Eye Trauma

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10/29/2019

Diagnostic Radiology

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Clinical History

- 36 yo M, Hx of bilateral congenital glaucoma, fell and struck L eye on corner of furniture. Patient had 3x previous L corneal transplants; once as child, twice as adult.
  - 2-3 years ago, L corneal transplant repair after rupture.
  - No vision in R eye at baseline.
- Presenting Symptoms: Complete loss of vision in L eye, 6/10 pain, loss of pressure sensation.
- Physical Exam Findings: Obviously sunken L eye with visible drainage, concern for open globe.

Possible Imaging Modalities for Eye Trauma

- CT Orbits without contrast
- MRI Orbits
- Ultrasound of globe
- Fluorescein instillation and examination with Wood's Lamp

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- CT Orbits without contrast
- MRI Orbits
- Ultrasound of globe ←CONTRAINDICATED!!!
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Possible Imaging Modalities for Eye Trauma

- CT Orbits without contrast
- MRI Orbits ←Slow
- Ultrasound of globe ←CONTRAINDICATED!!!
- Fluorescein instillation and examination with Wood's Lamp

Possible Imaging Modalities for Eye Trauma

- CT Orbits without contrast
- MRI Orbits ←Slow
- Ultrasound of globe ←CONTRAINDICATED!!!
- Fluorescein instillation and examination with Wood's Lamp ←Not enough info.

Possible Imaging Modalities for Eye Trauma

- CT Orbits without contrast ← WINNER!!!
- MRI Orbits ←Slow
- Ultrasound of globe ←CONTRAINDICATED!!!
- Fluorescein instillation and examination with Wood's Lamp ←Not enough info.

ACR appropriateness Criteria

3 Major blunt trauma. Hemodynamically stable. Suspected facial injury. Initial imaging. 9

Name	Category	Adult RRL	Peds RRL
CT maxillofacial without IV contrast	Usually appropriate	☢☢ 0.1-1mSv	
CT head without IV contrast	Usually appropriate	☢☢☢ 1-10 mSv	☢☢☢ 0.3-3 mSv [ped]
Radiography trauma series	Usually appropriate	☢☢☢ 1-10 mSv	
CT whole body with IV contrast	May be appropriate (Disagreement)	☢☢☢☢ 10-30 mSv	
CT whole body without IV contrast	May be appropriate	☢☢☢☢ 10-30 mSv	
CT head with IV contrast	Usually not appropriate	☢☢☢ 1-10 mSv	☢☢☢ 0.3-3 mSv [ped]
CT head without and with IV contrast	Usually not appropriate	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]
CT maxillofacial with IV contrast	Usually not appropriate	☢☢ 0.1-1mSv	
CT maxillofacial without and with IV contrast	Usually not appropriate	☢☢☢ 1-10 mSv	

Relevant Imaging

- Axial CT of Orbits without contrast, Soft Tissue. Obtained on 10/29/19.
- Sagittal CT of Orbits without contrast, Soft Tissue. Same instance.
- Axial CT of Orbits without contrast, Bone. Same instance.

Axial CT of Orbits without contrast, Soft Tissue attenuation.

