Ocular Trauma: Tips & Terminology

Valerie Sharpe, OD FAAO
DHHS IHS, Chinle Hospital / Alpine Eyecare
Telluride, CO
tellurideeyecare@gmail.com

ABSTRACT
This lecture will survey the diagnosis and management of ocular trauma, highlighting the importance of a systematic approach. A brief introduction to the standardized ocular trauma terminology will also be included. Case presentations will emphasize serious facial, ocular and orbital injuries. We will also discuss opportunities optometrists can explore to increase their involvement with acute traumatic eyecare and promote their expertise in medical eyecare.

LEARNING OBJECTIVES
A. To be aware of the most common and serious eye injuries
B. To become familiar with the standardized ocular trauma terminology
C. To increase exposure to eye trauma cases
D. To offer perspective on the role of the optometrist in providing trauma care

OUTLINE
I. Introduction to Ocular Trauma
   A. Typical sports trauma case
      1. Eyebrow laceration
      2. R/O traumatic optic neuropathy with injury above the brow
   B. Typical ocular trauma case
      1. Contusion: lid avulsion
      2. Was an optometrist helpful?
         a) As consultant, assess comfort level of provider
         b) Ask for additional testing to be performed, i.e. VAs
         c) Systematic approach - full bilateral comprehensive exam
   C. Why treat traumatic eye injuries?
      1. Broaden your clinical experience
      2. Enhance your role within the medical community
      3. Provide valuable and cost effective eyecare
      4. Market your medical eyecare expertise

II. Review of Ocular Trauma Epidemiological Data
   A. Ocular injuries as a public health issue
      1. 2.4 million eye injuries per year
      2. Incidence of eye injury 13.2 per 100,000
      3. 2nd leading cause of visual impairment worldwide
      4. Eye injury #1 cause of monocular blindness
   B. Common injuries with minor severity
      1. Superficial injury of eye/adnexa
      2. Superficial foreign body
      3. Minor contusions
      4. Peri-ocular open wounds
Ocular Trauma: Tips & Terminology

5. Minor burns to eye and adnexa

C. Ocular & orbital injuries: US hospitalization rates
1. Incidence 13.4 to 71 per 100,000
2. Top three trauma admissions
   #1 Orbital floor fracture
   #2 Open wound of eyeball
   #3 Open wound of adnexa
3. 3% of all ED eye related encounters
4. Hospitalized pediatric patient
   a) Most common cause: MVA
   b) Incidence of hospitalization 8.9 per 100,000
   c) Most at risk demographic: males 18-20
   d) 60% pediatric injuries sports related

D. United States Eye Injury Registry (USEIR)
1. Selective reporting began 1988
2. Contributions from hospitals and individual providers
3. Emerging patterns of severe eye injuries (represent 5% overall)
4. Cause of Injury
   a) Most common blunt object
   b) Pediatric injuries (<17 years old) - top three
      ATV accidents, Paintball, & Firework injuries
5. Vision is the most significant prognostic factor for final visual outcome
6. Initial VA <20/40, only 10% had any further vision loss
7. Initial VA > LP, 20% of those patients were NLP in 6 mos
8. Location of Injury
   a) OHSA enacted 1970. Shift from work to leisure activities
   b) Most reported occupation: construction
9. Eye protection - glasses improve outcomes
   a) 6% open-globe injuries in workplace were wearing eye protection
   b) Educate your patients!!!

E. Eye injuries - sudden & unexpected
1. Patient/family high anxiety
2. Concerns over quality of life, vision

III. True Eye Emergencies – (all trauma related)
1. Chemical burn
   a) Copious Irrigation
   b) Identify offending agent
   c) Swap fornices, brief initial exam, assess pH.
2. Orbital compartment syndrome
   a) LCC - Lateral canthotomy & cantholysis
   b) Primary indications for LCC
      i. retrobulbar hemorrhage with acute loss of VA
      ii. IOP > 40
      iii. proptosis (generally marked)
   c) Secondary indications for LCC
      i. (+) APD, CRAO, ophthalmoplegia, ONH pallor or eye pain
Ocular Trauma: Tips & Terminology

3. Other potentially urgent conditions
   a) Non-emergent, you have time to do a comprehensive exam
   b) Open globe injury, oculocardiac reflex, suprachoroidal hemorrhage, traumatic carotid cavernous fistula

