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Case Report

Kissing choroidal sign: A case report ☆☆☆★

Ajay Doniparthi, BS, MS^{a,*}, Aaron B. Deutsch, DO^a, Joel D. Stibbe, MD^a,
Nida M. Khan, MD^b, Matthew M. Palilonis, DO, MHSA^a

^a Department of Emergency and Hospital Medicine, Lehigh Valley Health Network/USF Morsani College of Medicine, Allentown, PA, USA

^b Department of Ophthalmology, Lehigh Valley Health Network/USF Morsani College of Medicine, Allentown, PA, USA

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ABSTRACT

Choroidal detachment (CD) is a rare and potentially vision-threatening complication of glaucoma surgery. Inflammation and prolonged ocular hypotony can promote fluid accumulation between the choroid and sclera. Risk factors include trauma, advanced age, use of anti-coagulant medications, systemic hypertension, atherosclerosis, and diabetes. CD ultrasound findings will show 2 layers, detaching as far anteriorly as the ciliary bodies, that protrude convexly into the vitreous without extending to the optic disc, often described as the appositional or kissing choroidal sign. In contrast, retinal detachments will show a distinct “V” shape due to the retina’s fixation to the optic nerve head posteriorly. In the case of hemorrhagic CD, therapy should be targeted at reducing intraocular pressure.

In this case, the patient was started on atropine and prednisolone drops and discontinued on all glaucoma medications in the left eye. While serous choroidal detachments are usually benign, persistent choroidal effusions may cause significant morbidity with hemorrhagic CD having a worse prognosis. Point of care ultrasound can help emergency physicians quickly distinguish between choroidal and retinal detachments and thus guide management in a safe and timely manner.

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Introduction

Choroidal detachment (CD) is a rare yet clinically significant ocular condition, most commonly occurring as a complica-

tion of trabeculectomy glaucoma surgery [1,2]. The incidence of choroidal detachment after trabeculectomy is estimated between 5%-44% [3]. Point of care ultrasound (POCUS) in the emergency department (ED) enables non-invasive assessment of ocular pathology to facilitate timely interventions, which

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* Corresponding author.

E-mail address: Ajay.Doniparthi@lvhn.org (A. Doniparthi).

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can be critical in preserving visual function [1]. We present a case of a 63-year-old female with a history of recent glaucoma surgery, presenting to the ED with acute eye pain progressing into vision loss. Characteristic ultrasound findings confirm the diagnosis and allow for rapid ophthalmologic intervention.

Acute vision loss can generate a broad differential with ocular pathologies that demand urgent identification to avoid permanent progression of symptoms. It can be challenging to evaluate these patients in the emergency department (ED) setting due to difficult to perform fundoscopic exams or a lack of specialized equipment. In some EDs, the local availability of on-call ophthalmologists may be limited and require the patient to be transferred to larger hospital for diagnosis. POCUS is a valuable tool for the emergency physician and is an advanced diagnostic ultrasonography performed and interpreted at bedside in real time by the performing clinician [4]. POCUS allows for a streamlined diagnostic investigation in situations where awaiting a formal radiological investigation may delay a diagnosis [4]. POCUS is particularly useful for the emergency physician in the evaluation of ocular trauma, retinal detachment, central retinal artery occlusion, papilledema, hyphema, intraocular foreign body detection, elevated intracranial pressure, and a variety of posterior chamber conditions [1]. POCUS is reliable in examining patients when a fundoscopic examination is not possible and allows for a dynamic evaluation and diagnosis [5]. This case report presents the utility of POCUS in the ED setting for the diagnosis and immediate management of CD.

Case report

A 63-year-old female presented to the ED with 2 days of left eye pain progressing to decreased visual acuity, photophobia, and conjunctival injection in that eye. The pain started suddenly and has been constant and worsening. She denies recent trauma, nausea, vomiting, fever, chills, or congestion. Six weeks prior, she had tube-shunt surgery for glaucoma of the left eye. Intraocular pressures (IOP) prior to the surgery were around 40 mmHg. She had a routine post-op visit a few hours prior to the onset of her symptoms where left eye IOP was measured at 8 mmHg. At the time of presentation to the ED, medications for glaucoma included oral acetazolamide, brimonidine tartrate/timolol drops, and dorzolamide drops. Other notable medical history includes hypertension, type 2 diabetes mellitus, bilateral cataract extraction, and aortic valve replacement on warfarin and aspirin. Family history is significant for glaucoma in her father.