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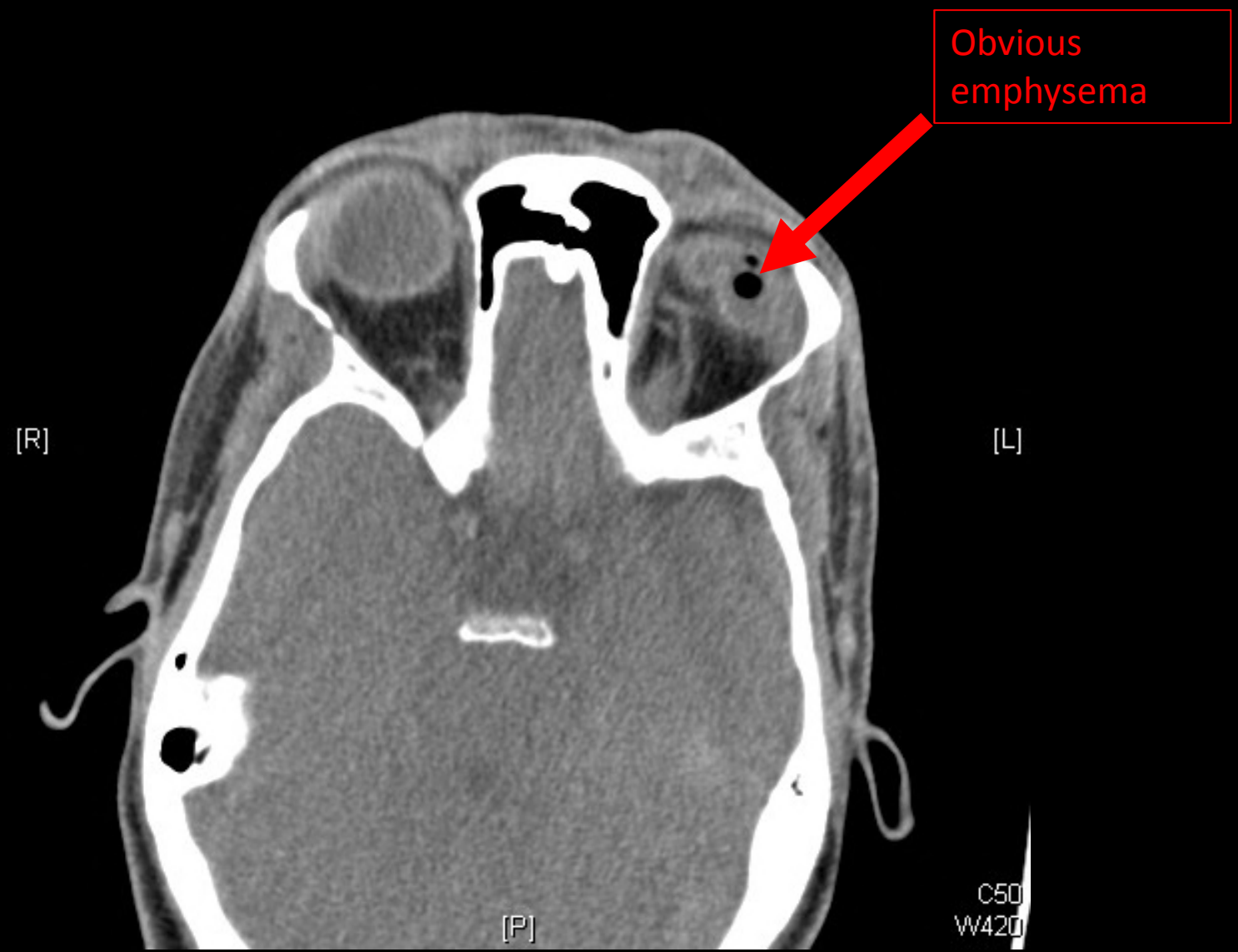
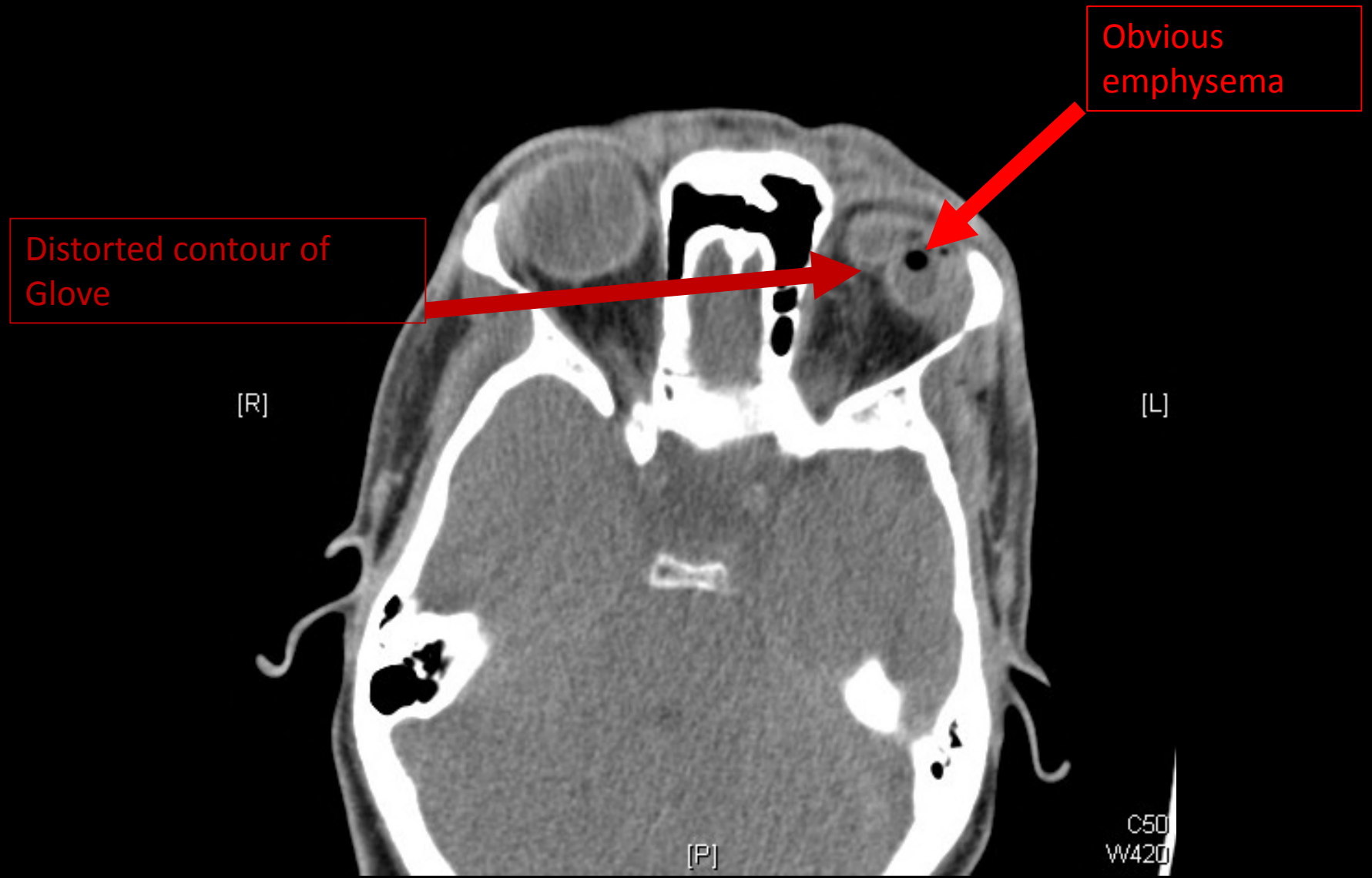
