Dear Colleagues,

Welcome to our first issue of Eye Advisory, Mass. Eye and Ear's clinical practice newsletter for Ophthalmologists. Eye Advisory offers busy physicians practical and relevant best practice information from Mass. Eye and Ear specialists covering a wide range of ophthalmic diseases and conditions.

Our first issue focuses on Ocular Trauma and includes our benchmark protocols for managing open-globe injuries and minimizing the risks of endophthalmitis after surgical repair. We have provided key recommendations from a report prepared by ophthalmology faculty from Harvard Medical School and Boston University who were involved in emergency response efforts following the Boston Marathon bombings, a paper is in press at the journal, Ophthalmology. This report also provides important insights and valuable lessons in disaster-readiness and response planning.

We hope you find Eye Advisory to be a helpful tool for supporting your patient management practices. The newsletter will be mailed twice a year in spring and fall, and back issues will be available on-line at MassEyeAndEar.org. If you have questions or comments, please email us at eyeadvisor@mit.edu.

Sincerely,

Joan W. Miller, MD, FARVO
Chief & Chair, Department of Ophthalmology
Massachusetts Eye and Ear, Massachusetts General Hospital, Harvard Medical School

---

April 15, 2013: Residents, fellows and faculty from Mass. Eye and Ear and Harvard Medical School (HMS) clinical affiliates and Boston Medical Center at Boston University coordinated efforts to provide ocular trauma care to victims of the Boston Marathon bombings.

- 164 of 246 casualties were transported to Level 1 treatment centers affiliated with Harvard Medical School, Boston University and Tufts University Medical School.
- Mass. Eye and Ear ophthalmology residents were strategically mobilized in the Emergency Department and across several HMS clinical affiliates.
- 21 spectators and one runner required ophthalmic consultations.

*Mass General Hospital, Boston Children's Hospital, Beth Israel Deaconess Medical Center and Brigham and Women's Hospital
EYE ADVISORY

Benchmark Protocols for Managing Eye Trauma

Epidemiology
The annual incidence of open-globe injuries worldwide is estimated to be 203,000 cases. Overall, males comprise approximately 80 percent of open-globe injuries. Males age 10 to 30 are at greatest risk. The chance of blunt globe rupture also increases after some types of ocular surgical procedures, including: large incision cataract removal, cornea transplant, glaucoma filtering, or refractive surgery.

Standardized Terminology

<table>
<thead>
<tr>
<th>TERM</th>
<th>DEFINITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open-globe injury</td>
<td>Full-thickness wound of eye wall</td>
</tr>
<tr>
<td>Laceration</td>
<td>Full-thickness wound of the eye wall caused by a sharp object</td>
</tr>
<tr>
<td>Laceration</td>
<td>Partial-thickness wound of the eye wall</td>
</tr>
<tr>
<td>Rupture</td>
<td>Full-thickness wound of the eye wall caused by a blunt object</td>
</tr>
<tr>
<td>Penetrating injury</td>
<td>Only entrance wound is present</td>
</tr>
<tr>
<td>Perforating injury</td>
<td>Both an entrance and exit wound are present</td>
</tr>
</tbody>
</table>

Rapid Overview of Open-Globe Injury Protocol
Based on Mass., Eye and Ear’s experience, we recommend that institutions adopt a standardized management protocol for treating open-globe injuries that consists of a dedicated eye trauma service and 48 hours of intravenous antibiotics.

- Ensure nothing by mouth (NPO)
- Make sure patient has been examined and cleared for life-threatening or systemic injuries
- Avoid high dose ketamine if rapid sequence induction (RSI) is required
- If RSI is necessary, rocuronium is preferred to succinylcholine for muscle relaxation
- Do not remove any protruding foreign bodies until under controlled conditions in an OR
- Avoid eye manipulation that may increase the risk of extrusion of intraocular contents
- Use a new bottle when administering eye drops to patient to ensure drops are sterile
- Place eye shield after initial eye examination
- Put patient on bed rest with head of bed elevated to 30 degrees if hemodynamic condition allows
- Treat nausea and vomiting aggressively (e.g., ondansetron 0.15 mg/kg per dose, up to 12 mg intravenously)
- Provide sedation, as needed (e.g., lorazepam 0.05 mg/kg, maximum initial dose: 2 mg)
- Provide analgesia (e.g., IV fentanyl 1 [mcg/kg per dose, maximum initial dose: 100 mcg], or morphine 0.1 mg/kg per dose, maximum initial dose: 10 mg)
- Begin IV antibiotics (Transfer of patients with ruptured globes to a tertiary trauma center should not delay the administration of antibiotics):
  - Vancomycin (15 mg/kg IV, maximum dose: 1.5 grams)
  - Cefazidime (50 mg/kg IV, maximum dose: 2.0 grams)
  - Fluoroquinolone for penicillin allergic patients (e.g., ciprofloxacin 10 mg/kg IV, maximum dose: 400 mg, use with caution in patients under 18 years of age)
- Urgent surgical repair, ideally within 24 hours of injury

Preferred Imaging Modality:
Axial and coronal CT of the eye without contrast, utilizing 1 to 2 mm cuts through the orbit to further assess suspected open-globe injuries. CT is superior to ultrasound in determining location and size of IOPs and requires no direct contact with eyelids or globe. CT is faster than MRI, has less motion artifact, and will not cause movement of metallic foreign bodies.

Note: Corneal CT has limited ability to demonstrate an occult open-globe injury and should not be used as the sole determining factor for decisions regarding surgical exploration.

Eye Injury Zonas

| Zone 1 | Injury to cornea or limbus |
| Zone 2 | Injury to anterior 5mm of sclera |
| Zone 3 | Full thickness injury more than 5mm posterior to limbus |


Keeping Endophthalmitis Rates Near Zero
The standard Mass., Eye and Ear protocol for eye trauma has resulted in the lowest civilian endophthalmitis rates – less than 1% of cases – reported in the country.

The literature suggests that endophthalmitis rates around the world range from 2.6% to 17%. The United States National Eye Trauma Registry has reported an endophthalmitis rate of 6.8% after open-globe injury.4

Clinical Resources
- Visit www.aaojournal.org/article/S0161-6420(13)00582-4/fulltext to find out how Mass., Eye and Ear’s ROC-OGI score can help predict risk of retinal detachment after open-globe trauma.

Editor-in-Chief: Joan W. Miller, MD, FARVO
Managing Editor: Matthew F. Gardner, MD
Clinical Advisory Group: Carolyn E. Koek, MD, Deeba Hussain, MD, Ankoo S. Shah, MD, PhD, Angela V. Turalba, MD
Communications Director: Suzanne Ward

Send questions or comments to: eyeadv@meie.harvard.edu