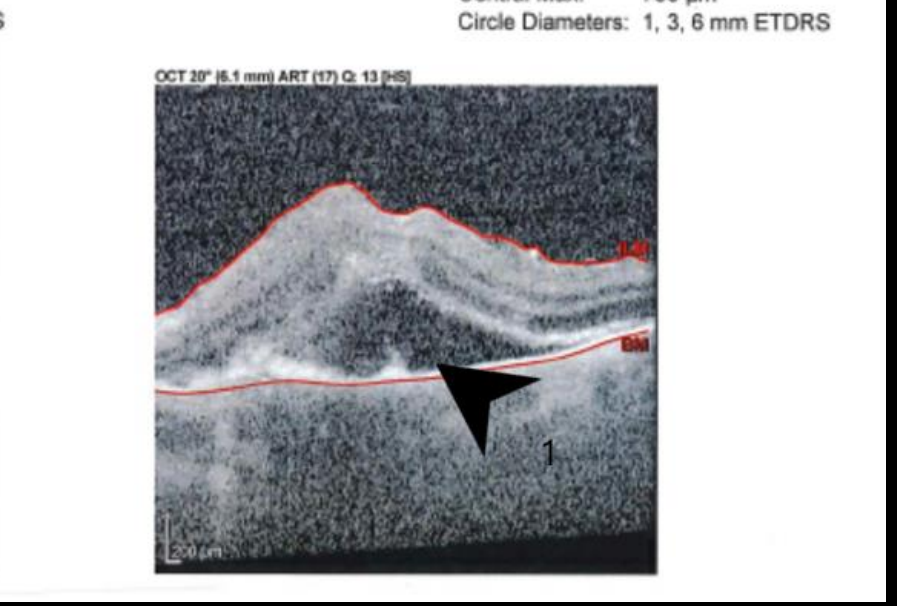
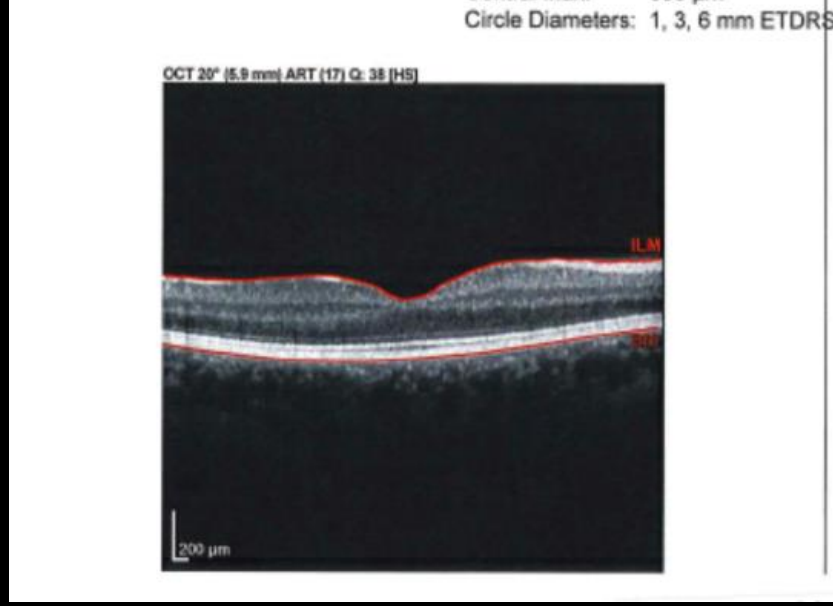
- Diagnosis made with slit-lamp examination of the anterior chamber
- Patients will have blurry vision and ocular distortion
- Case series of 235 cases
 - Risk of elevated IOP increased significantly for hyphemas filled to more than 50%
 - 27%
 - Lower than 50% filled only had a 13.5% increase in IOP
- 5% of patients will require surgery
 - Anterior chamber washout

Treatment

- Treatment: Pred 1 drop BID, vigamox 1 drop QID, atropine 1 drop BID, bandage contact lens, shield eye at all times
- Recommendations: No lifting/bending/straining and keep head elevated
- Outcomes: Patients will primarily experience resolution of symptoms with medical management
 - Complications: hyphema, vitreous hemorrhage, corneal scarring, infections (endophthalmitis), cataract formation, secondary glaucoma, retinal damage
- Our case:
 - Patient developed hyphema
 - Hyphema had mostly resolved with 5 days of medical management
 - Vitreous hemorrhage
 - Choroidal Rupture
 - Subretinal fluid and exudates in the fovea



<https://www.neco.edu/news/entry/new-england-college-of-optometry-professor-releases-oct-visual-atlas-app-octavia>



OCT-Macula 8/5/20

Final Diagnosis

- Partial thickness corneal laceration with hyphema, vitreous hemorrhage, and choroidal rupture

ACR appropriateness Criteria

- The case was in accordance to the ACR appropriateness guidelines.
- Cost of CT Head without contrast: Avg \$464
- Cost of OCT Eye: \$75

Variant 1: Traumatic visual defect. Suspect orbital injury. Initial imaging.