The patient's triage vitals show she is afebrile with blood pressure of 148/79. On initial examination, both eyelids are normal and extraocular movements are intact. Visual fields in the right eye are normal. The left eye shows an injected conjunctiva and unreactive pupil. The patient indicates sensitivity to light but no color vision. IOP of the left eye was 7 mmHg. A POCUS was performed which revealed bilateral convexities protruding into the vitreous without extending to the optic nerve, suggestive of a choroidal detachment (Fig. 1).

Ophthalmology was consulted from the ED with recommendations to discontinue all glaucoma medications in the

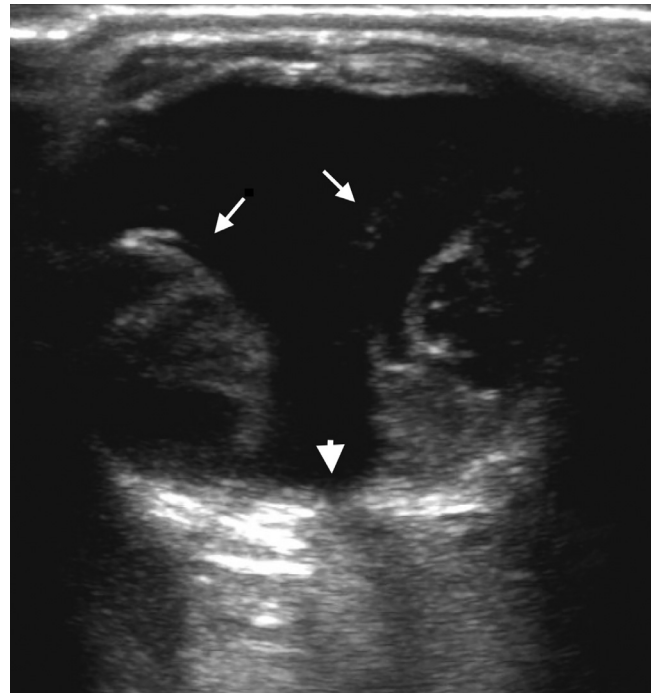


Fig. 1 – POCUS of the eye with arrows showing choroidal layers extending into the vitreous with partially echo-dense fluid between the choroid and sclera. Notably, the detachment does not extend to the head of the optic nerve.

left eye and to start atropine and prednisolone drops. The patient was discharged with recommendation to follow up with the retina specialist in a couple days. A few months later, the patient was seen by Ophthalmology with full improvement in pain and a slight improvement in visual acuity to counting fingers. The patient continued to use atropine and prednisolone drops in the left eye and IOP was measured to be 15 mmHg.

Discussion

CD is a rare and potentially vision-threatening ocular pathology most commonly associated with recent glaucoma surgery [3,6]. Risk factors include trauma, advanced age, use of anti-coagulant agents, systemic hypertension, atherosclerosis, and diabetes [7,8]. Clinical profiles of eyes with choroidal detachment after glaucoma surgery in a prior retrospective study retrospective review of 45 choroidal detachments after glaucoma surgery revealed hypotony with an average IOP at time of CD of 4.07 mm Hg [9]. The low IOP, or hypotony, results fluid accumulation in the suprachoroidal space, a collapsed potential space located between the choroid and the sclera [10]. Anatomically the space exists when it is occupied such as with fluid or effusion post-operatively from trabeculectomy. This effusion inhibits ciliary body aqueous humor production, exacerbating the hypotony [11]. Our patient, presented with an IOP of 7 mmHg, and we hypothesize that fluid accumulation in the suprachoroidal space caused the choroidal detachment.

CD is further categorized into serous and hemorrhagic suprachoroidal accumulations. In serous CD, transudation of serum follows Starling equation forces. In hemorrhagic CD, prolonged hypotony and inflammation lead to rupture of ciliary arteries with rapid blood accumulation [12]. Distinguishing between the 2 types is important for the immediate management of CD and to ascertain the need for urgent intervention.

Ultrasound findings of CD will show 2 layers, detaching as far anteriorly as the ciliary bodies, that protrude convexly into the vitreous without extending to the optic disc, often described as the appositional or kissing choroidal sign [13]. In contrast, retinal detachments will show a distinct “V” shape due to the retina’s fixation to the optic nerve head posteriorly. Echo-dense and echo-lucent fluid behind choroidal layers correlate with hemorrhagic and serous etiologies, respectively. Hemorrhagic CD is typically associated with sudden severe pain and elevated IOP whereas serous CD is generally painless with low IOP. Initial medication management should include topical corticosteroids, cycloplegics, and mydriatics to reduce IOP. In the case of hemorrhagic CD and its often associated elevated IOP, therapy should be targeted at reducing IOP [5]. Our patient was started on atropine and prednisolone drops to increase her IOP. While serous CD typically resolves spontaneously and carries a better prognosis than hemorrhagic CD, prolonged and large choroidal effusions of any kind may cause significant morbidity [14,15].