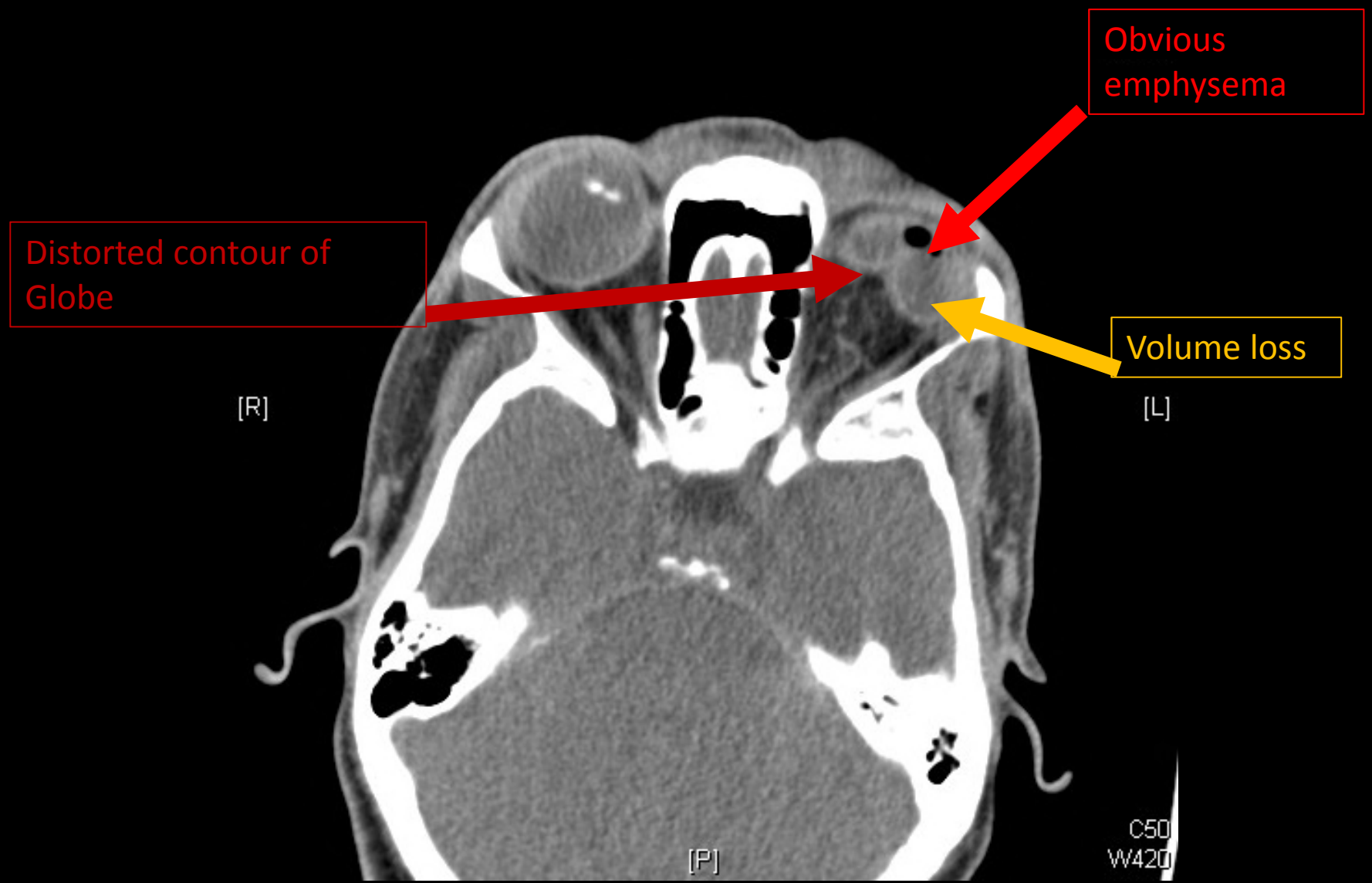


