

IMAGES IN EMERGENCY MEDICINE**Ophthalmology**

Young woman with a headache

Megan Hoffer DO  | Keith Boniface MD, RDMS

Department of Emergency Medicine, The George Washington University School of Medicine and Health Sciences, Washington, District of Columbia, USA

Correspondence

Megan Hoffer, Department of Emergency Medicine, George Washington University School of Medicine and Health Sciences, 2120 L St., Washington, DC 20037, USA.

Email: megan.a.hoffer@gmail.com**1 | PATIENT PRESENTATION**

A 42-year-old female presented to the emergency department (ED) with a headache of 2 days' duration. She reported a low mechanism headstrike without loss of consciousness 2 days prior, as well as a history of idiopathic intracranial hypertension (IIH). She endorsed blurred vision but denied nausea, vomiting, fever, or use of anticoagulation. Point-of-care ultrasound revealed elevated optic discs with crescent signs bilaterally (Figure 1).

2 | DIAGNOSIS: PAPILLEDEMA DUE TO IDIOPATHIC INTRACRANIAL HYPERTENSION

A computed tomography scan of the brain was negative for intracranial hemorrhage or mass, but did show sequelae of IIH, including prominent optic nerve sheaths and an empty sella, which had been previously demonstrated on neuroimaging in the medical record. She was offered therapeutic lumbar puncture and neurology evaluation but declined as she was scheduled for ventriculoperitoneal shunt placement with neurosurgery for management.

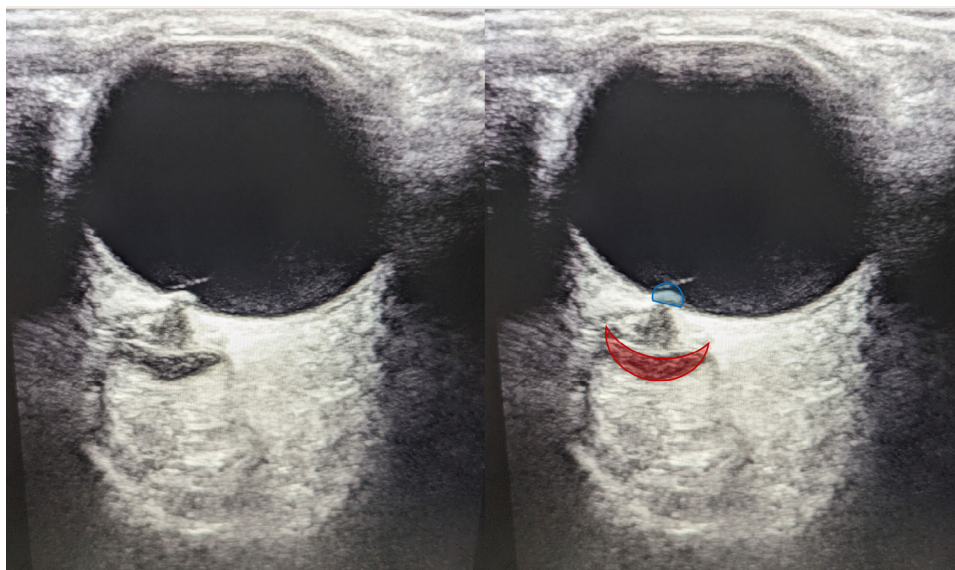
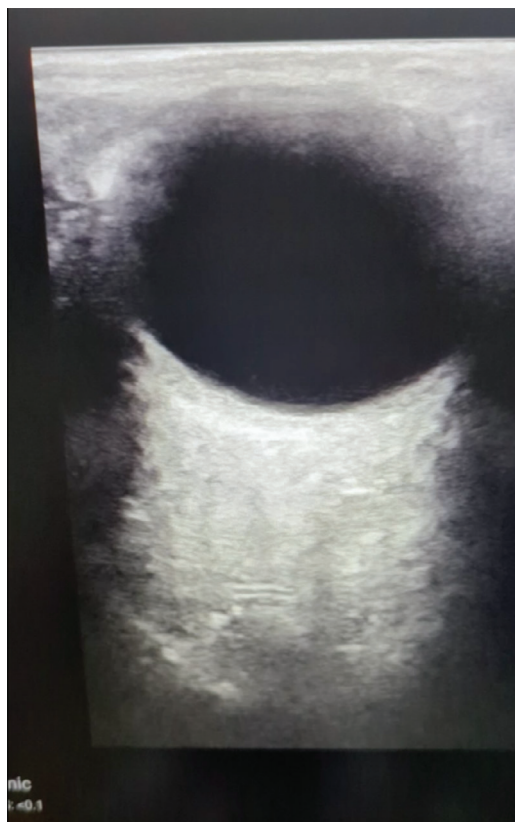


