



## Pediatric pseudopapilledema on an ocular emergency department point of care ultrasound (POCUS)



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### 1. Discussion

N/A.

### 2. Visual case discussion

A 12 year old boy was sent to the Emergency Department by an ophthalmologist for unexplained right sided papilledema on routine exam. He had an otherwise normal exam and vital signs. There was no history of trauma or visual changes. Left ocular Point of Care Ultrasound (POCUS) was normal. Right ocular POCUS illustrated a slightly elevated, hyperechogenic optic disc with posterior shadowing consistent with optic nerve drusen rather than papilledema<sup>2,3</sup> (Fig. 1). Papilledema is defined as elevated optic disc, optic nerve sheath diameter >5.7 mm or (+) crescent sign.<sup>3</sup> No crescent sign was visualized and optic nerve sheath diameter appeared normal on visual estimation. Optic nerve sheath diameter could not be measured due to technical difficulties. CT orbits confirmed calcification of the right optic nerve, representing drusen (Fig. 2). The patient was discharged with ophthalmology follow up.

### Questions

- Which of the following entities leads to papilledema?
  - Acute closed-angle glaucoma.
  - Retinal Detachment.
  - Increased intracranial pressure.
  - Central Retinal Artery Occlusion

### 2. What is pseudopapilledema?

- Elevation of the optic disc due to elevated intracranial pressure.
  - Elevation of the optic disc due to optic disc drusen.
  - Elevation of the optic disc due to cerebral hemorrhage.
  - Elevation of the optic disc due to idiopathic intracranial hypertension.
- Does hyperechogenicity, alone, of the optic disc represent papilledema on ultrasound?
    - No, hyperechogenicity alone does not, other signs like increased optic nerve sheath diameter or a crescent sign represent papilledema.
    - Yes, as it represents elevation of the optic disc and therefore papilledema.
    - No, hyperechogenicity and elevated optic disc represent papilledema.
    - No, papilledema can only be seen on physical exam

### Answers

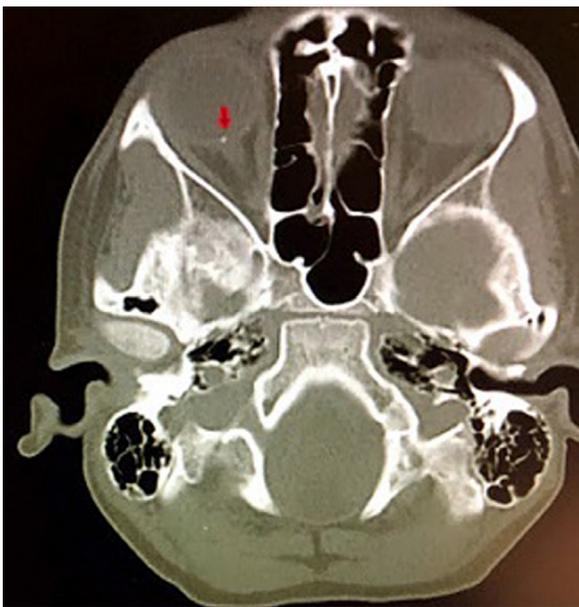
- Increased intracranial pressure. Explanation: The term “papilledema” is “defined as optic disc edema secondary to high intracranial pressure (ICP)” (1). Papilledema does not exist without high ICP, however, not every ICP results in papilledema. Some etiologies of increased ICP include brain tumors, meningitis, cerebral venous sinus thrombosis, cerebral hemorrhage, head trauma, hydrocephalus.<sup>1</sup>
- Elevation of the optic disc due to optic disc drusen. Explanation: Pseudopapilledema is defined as elevation of the “optic disc

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**Fig. 1.** Ocular POCUS demonstrating a hyperechoic, slightly elevated optic disc consistent with calcified opacities of optic disc drusen (arrow). Note the characteristic posterior shadowing due to the calcifications (star).



**Fig. 2.** CT orbit demonstrates calcification of the right posterior globe (arrow), consistent with drusen in an asymptomatic patient with a normal exam.

secondary to local underlying structural conditions, such as optic

disc drusen (ODD)” ODD represents “calcified extracellular hyaline deposits in the optic nerve head” and is a common reason for pseudopapilledema making in up to 0.4% of pediatric patients.<sup>2</sup> A less common cause for pseudopapilledema can be due to a smaller optic cup seen with hyperopia. The smaller cup results in crowding of optic nerve axons resulting in “heaped-up and elevated” appearance as they leave the eye resulting in a large cup and blurring of the disc margins.<sup>2</sup>

3. No, hyperechogenicity alone does not, other signs like increased optic nerve sheath diameter or a crescent sign represent papilledema. Explanation: Papilledema is represented by several findings on ultrasound. These findings include hyperechogenicity of the optic nerve head, which may be due to an elevated optic disc.<sup>3</sup> However, additional findings of crescent sign and/or optic nerve sheath diameter greater than 5.7 mm is required to make a diagnosis of elevated optic disc pressure, and therefore, papilledema. Just having findings of hyperechogenicity and elevated optic disc can represent pseudopapilledema due to optic disc drusen.<sup>2,3</sup>

#### Supplementary materials

Supplementary material associated with this article can be found, in the online version, at [doi:10.1016/j.visj.2019.100653](https://doi.org/10.1016/j.visj.2019.100653).

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