

Emergency Imaging

Lily Belfi MD, Christopher Wladyka MD, and Keith D. Hentel MD

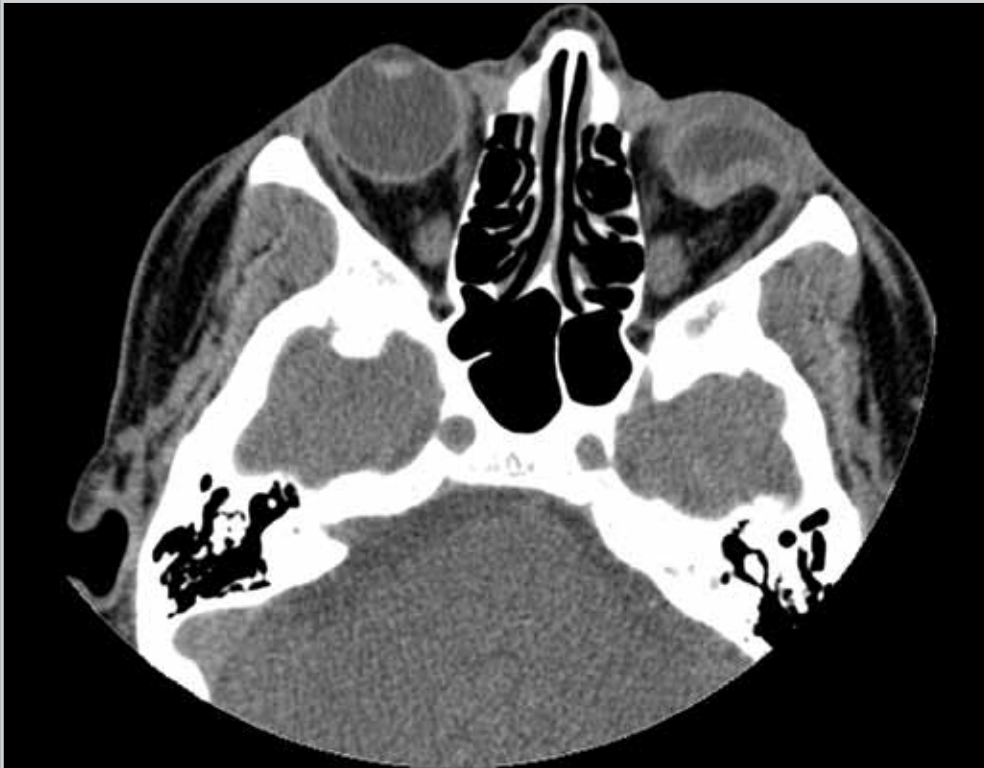


Figure 1

A 48-year-old man presents to the ED after a fall while shoveling snow. He states that when he fell, his left thumb entered his left eye. He complains of eye pain and decreased vision. A noncontrast CT scan is obtained and a representative axial image is shown above (Figure 1).

What is the diagnosis?

Dr Belfi is an assistant professor of radiology at Weill Cornell Medical College in New York City and an assistant attending radiologist at New York-Presbyterian Hospital/Weill Cornell Medical Center. **Dr Wladyka** is an assistant professor of radiology at Weill Cornell Medical College in New York City and an assistant attending radiologist at New York-Presbyterian Hospital/Weill Cornell Medical Center. **Dr Hentel**, editor of "Emergency Imaging," is an associate professor of clinical radiology at Weill Cornell Medical College in New York City. He is also chief of emergency/musculoskeletal imaging and the vice-chairman for clinical operations for the department of radiology at New York-Presbyterian Hospital/Weill Cornell Medical Center. He is a member of the EMERGENCY MEDICINE editorial board.