Conclusion

This case serves to demonstrate how ocular POCUS can help emergency physicians more confidently identify patients with CD. Prompt diagnosis can improve visual outcomes by facilitating the most informed and necessary ophthalmologic consultations. Further studies are needed to determine the impact of early POCUS performed in the ED on patient outcomes, such as visual acuity, recurrence rates, and the need for surgical intervention.

Patient consent

Written informed consent for this publication has been obtained from the patient.

Author contributions

All authors provided substantial contributions to manuscript content. All authors gave final approval of the version of the article to be published.

REFERENCES

- Skidmore C, Saurey T, Ferre RM, Rodriguez-Brizuela R, Spaulding J, Lundgreen Mason N. A narrative review of common uses of ophthalmic ultrasound in emergency medicine. *J Emerg Med* 2021;60(1):80–9. doi:10.1016/j.jemermed.2020.08.003.
- Benson SE, Mandal K, Bunce CV, Fraser SG. Is post-trabeculectomy hypotony a risk factor for subsequent failure? A case control study. *BMC Ophthalmol* 2005;5:7. doi:10.1186/1471-2415-5-7.
- Haga A, Inatani M, Shobayashi K, Kojima S, Inoue T, Tanihara H. Risk factors for choroidal detachment after trabeculectomy with mitomycin C. *Clin Ophthalmol* 2013;7:1417–21 Epub July 11, 2013. doi:10.2147/OPTH.S46375.
- Hashim A, Tahir MJ, Ullah I, Asghar MS, Siddiqi H, Yousaf Z. The utility of point of care ultrasonography (POCUS). *Ann Med Surg (Lond)* 2021;71:102982. doi:10.1016/j.amsu.2021.102982.
- Jarrett B, Secko M. Choroid detachment, a rare cause of vision loss diagnosed by point-of-care ultrasound. *J Emerg Med* 2017;52(4):527–9. doi:10.1016/j.jemermed.2016.07.115.
- Gedde SJ, Herndon LW, Brandt JD, Budenz DL, Feuer WJ, Schiffman JC. Surgical complications in the tube versus trabeculectomy study during the first year of follow-up. *Am J Ophthalmol* 2007;143(1):23–31 e2. doi:10.1016/j.ajo.2006.07.022.
- Berke SJ, Bellows AR, Shingleton BJ, Richter CU, Hutchinson BT. Chronic and recurrent choroidal detachment after glaucoma filtering surgery. *Ophthalmology* 1987;94(2):154–62. doi:10.1016/S0161-6420(87)33482-7.
- Law SK, Song BJ, Yu F, Kurbanyan K, Yang TA, Caprioli J. Hemorrhagic complications from glaucoma surgery in patients on anticoagulation therapy or antiplatelet therapy. *Am J Ophthalmol* 2008;145(4):736–46. doi:10.1016/j.ajo.2007.12.007.
- Rao S, Maheshwari D, Pawar N, Kadar MA, Ramakrishnan R, Uduman MS. Clinical profile and long term outcomes of eyes with choroidal detachment following trabeculectomy. *Indian J Ophthalmol* 2022;70(5):1635–41. doi:10.4103/ijo.IJO_2876_21.
- Chiang B, Jung JH, Prausnitz MR. The suprachoroidal space as a route of administration to the posterior segment of the eye. *Adv Drug Deliv Rev* 2018;126:58–66. doi:10.1016/j.addr.2018.03.001.
- Obuchowska I, Mariak Z. [Choroidal detachment–pathogenesis, etiology and clinical features]. *Klin Oczna* 2005;107(7-9):529–32.
- Schrieber C, Liu Y. Choroidal effusions after glaucoma surgery. *Curr Opin Ophthalmol* 2015;26(2):134. doi:10.1097/ICU.0000000000000131.
- Chu TG, Green RL. Suprachoroidal Hemorrhage. *Surv Ophthalmol* 1999;43(6):471–86. doi:10.1016/S0039-6257(99)00037-5.
- Wirostko WJ, Han DP, Mieler WF, Pulido JS, Connor TB Jr, Kuhn E. Suprachoroidal hemorrhage: outcome of surgical management according to hemorrhage severity. *Ophthalmology* 1998;105(12):2271–5. doi:10.1016/S0161-6420(98)91228-3.
- Altan T, Temel A, Bavbek T, Kazokoglu H. Hypotonic maculopathy after trabeculectomy with postoperative use of 5-fluorouracil. *Ophthalmol J Int Ophtalmol Int J Ophthalmol Z Augenheilkd* 1994;208(6):318–20. doi:10.1159/000310529.