



Visual Case Discussion

Traumatic retrobulbar hematoma: Case report of a new ultrasound finding and summary of the literature



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ABSTRACT

Retrobulbar hematoma (RBH) is a rare vision threatening diagnosis. Left unchecked, RBH can cause orbital compartment syndrome and vision loss in as little as 60 min. Computed tomography (CT) is the current gold standard for diagnosing RBH, but can be delayed in the emergency department (ED) for many reasons. Point of care ultrasound (POCUS) has become commonplace in the ED and is found in most algorithms for diagnosing RBH, but until recently these algorithms did not offer common findings in RBH. We present a case of traumatic retrobulbar hemorrhage diagnosed by exam findings and ultrasound demonstration of restricted ocular movement, resulting in rapid cantholysis by the ED physician and restoration of vision. We also review the literature on ultrasound findings of RBH.

1. Case report

A 66-year-old woman tripped and struck her face and left eye on the side of a metal cabinet. She presented to the ED with significant left periorbital swelling, ecchymosis, lacerations, and was unable to open her left eye due to swelling. Using bent paperclips, the emergency physician (EP) retracted the eyelids for an exam. This revealed an afferent pupillary defect (APD) and visual acuity was only to light/dark. Intraocular pressure (IOP) at 60 mmHg in the left eye and 16 mmHg in the right eye. The presence of proptosis or restricted extraocular movements was difficult to assess due to the periorbital swelling.

A POCUS exam showed restriction of extraocular movements in the affected eye (supplemental video 1). No fluid collection was visible in the retrobulbar space; however, the posterior aspect of the globe had lost its normal round contour was noted to be more angular—suspicious

for increased retrobulbar pressure. Ultrasound of the unaffected eye showed normal contours and extraocular movements (supplemental video 2). A rapid CT scan did not demonstrate a globe rupture or discrete retrobulbar fluid collection, but did note significant edema and stranding of the retrobulbar contents. Given the combination of imaging and exam findings, the EP diagnosed orbital compartment syndrome and called ophthalmology but was advised they would not be able to see the patient for at least an hour. The EP then performed a lateral canthotomy and cantholysis.

The patient was admitted to the surgical floor with ophthalmology consulting. By the evening after surgical decompression visual acuity had improved to 20/100. The following morning the visual acuity had further improved to 20/40. She underwent surgical wound revision several days later and was eventually discharged in good condition.

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2. Discussion

RBH is a rare complication of blunt facial trauma involving the orbits. It occurs in 0.3% of orbital wall fractures, but is also a known complication of spontaneous bleeding in hemophiliac patients or re- active bleeding following ophthalmologic procedures. RBH is a vision threatening emergency with permanent vision loss possible within 60–90 min.^{1–3} Definitive treatment is surgical decompression by lateral canthotomy with inferior cantholysis, relieving symptoms and removing threat to vision from ocular compartment syndrome. Signs and symptoms of RBH and ocular compartment syndrome are variable and can be present in any combination. These include restrictions of, and pain with, extraocular movements, exophthalmos or proptosis, afferent pupillary defect, impaired visual acuity, resistance to retro-pulsion, a pale or swollen optic disc, and increased intraocular pressure (> 40 mmHg).

CT without contrast of the facial bones including the orbits is the gold standard for diagnosing RBH. Immediate CT, however, is often unavailable and the physician may be forced to perform canthotomy without imaging in order to prevent permanent vision. Given the high level of anxiety around this rarely performed procedure, POCUS as a way to rapidly confirm the diagnosis and may be ideal when CT is not available.

Published diagnostic pathways for RBH recognize the delay that can be caused by CT, and recommend early utilization of POCUS as a rapid method for diagnosis.^{4,5} Surprisingly, however, there is a notable lack of data regarding ultrasound findings in RBH. To our knowledge only three case reports have published ultrasound images of RBH. Two reports by Roque⁶ and Knies⁷ describe anechoic fluid collections posterior to the globe (Figs. 1 and 2). While visualization of an anechoic fluid collection would be ideal, this is not always reliable since blood may become isoechoic to the other posterior structures. Another report by Theoret et al. describes a “guitar pick” deformation of the posterior globe as a result of retrobulbar pressure, with resolution after surgical decompression⁸ (Fig. 3). Our paper adds restricted ocular movement as a third possible POCUS finding.

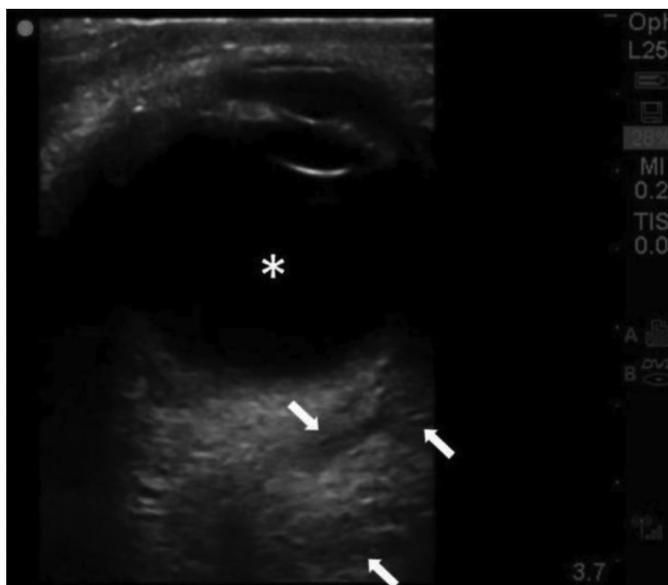


Fig. 1. Ultrasonography showed hypoechoic collections of fluid (arrows) posterior to the globe (asterisk) consistent with retrobulbar hemorrhage.