ANSWER

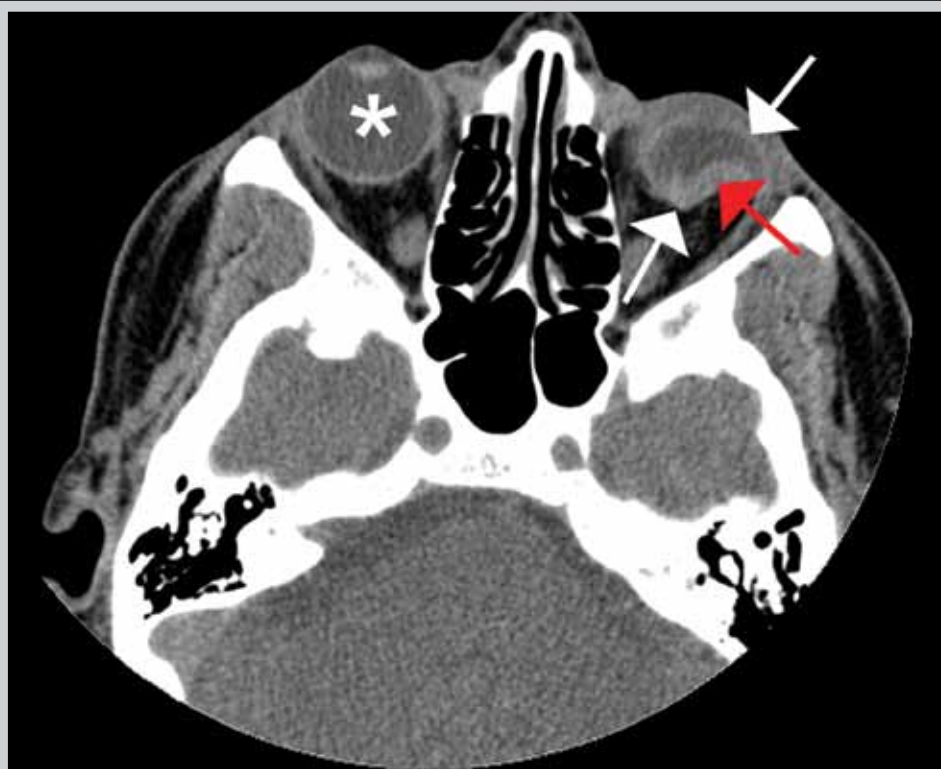


Figure 2

The noncontrast CT image (Figure 2) demonstrates abnormal contour and significant volume loss of the left globe (white arrows); contour of a normal right globe can be seen on the left side of the image (white asterisk). This loss of the normal circular shape, suggesting open-globe injury, is referred to as a “flat tire” sign.” The abnormal contour of the left globe is confirmed on a coronal reformat through both orbits (white arrows, Figure 3). In addition, there is dislocation of the left lens, which is not identified in its expected location but is found on the dependent portion of the globe (red arrow, Figure 2). These findings are diagnostic for traumatic orbital injury with rupture of the left globe and lens dislocation. The patient was referred to an ophthalmologist for surgical repair.

Although orbital trauma accounts for only 3% of ED visits in the United States, it results in orbital morbidity (eg, monocular blindness) in a large percentage of patients.¹ Rapid diagnosis and appropriate management in these cases are critical for positive outcomes. Evaluation should begin with an ophthalmologic examination, often followed by diagnostic imaging. CT is the first-line and optimal modality in cases of suspected globe injury, as it allows evaluation of the globe as well surrounding osseous and intracranial structures. Concomitant orbital fractures and intracranial hemorrhage usually occur with this type of injury. Pertinent findings on non-

contrast CT in patients with orbital trauma include abnormal globe contour and volume loss, vitreous hemorrhage, lens dislocation, retinal hemorrhage/detachment, and intraocular air or foreign bodies. Secondary findings of carotid cavernous fistulas or optic nerve injuries, such as dilatation of the superior ophthalmic vein or fracture through orbital apex, may also be appreciated on noncontrast CT.^{2,3}

In this patient, “flat-tire” sign on CT confirmed the diagnosis of traumatic globe rupture. Rupture often occurs where the sclera is thinnest, near the insertion of the intraocular muscles. As seen in this case, decreased volume of the posterior segment of the globe often results in associated lens dislocation. In orbital trauma, open-globe injury is a major cause of blindness. These injuries



Figure 3

are clinically evident when intraocular contents are visualized on clinical examination. CT is an excellent imaging tool and should be used in conjunction with clinical findings to further characterize these injuries.

References

1. Bord SP, Linden J. Trauma to the globe and orbit. *Emerg Med Clin North Am.* 2008;26(1):97-123.
2. Kubal WS. Imaging of orbital trauma. *Radiographics.* 2008;28(6):1729-1739.
3. Joseph DP, Pieramici DJ, Beauchamp NJ Jr. Computed tomography in the diagnosis and prognosis of open-globe injuries. *Ophthalmology.* 2000;107(10):1899-1906.