Axial CT of Orbits without contrast, Soft Tissue attenuation.



Axial CT of Orbits without contrast, Soft Tissue attenuation.



Axial CT of Orbits without contrast, Soft Tissue attenuation.

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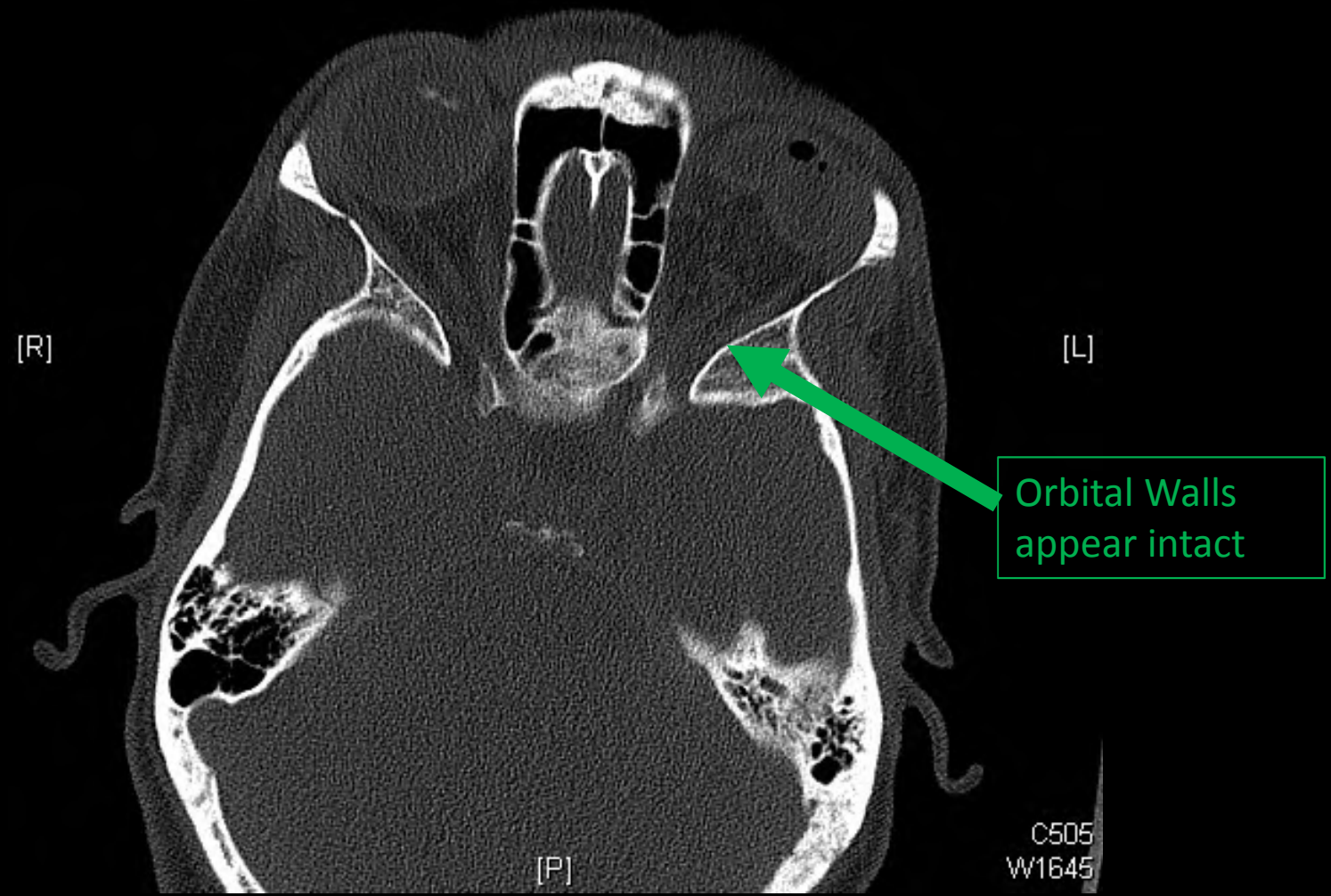
Axial CT of Orbits without contrast, Soft Tissue attenuation.

More relevant imaging

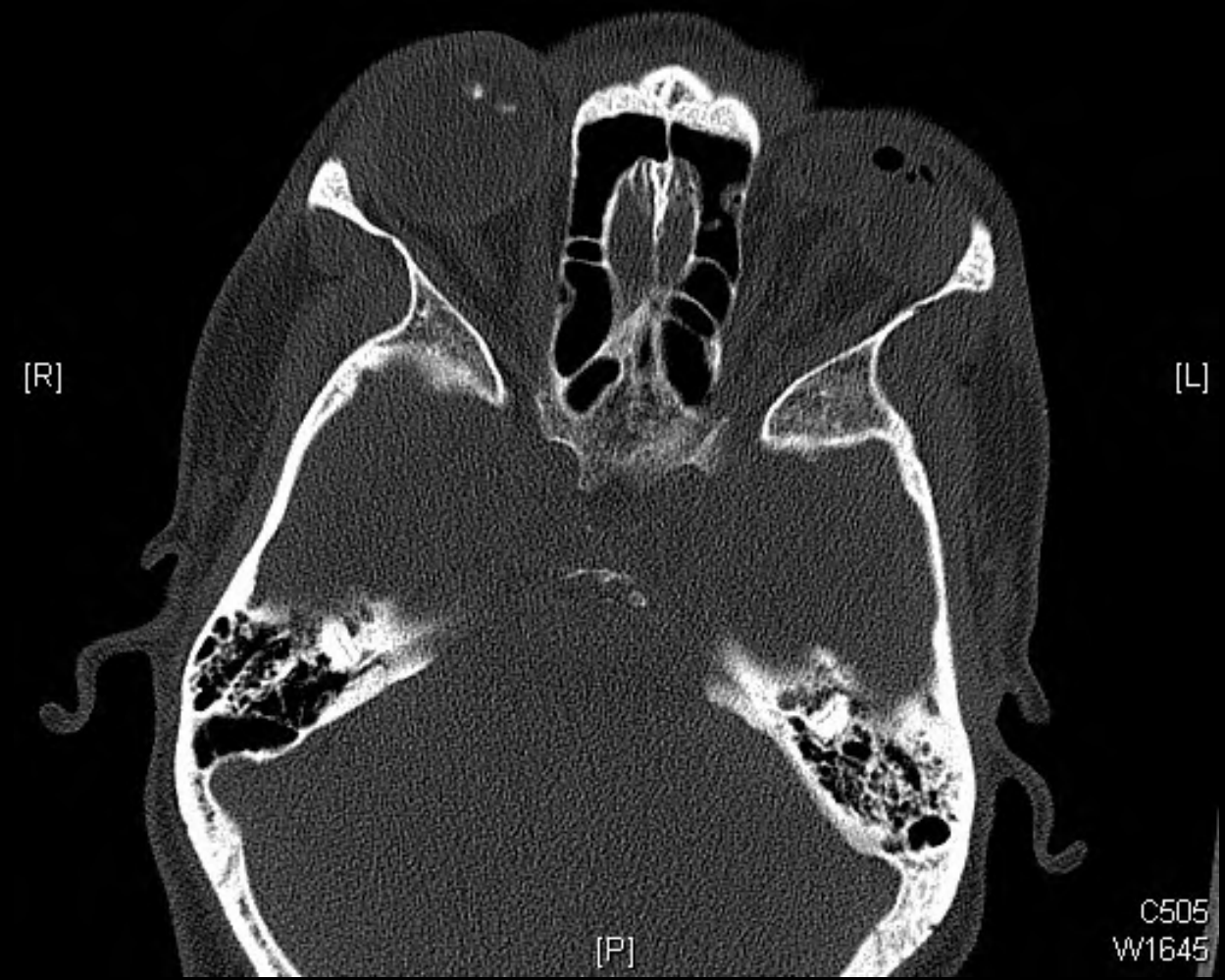
- Axial CT Orbits without contrast bone attenuation.

