Bedside Ocular Ultrasound unveils Globe rupture: A case report

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Dr Arihant Jain[1], Dr Amrithanand V T[2]

Background

Blunt eye trauma can show subtle signs of severe injury. Bedside ultrasound (POCUS) is vital in revealing critical intraocular damage such as globe rupture, which may be missed during local examination. Globe rupture is a serious injury requiring urgent ophthalmologic intervention. Early detection by bedside USG accelerates necessary treatment, highlighting its role in managing ocular trauma. Timely diagnosis and intervention are essential to preserving vision and preventing long-term complications. This case emphasizes the importance of including bedside USG in the evaluation of blunt ocular trauma for accurate diagnosis and prompt care.

Case Presentation

The presented case involves a 51-year-old female without known comorbidities who sought emergency care following a slip and fell in her bathroom, resulting in a direct, blunt impact to the left eye from a tap. Four hours post-trauma, she reported sudden vision diminution in the left eye without associated symptoms like altered sensorium, bleeding from the ear or nose, vomiting, weakness, seizures, or other extremity injuries. Upon examination, the patient displayed normal airway, breathing, and circulation, maintaining consciousness and orientation. The Right eye examination was within normal limits. Left eye examination (Figure 1) revealed swelling and a 0.5*2 cm laceration on the medial side of the lower eyelid of the left eye. Pupil examination indicated a circular, regular, dilated pupil unresponsive to light. Hyphema was observed in the anterior chamber, and visual acuity in the left eye corresponded to light perception.

Bedside ocular ultrasound in the emergency department(Figure 2) revealed decreased anteroposterior dimension and loss of contour of the eyeball. Hyphema in the anterior chamber and hyper-echogenicities in the vitreous, suggestive of intraocular hemorrhage, were noted. Notably, there was no evidence of retrobulbar hematoma or lens dislocation in the ocular ultrasound, and the optic nerve sheath diameter measured 4mm.

The USG findings liked decreased anteroposterior dimension and loss of contour of eyeball, were suggestive of globe rupture, which was not evident on local examination. POCUS was ceased, eye was sealed, appropriate antibiotics were initiated, and urgent ophthalmology referral was dispatched, ensuring prompt management of potential ocular injury.

These findings prompted urgent intervention and referral to an ophthalmologist for further management, underscoring the critical role of bedside ocular ultrasound in the timely diagnosis and subsequent treatment of traumatic ocular injuries.