Procedure	Appropriateness Category	RRL
CT orbits without IV contrast	Usually Appropriate	☼☼☼
CT head without IV contrast	Usually Appropriate	☼☼☼
MRI head without IV contrast	May Be Appropriate	○
MRI orbits without IV contrast	May Be Appropriate	○
CT orbits with IV contrast	May Be Appropriate (Disagreement)	☼☼☼
CTA head and neck with IV contrast	May Be Appropriate	☼☼☼
MRI head without and with IV contrast	May Be Appropriate	○
MRI orbits without and with IV contrast	May Be Appropriate (Disagreement)	○
MRA head and neck without and with IV contrast	May Be Appropriate	○
MRA head and neck without IV contrast	May Be Appropriate	○
Arteriography cervicocerebral	Usually Not Appropriate	☼☼☼
CT head with IV contrast	Usually Not Appropriate	☼☼☼
CT head without and with IV contrast	Usually Not Appropriate	☼☼☼
CT orbits without and with IV contrast	Usually Not Appropriate	☼☼☼
X-ray orbit	Usually Not Appropriate	☼

Take Home Points / Teaching points

- CT Head w/o contrast is appropriate imaging for orbital trauma
- Seidel Test is used when suspected ruptured globe
- OCT-Macula should be done on patients with orbital

References

- 1 *Retrobulbar hemorrhage* - EyeWiki. n.d. URL: https://eyewiki.org/Retrobulbar_hemorrhage (Accessed August 16, 2020).
- 2 *Hyphema* - EyeWiki. n.d. URL: <https://eyewiki.aao.org/Hyphema> (Accessed August 16, 2020).
- 3 *Eye Exam - Cost Comparison* - EyeCare for You in Apex, NC. n.d. URL: <https://eyecarenc.com/eye-exam-cost-comparison/> (Accessed August 15, 2020).
- 4 *How Much Does a CT Scan without Contrast Cost Near Me?* - MDsave. n.d. URL: <https://www.mdsave.com/procedures/ct-scan-without-contrast/d781f5cd> (Accessed August 15, 2020).
- 5 Kiire C, Srinivasan S, Stoddart MG. A novel use of fibrin glue in the treatment of a partial thickness corneal laceration. *British Journal of Ophthalmology* 2010;810–1. <https://doi.org/10.1136/bjo.2009.166512>.
- 6 Saka ES, Monsudi KF, Olatuji V. TRAUMATIC CORNEAL LACERATION IN NORTHWESTERN NIGERIA. *Journal of the West African College of Surgeons* 2017;7:72–84.
- 7 Kiire C, Srinivasan S, Stoddart MG. A novel use of fibrin glue in the treatment of a partial thickness corneal laceration. *British Journal of Ophthalmology* 2010;810–1. <https://doi.org/10.1136/bjo.2009.166512>.
- 8 Kim U, Sivaraman K. Penetrating orbital injuries from plant material during pond and river diving. *Indian Journal of Ophthalmology* 2013;61:76. <https://doi.org/10.4103/0301-4738.107199>.
- 9 *Penetrating eye globe injury from trauma with a metallic nail: a case report*. n.d. URL: <https://reference.medscape.com/medline/abstract/23882992> (Accessed August 15, 2020).
- 10 *Endophthalmitis* - EyeWiki. n.d. URL: <https://eyewiki.aao.org/Endophthalmitis> (Accessed August 15, 2020).
- 11 *Seidel Test* - EyeWiki. n.d. URL: https://eyewiki.aao.org/Seidel_Test (Accessed August 15, 2020).
- 12 *Seroma management after an external dacryocystorhinostomy*. n.d. URL: <https://www.alliedacademies.org/articles/seroma-management-after-an-external-dacryocystorhinostomy-11988.html> (Accessed August 15, 2020).
- 13 *Pract Cases Emerg Med*. 2018;2(3):266-267. Published 2018 Jun 12. doi:10.5811/cpcem.2018.4.38086



Questions?