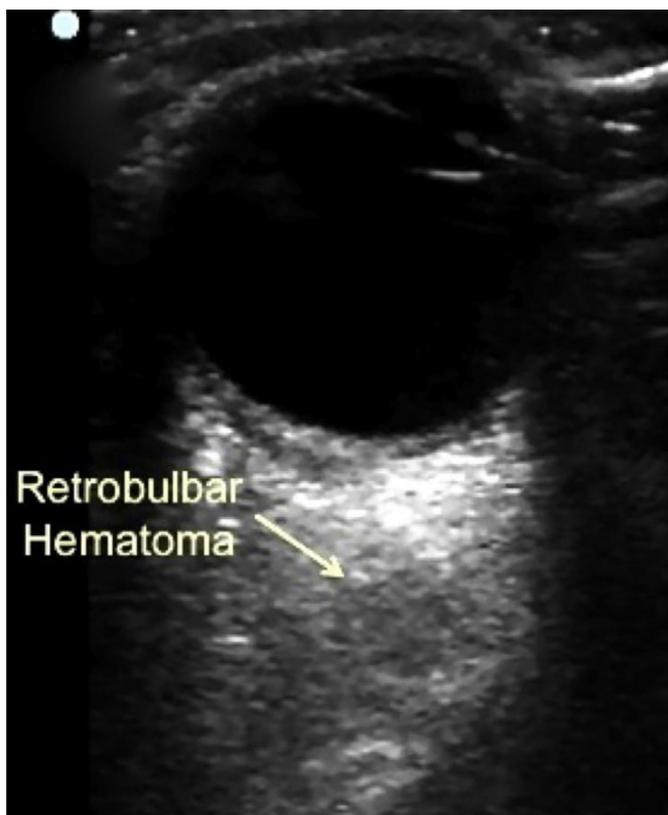


Fig. 2. Ocular ultrasound showing a retrobulbar hematoma.

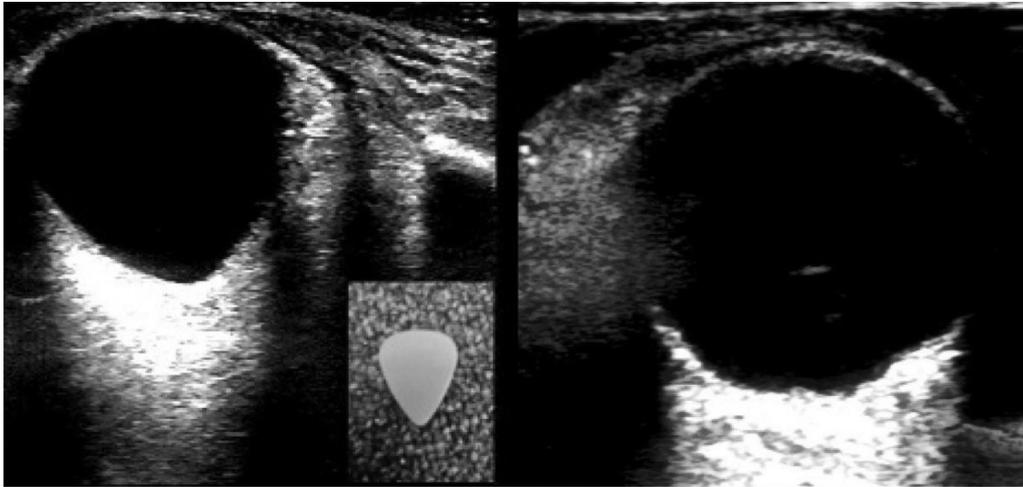


Fig. 3. Left image shows ultrasound image demonstrating conical deformation of the left posterior ocular globe, mimicking the shape of a guitar pick (insert). Right image, normalization of the posterior ocular globe shape on a sonogram following lateral canthotomy and inferior cantholysis.

3. Conclusion

We recommend using a combination of physical exam findings and POCUS for the diagnosis of RBH if immediate CT is unavailable. Given the rarity of RBH, large studies are not likely to be forthcoming. We suggest looking for a retrobulbar fluid collection, deformity of the posterior globe resulting from retrobulbar pressure, and/or restricted ocular movement based on case report data.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at [doi:10.1016/j.visj.2019.100574](https://doi.org/10.1016/j.visj.2019.100574).

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Questions

- Which of the following physical exam findings are most reliable in diagnosing retrobulbar hematoma?
 - Proptosis
 - Afferent pupillary defect
 - No specific finding is reliable

- Restricted extraocular movements
- Retro-orbital collections of blood

- Lateral canthotomy with inferior cantholysis is the definitive treatment for diagnosed RBH with suspected orbital compartment syndrome?
 - True
 - False
- Point-of-care ultrasound can be used to detect which physical exam findings, indicative of possible retrobulbar hematoma?
 - Afferent pupillary defect
 - Impaired visual acuity
 - Increased intraocular pressure
 - Restricted ocular movements
 - A and D only

Answers

- No specific finding is reliable. Explanation: There is no definitive finding on physical exam that reliably diagnoses retrobulbar hematoma and compartment syndrome. Rather, it is a collection of symptoms and findings in the correct context.
- True. Explanation: Release of the orbital compartment via lateral canthotomy with inferior cantholysis when it has increased pressure possibly causing permanent vision loss is essential, and there are no other known procedures that accomplish a decrease in pressure as effectively.
- A and D only. Explanation: Point-of-care ultrasound can show restriction of ocular movement when compared to the unaffected eye, afferent pupillary defects, collections of blood posterior to the globe, and misshapen posterior shape of the globe. POCUS cannot diagnose increased intraocular pressure, changes in vision, proptosis, changes to the optic disc, or resistance to retropulsion.