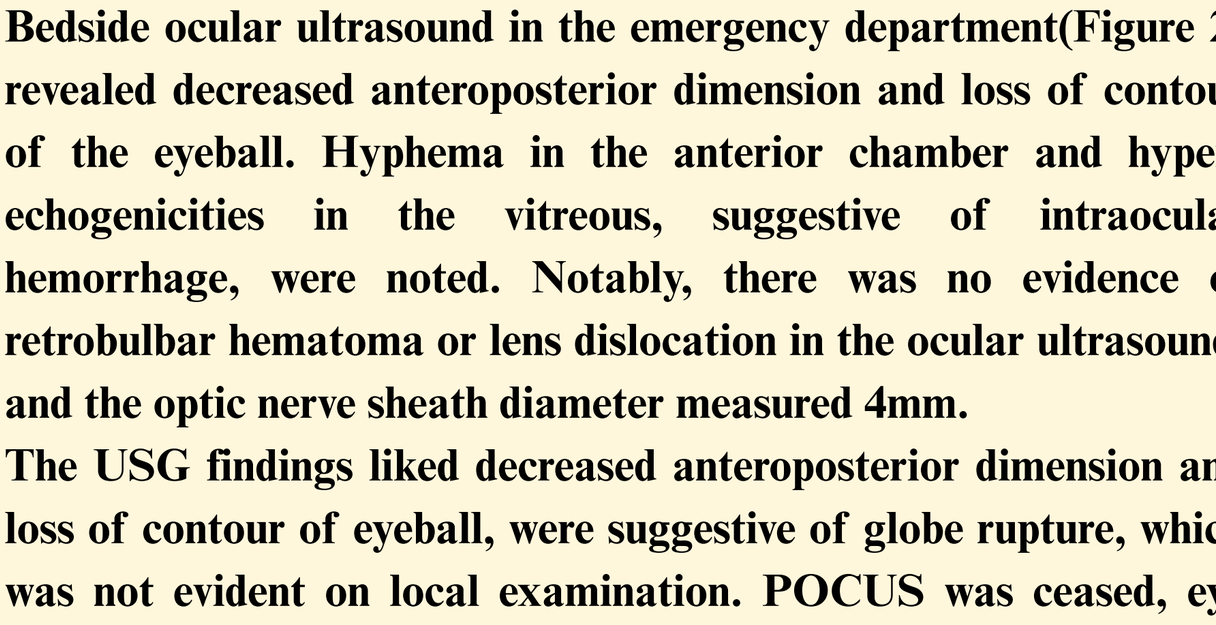

Figure 1. Local examination of left eye; laceration of medial side of lower eyelid, pupil being circular, regular, dilated and not reacting to light with hyphema in anterior chamber.

