EMBOLIC CENTRAL RETINAL ARTERY OCCLUSION DETECTED WITH POINT-OF-CARE ULTRASONOGRAPHY IN THE EMERGENCY DEPARTMENT

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Abstract—Background: Ocular emergencies account for 2–3% of all emergency department (ED) visits. Sonographic evaluation of the eye offers a very useful diagnostic tool in the ED. In the ED setting, ocular ultrasound could identify a retinal detachment, or a massive vitreous hemorrhage, and the training for emergency medicine practitioners is quite easy. Case Report: An 84-year-old woman presented to our ED with a painless acute vision loss in her right eye. Immediate bedside emergency ocular ultrasound was performed, and it showed a retrobulbar hyperechoic material, suggestive of an embolus within the central retinal artery. Fluorescein angiography showed limited and sluggish filling of the retinal arteries after injection of fluorescein, and optical coherence tomography demonstrated a decrease in the reflectivity and thickness of the inner retinal layers. The final diagnosis was embolic central retinal artery occlusion (CRAO). Why Should an Emergency Physician Be Aware of This?: Among the causes of acute loss of vision, CRAO is associated with systemic vascular disease. The importance of visible retinal emboli has been well documented due to its association with increase in mortality. A rapid evaluation of the central retinal artery could be a simple tool to identify an embolus, and this could lead to a rapid treatment. The evaluation of central retinal artery is a less defined setting in emergency physician bedside ultrasound, but the identification of CRAO could lead to a rapid acceleration in diagnosis and treatment of a potentially life-threatening disease. © 2016 Elsevier Inc.

Keywords—central retinal artery occlusion; emergency ultrasound; sudden vision loss

INTRODUCTION

We briefly report a case of embolic central retinal artery occlusion detected by point-of-care emergency ultrasound. Ocular disease is quite common and could range from conditions that are not urgent to organ-threatening disease: in the latter conditions, point-of-care ultrasonography offers a very useful tool to the emergency physician.

CASE REPORT

An 84-year-old woman presented to our Emergency Department (ED) with a painless acute vision loss in her right eye 30 min prior to presentation. She denied any associated symptoms. Past medical history included hypertension, treated with ramipril. She denied smoking or alcohol use. Her vital signs were normal: heart rate 76 beats/min, blood pressure 130/80 mm Hg, temperature 36.8°C, oxygen saturation 98% while breathing room air, and electrocardiogram was normal, showing a sinus rhythm. The physical and neurological examinations were normal, and the temporal artery evaluation was normal. Ocular examination was remarkable for visual acuity loss and for absent light reflex in the right eye, and the inspection showed no external signs of trauma.

Patients gave the authors written consent to use the imaging reproduced in this paper.
or infection, conjunctivitis, or evidence of corneal abrasion. Extraocular movements were intact.

Immediate point-of-care emergency ocular ultrasound was performed, with a 10-MHz linear-array ultrasound probe using a closed-eye technique: the examination showed no evidence of vitreous hemorrhage or retinal detachment, but showed a retrobulbar hyperechoic material, suggestive of an embolus within the central retinal artery (Figure 1), with intact flow in the ophthalmic branches. The color Doppler and the pulsed Doppler examinations showed no blood flow within the central retinal artery. The patient received a weight-adjusted dose of low-weight molecular heparin (LWMH) (enoxaparin 80 mg) and an emergent Ophthalmology consult was obtained. The eye’s tonometry was normal. Fundoscopic evaluation of the retina showed optic disc pallor, and a whitish, edematous retina.

The patient, after a careful examination that excluded other embolization sites and did not detect any clear embolic source, was discharged with an LWMH (enoxaparin 80 mg/12 h). The next day the patient returned to the hospital for further examination in the ophthalmology ward: fluorescein angiography showed limited and sluggish filling of the retinal arteries (Figure 2), and optical coherence tomography demonstrated a decrease in the reflectivity and thickness of the inner retinal layers (Figure 3). No improvement was observed in visual acuity.

The final diagnosis was embolic central retinal artery occlusion (CRAO).

**DISCUSSION**

Ocular emergencies account for 2–3% of all ED visits, and can range from conditions that are not urgent (e.g., simple conjunctivitis), or painful conditions (e.g., corneal foreign body) to organ-threatening diseases (such as retinal detachment or central retinal artery occlusion) (1). The evaluation of ocular emergencies in a busy ED can be difficult for lack of specialized equipment, and a quick ophthalmologic evaluation is not always available (2,3). The diffusion of point-of-care ultrasound in Emergency Medicine is useful in many settings, and ocular emergencies are one of the latest additions: sonographic evaluation of the eye offers a very useful diagnostic tool to emergency physicians (1,4). Ocular ultrasonography was initially investigated in clinical settings in the late 1960s and early 1970s, but the development of modern equipment spread its use; in ED settings, ocular ultrasound in patients with monocular loss of vision could identify with high accuracy a retinal detachment, or massive vitreous hemorrhage, and the training for emergency medicine practitioners is quite easy, as compared with other settings: the eye is a perfect target for ultrasound, because it is fluid-filled within hyperechoic structures. Ocular ultrasound performed by a well-trained emergency physician could rapidly identify patients with acute visual change to refer them for appropriate ophthalmology evaluation (1). Among other causes of acute loss of vision, CRAO is associated with systemic vascular disease, and the causes include embolism, thrombosis, vasculitis, arterial spasm, arterial dissection, and hypertensive arteriolar necrosis (5). The importance of visible retinal emboli has been well documented due to its association with increase in mortality (2). Furthermore, the identification of an
embolization is important because it requires a thorough evaluation for the source of embolic material (3). As reported by Foroozan et al., ocular ultrasound could identify emboli in the central retinal artery as a cause of CRAO (6). The detection of hyperechoic material in the retrobulbar circulation quickly differentiates embolic disease from other causes of CRAO, and the identification of an embolic cause of CRAO is critical also for prevention of embolism in other areas (3–5). To the best of our knowledge, this is the first documentation of embolic CRAO detected by emergency ultrasound performed by an emergency physician. Although there is no good therapy for retinal artery thrombosis, a quick identification of an embolic retinal artery occlusion may lead to invasive treatment in selected cases, as reported in some anecdotal reporting in the literature (7–9). Also, once an embolic cause for a CRAO is recognized, any efforts can be directed toward identifying a source of the embolus (2). Furthermore, the identification of emboli excludes other important causes of CRAO, such as giant cell arteritis, and this could spare patients high-dose corticosteroids and invasive procedures, such as temporal artery biopsies (2,6). Point-of-care emergency ultrasound is a well-demonstrated useful tool to evaluate acute change in vision (1). In our case, the point-of-care ultrasound didn’t change the patient’s outcome, but in selected patients the rapid detection of an embolic CRAO could change the management and could lead to an invasive and appropriate treatment. Evaluation of the central retinal artery is a less defined setting in emergency point-of-care ultrasound, but the rapid identification of an image, such as that reported in Figure 1, could lead to an acceleration in the diagnosis and treatment of a potentially life-threatening disease.

WHY SHOULD AN EMERGENCY PHYSICIAN BE AWARE OF THIS?

Our case report is important because an immediate identification of embolic CRAO is essential: an emergency point-of-care ocular ultrasound, usually oriented toward a search for retinal detachment, could also identify an embolic CRAO and could lead to an acceleration in diagnosis and treatment of a potentially life-threatening disease.

REFERENCES