IV. Standardized Ocular Trauma Terminology
   A. Birmingham Eye Trauma Terminology System (BETTS)
      1. Why standardize the terminology?
         a) better reproducibility across disciplines
         b) eliminate confusion, improve communication
      2. Terms and definitions
         a) Eyewall (corneal/scleral) is the tissue of reference
         b) Open globe injuries - full thickness wound of the eyewall
            i. Rupture - caused by a blunt object
            ii. Laceration - caused by a sharp object
               a. Penetration - same entrance & exit wound
               b. IOFB - Inter-ocular foreign body, retained in the globe
               c. Perforation - separate entrance and exit wounds
         c) Closed globe injuries - just as serious if not more visual threatening
            i. Contusion - blunt force injury with no wound
            ii. Lamellar laceration - partial thickness wound of eyeball
               caused by a sharp object (i.e. corneal abrasion)

   B. Ocular Trauma Score (OTS)
      1. Evidenced based prognosis prediction
      2. Six variables

V. Emergency Department Case Presentations
   A. Facial trauma
      1. Life-Eye-Orbit: Traumatic Optic Neuropathy
         a) Associated with frontal injuries
         b) 50% cases have spontaneous improved VA
         c) Mixed mechanism of injury
         d) Mega-dose IV steroid tx - controversial (within 8 hours of injury)
         e) Treatment basis from NASCIS II and CRASH studies
      2. Blunt facial trauma without ocular complication
      3. Blunt facial trauma with orbital fractures
   B. Domestic violence
      1. More commonly encountered in ED
      2. How to stay focus and perform your role
   C. Ocular trauma
      1. Open globe injuries
         a) Ruptured globe
            i. Post-op Seidel
            ii. Iris incarceration & peaked pupil
Ocular Trauma: Tips & Terminology

b) Penetrating injury
   i. Rooster peck
   ii. Are toy guns harmless?
   iii. Late complications

2. Closed globe injuries
   a) Contusion injury cases
      i. Hemorrhagic chemosis
      ii. Traumatic uveitis
      iii. Hyphema (increased risk of 2’ glaucoma)
      iv. Iridodialysis
      v. Lens trauma
      vi. Choroidal rupture
      vii. Retinal contusions
   b) Lamellar laceration : Conjunctival lacerations

3. Ocular and adnexal surface injuries
   a) Corneal foreign body
   b) Thermal burns
      i. Fireworks
      ii. Curling iron burn

4. Eyebrow and eyelid injuries
   a) Brow laceration
   b) Lid avulsion
      i. Repair delay up to 48 hours
      ii. Repair in the hands of oculoplastics ideal
      iii. Keep well lubricated

5. Orbital fractures and foreign bodies
   a) CT imaging in ocular and orbital trauma
      i. CT without contrast modality of choice
      ii. Axial and coronal scans most helpful
   b) Orbital floor fracture (most common)
      i. R/O entrapment, persistent diplopia, enophthalmos >2mm
   c) Naso-ethmoid fracture
   d) Medial fracture
   e) Orbital emphysema
      i. Can cause an orbital compartment syndrome
      ii. Instruct patients not to blow nose
      iii. Consider decongestant therapy, possibly steroids
   e) Intraorbital foreign body
      i. Reactive metal (copper) vs. non-reactive
      ii. Always remove organic matter
   f) Sclopetaria
      referred energy from high velocity projective (shock wave)

VI. Role of Optometrist in Providing Traumatic Eyecare
A. Less ophthalmologists working in hospitals 2’ movement to ASC
B. On-call concerns of providers (low reimbursement, low volume/high risk)
C. Generally limited reimbursement for after hours codes on outpatient visits
D. Seek out opportunities in your community
   1. Discuss with local ED providers if they have consultant for eyecare
   2. Meet with local hospital administrators
   3. Move forward with credentialing and privileges at a facility

VI. Conclusion
A. Final case presentation: CSF rhinorrhea
B. Take home on trauma
   1. Utilize a systematic approach
   2. Life – Eye - Orbit
   3. Believe in your expertise
   4. Promote your skills, your practice will be rewarded!

VII. References


   http://www.pediatrics.org/cgi/content/full/117/6/e1263