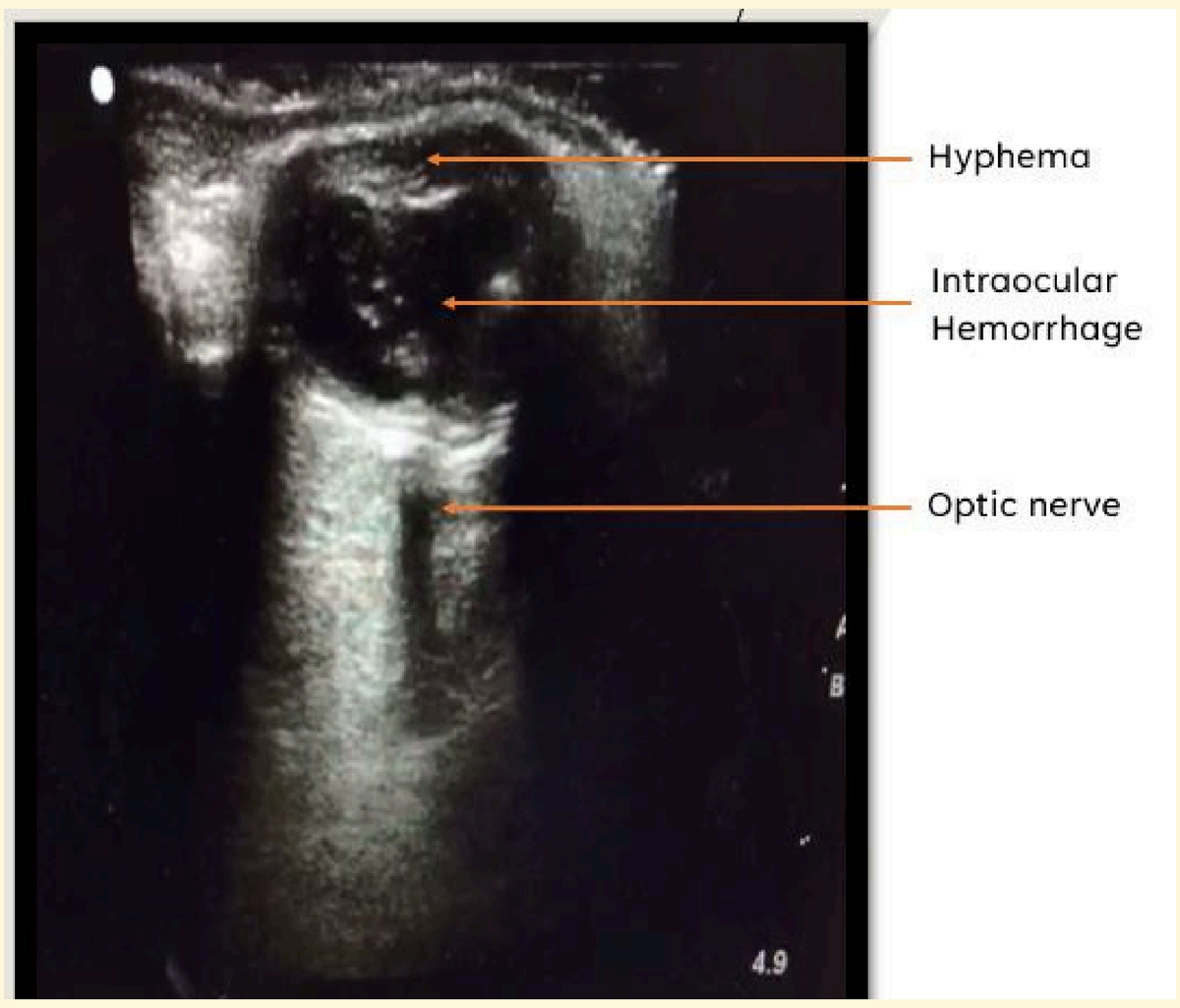

Figure 2. Bedside ocular USG of left eye, demonstrating decreased anteroposterior dimension and loss of contour of the eyeball. Hyphema in the anterior chamber and hyper-echogenicity in the vitreous, suggestive of intraocular hemorrhage.

Discussion

Bedside ocular ultrasound (USG) is an essential, rapid, and non-invasive tool for assessing ocular trauma.(1,2) It quickly identifies vitreous hemorrhage, retinal detachment, and intraocular foreign bodies, guiding urgent care and improving outcomes. In this case, local exam missed an open globe injury that USG detected, highlighting its vital diagnostic value.

POCUS use in suspected open globe injuries is controversial due to risks of worsening injury from pressure. (1,2) If open globe is suspected clinically, POCUS should be avoided; if not, minimal pressure POCUS may be used cautiously. CT is preferred if penetrating trauma is suspected.

The portability and speed of bedside USG make it ideal in emergencies, enabling fast decisions and reducing vision loss risk. Studies by Shinar, Singh, Blaivas, and Roque confirm bedside USG as a crucial trauma adjunct enhancing diagnostic accuracy and timely treatment, thereby improving patient outcomes.(1-4)

Conclusion

The presented case highlights the pivotal role of bedside ocular ultrasound in promptly diagnosing severe intraocular injuries following blunt trauma. The ultrasound findings, including decreased eye dimensions and loss of contour, suggested open globe injury and led to informed urgent intervention and facilitated timely referral to an ophthalmologist.

The case illustrates how integrating ocular ultrasonography into physical examinations can improve diagnostic precision and aid in appropriate management, underscoring the importance of developing proficiency in its application and interpretation. This underscores the critical importance of incorporating ocular ultrasound in the initial assessment of ocular trauma cases, enabling swift decision-making and optimizing patient outcomes.

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References:

1. Blaivas M, Theodoro D, Sierzenski PR. A study of bedside ocular ultrasonography in the emergency department. Acad Emerg Med Off J Soc Acad Emerg Med. 2002 Aug;9(8):791–9.
2. Roque PJ, Hatch N, Barr L, Wu TS. Bedside ocular ultrasound. Crit Care Clin. 2014 Apr;30(2):227–41, v.
3. Shinar Z, Chan L, Orlinsky M. Use of ocular ultrasound for the evaluation of retinaldetachment. J Emerg Med. 2011 Jan;40(1):53–7.
4. Singh S, Sharma B, Kumar K, Dubey A, Ahirwar K. Epidemiology, clinical profile and factors, predicting final visual outcome of pediatric ocular trauma in a tertiary eye care center of Central India. Indian J Ophthalmol. 2017 Nov;65(11):1192–7.

Authors:

1. *Dr Arihant Jain,* Senior Resident, Department of Emergency Medicine, AIIMS, New Delhi, India
2. *Dr Amrithanand V T,* Assistant Professor, Department of Emergency Medicine, JIPMER, Puducherry, India.