Axial CT Orbits without contrast bone attenuation.

Axial CT Orbits without contrast bone attenuation.



Axial CT Orbits without contrast bone attenuation.

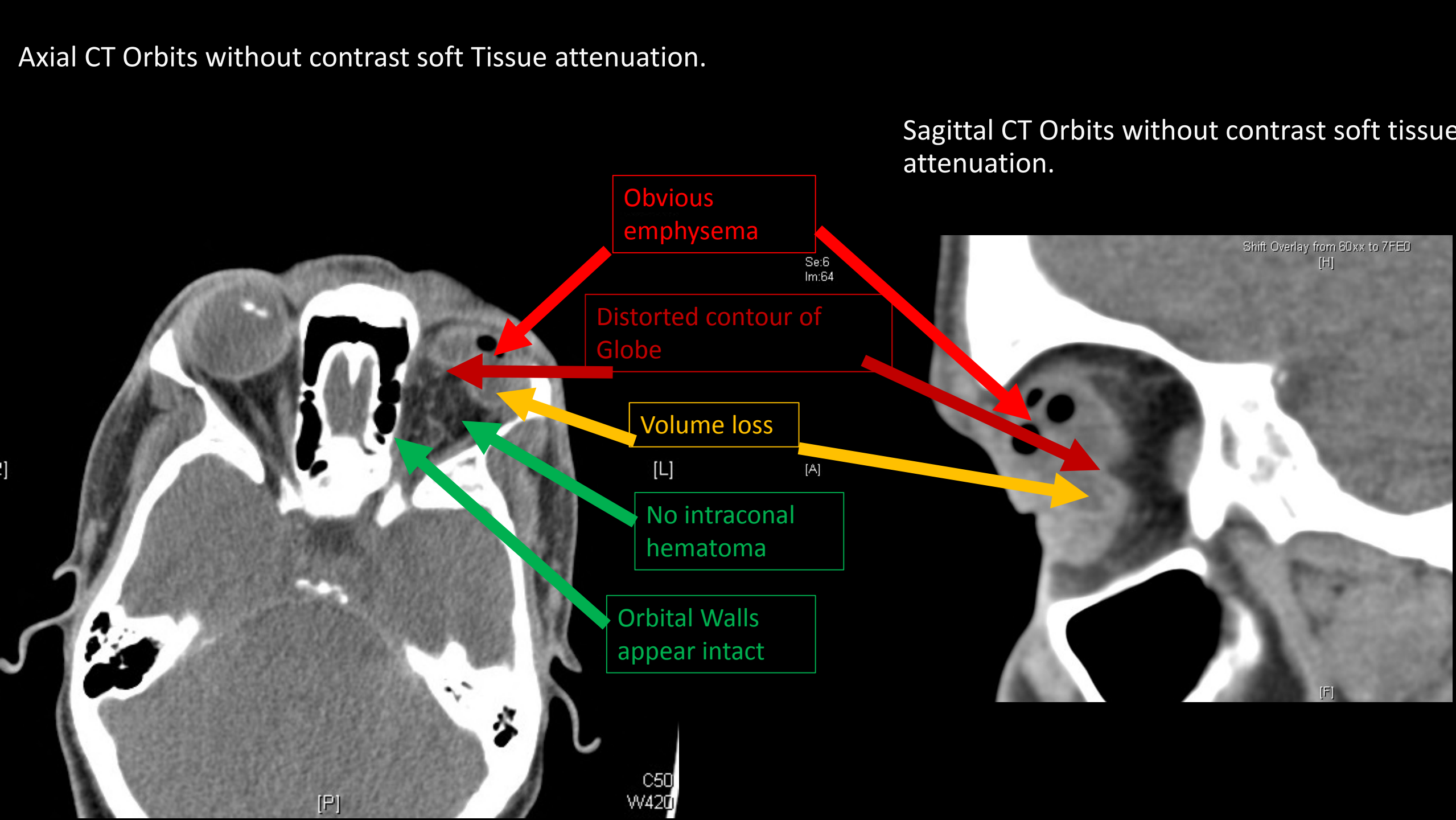


Key imaging findings

- **L Eye**: Obvious emphysema within globe, distorted contour, volume loss consistent with acute **vision loss, pain, visible sunken left eye, and visible drainage.**
- Absent intraconal hematoma, absent orbital fracture.
- R Eye: absent lens, possibly due to history of bilateral eye surgery.

Axial CT Orbits without contrast soft Tissue attenuation.

Sagittal CT Orbits without contrast soft tissue attenuation.



Differential Diagnosis

- Globe rupture
- Globe laceration
- Corneal abrasion
- Retrobulbar hematoma/ orbital compartment syndrome
- Orbital fracture
- Intraocular Foreign Body

Discussion

- Globe rupture is more common than globe laceration in elderly patients and patients with **prior surgery**, and mechanism of injury is often a fall (1).
- Results in sudden decrease of vision, relative afferent pupillary defect (1).
- Consistent with patient's mechanism of injury and medical history.
- Of concern: Patient has lost significant aqueous/vitreous humor.
- Important management: **Prevent increase in intraocular pressure**.
- Further management: Surgical repair.

Continued discussion

- Interesting fact: **Zofran** is one of the most important early interventions in globe rupture (1).
- Globe Rupture/Laceration Zones:
  - Zone 1: Junction of cornea and sclera.
  - Zone 2: Anterior 5mm of sclera, sparing retina.
  - Zone 3: Involves posterior globe (1).

Final Diagnosis

- Globe rupture (dehiscence of corneal transplant).
- Rupture of globe at Zone 1, junction of cornea and sclera (1).

Treatment

- Patient received surgical repair of dehiscence.
- Patient regained light perception before discharge.
- Patient discharged with eye shield, eye drops, antibiotics, follow up instructions.

Take Home Points

- Globe Rupture is common in patients with previous ophthalmologic surgery.
- CT Scan is appropriate to assess suspected globe injury, identify associated pathologies (IOFB, orbital fracture, intraconal hematoma, etc.)
- Care should be taken to prevent further leakage of globe contents.

References

- 1. Open globe injuries: Emergency evaluation and initial management (Uptodate)
  - Authors: Christopher M Andreoli, MD; Matthew F Gardiner, MD
- 2. Tawfik HA, Abdelhalim A, Elkafrawy MH. Computed tomography of the orbit - A review and an update. *Saudi J Ophthalmol*. 2012;26(4):409–418. doi:10.1016/j.sjopt.2012.07.004https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3729578/


Questions?