FIGURE 1 Ocular ultrasound of the left eye demonstrates a crescent sign (outlined in red) as well as elevation of the optic disc (outlined in blue).

This is an open access article under the terms of the [Creative Commons Attribution-NonCommercial-NoDerivs](https://creativecommons.org/licenses/by-nc-nd/4.0/) License, which permits use and distribution in any medium, provided the original work is properly cited, the use is non-commercial and no modifications or adaptations are made.

© 2024 The Author(s). *Journal of the American College of Emergency Physicians Open* published by Wiley Periodicals, Inc. on behalf of American College of Emergency Physicians.



VIDEO 1 Ocular ultrasound of the left eye demonstrates a crescent sign and elevated optic disc.

Ocular ultrasound is an accessible and noninvasive tool for measuring intracranial pressure (ICP) in the ED, and has been shown to be 90% sensitive in detection of papilledema.¹ The optic nerve sheath is contiguous with the subarachnoid space and therefore the optic nerve sheath diameter fluctuates with changes in ICP.²⁻⁴ Crescent sign on point-of-care ultrasound is a hypochoic ring of subarachnoid fluid surrounding the optic nerve and the presence of a crescent sign has been found to be 92% sensitive for papilledema.^{5,6} When present, the

crescent sign is highly indicative of elevated ICP and warrants neuroimaging and specialty consult to rule out space-occupying lesions or other emergent etiologies of elevated ICP Video 1

CONFLICT OF INTEREST STATEMENT

The authors declare no conflicts of interest.

FUNDING INFORMATION

This is a non-funded study, with no compensation or honoraria for conducting the study.

ORCID

Megan Hoffer DO  <https://orcid.org/0000-0003-1478-0063>

REFERENCES

1. Carter SB, Pistilli M, Livingston KG, et al. The role of orbital ultrasonography in distinguishing papilledema from pseudopapilledema. *Eye (London, England)*. 2014;28(12):1425-1430.
2. Kimberly HH, Shah S, Marill K, Noble V. Correlation of optic nerve sheath diameter with direct measurement of intracranial pressure. *Acad Emerg Med*. 2008;15(2):201-204.
3. Hansen HC, Helmke K. The subarachnoid space surrounding the optic nerves. An ultrasound study of the optic nerve sheath. *Surg Radiol Anat*. 1996;18:323-328.
4. Killer HE, Laeng HR, Flammer J, Groscurth P. Architecture of arachnoid trabeculae, pillars, and septa in the subarachnoid space of the human optic nerve: anatomy and clinical considerations. *Br J Ophthalmol*. 2003;87:777-781.
5. Bhosale A, Shah VM, Shah PK. Accuracy of crescent sign on ocular ultrasound in diagnosing papilledema. *World J Methodol*. 2017;7(3):108-111.
6. Marchese RF, Mistry RD, Scarfone RJ, Chen AE. Identification of optic disc elevation and the crescent sign using point-of-care ocular ultrasound in children. *Pediatr Emerg Care*. 2015;31:304-307.

How to cite this article: Hoffer M, Boniface K. Young woman with a headache. *JACEP Open*. 2024;5:e13287.
<https://doi.org/10.1002/emp2.13287>