Central retinal vein occlusion associated with the use of tranexamic acid

Ali M. Al Shaharani, Turki A. Al Ghamdi

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Abstract:

Here we report a case of central retinal vein occlusion that developed after using tranexamic acid. A 46-year-old female not known to have any previous illness came to the ophthalmology clinic complaining of sudden blurring of the vision in her left eye for almost 1 month, for which it is advised that tranexamic acid should be discontinued.

Keywords:

Anti-fibrinolytic, central retinal vein occlusion (CRVO), tranexamic acid (TA)

Introduction

Tranexamic acid (TA) is an anti-fibrinolytic agent that is used to control bleeding –especially heavy menstrual bleeding – by binding to plasminogen, which prevents its conversion to plasmin, thereby preventing fibrin degradation.[2,3] A serious adverse effect of TA is increased risk of a thrombotic event, particularly with high dose or long-term use. In our clinical-based practice, TA is used for the treatment of menorrhagia, such as a heavy menstrual cycle.[1,4] Based on its action, within its therapeutic dose and duration, TA can be used to decrease hemorrhage and bleeding secondary to organic diseases or trauma (1–1.5 g, three to four times daily for 3–4 days). However, if it exceeds the maximum recommended daily dose of 4 g or if it is used for a prolonged period, clot formation is expected to occur, leading to blood vessel occlusion.[1,2,5] The central retinal vein is among those vessels having occlusion capability, especially in hematological disorder patients.[6]

Case Report

A 46-year-old female dentist not known to have any previous medical illness presented to the clinic complaining of blurred vision in her left eye since waking from bed one morning seeing flashes of light. Her vision improved within an hour but remained poor relative to the right eye. These symptoms were continued for 1 month. Before this attack, the patient frequently used TA (1 g) three times per day for 2 years during her menses to control the heavy bleeding. She reported no previous history of such episodes. She had never taken oral contraceptive pills or steroid. Ocular examination revealed that her visual acuity was 6/24 in the left eye and 6/6 in the right eye. Her pupils were round and reacting in both eyes without any relevant afferent pupillary defect (RAPD). On slit lamp examination, the eyelids and conjunctiva were normal in both eyes; the cornea was clear in both eyes, the anterior chamber was deep and quiet without neovascularization of the iris or angle, the lens was clear, and the intraocular pressure was 16 mmHg in the left eye and 14 mmHg in the right eye. Fundus examination of the left eye showed flame-shaped hemorrhages in all four quadrants, disc swelling, venous tortuosity, retinal and macular edema, but no neovascularization of the disc or elsewhere was detected, while the fundus of the right eye was normal with healthy disc and macula. To exclude the other etiologies of central retinal vein occlusion, we made additional investigations, including a complete laboratory workup. These results were normal: white blood cells (WBC), $5.3 \times 10^{[9]}$/L (4–11); red blood cells (RBC), $4.19 \times 10^{[12]}$/L (3.8–4.8); hemoglobin,

Department of Ophthalmology, Armed Forces Hospital Southern Region, Khamis Mushiyet, Saudi Arabia

Address for correspondence:
Ali Mohammed Al Shaharani
Ophthalmology Program, Southern Region, King Khaled University, Abha, Saudi Arabia.
E-mail: dr.ali.11@hotmail.com

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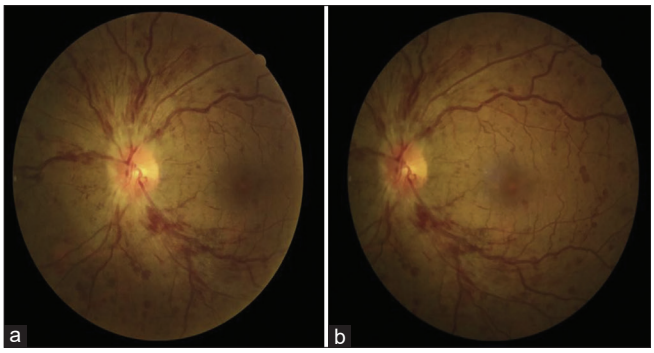

Figure 1: (a and b) Color fundus of the left eye showing flame-shaped hemorrhages in all four quadrants, disc swelling, venous tortuosity, retinal and macular edema, but no neovascularization of the disc or elsewhere

12.6 g/dl (12–16); glucose, negative; C-reactive protein, < 4.99 mg/l (0–10); erythrocyte sedimentation rate, 16 mm/h (1–20); creatinine, 58 µmol/l (33–88); blood urea nitrogen (BUN) 3.2 mmol/L (2.9–7.1); low density lipoprotein (LDL), 2.4 mmol/L (<3.4), cholesterol, 3.86 mmol/L (3–5); high density lipoprotein (HDL), 1.03 mmol/L (0.62–2.05); triglycerides, 0.77 mmol/L (0.34–2.28); international normalized ratio (INR), 1.0 (<1.4); partial thromboplastin time, 30.6 s (25–42); uric acid, 0.35 mmol/L (0.14–0.35); syphilis antibodies, negative; acid-fast bacilli stain of sputum, negative; alanine aminotransferase (ALT) 20 U/L (17–63); aspartate aminotransferase (AST), 22 U/L (15–41); alkaline phosphatase (ALP), 45 U/L (38–126); and gamma glutamyl transferase (GGT), 12 U/L (5–64). Optical coherence tomography (OCT) showed macular edema of the left eye and color fundus was performed [Figure 1a and b].

Based on the history and clinical finding, the patient was diagnosed as a case of central retinal vein occlusion secondary to use of TA. We started the patient on intravitreal ranibizumab (Lucentis) (0.5 mg/ml) twice, 1 month apart. We stopped the TA to prevent another attack in the fellow eye, and we arranged a gynecological consultation to address that. The appearance of the fundus of the left eye was normalized after 7 months of treatment.

Discussion

In our patient, after excluding systemic disorders and confirming the diagnosis of CRVO, we suspected the TA as potentially responsible for this ocular disease. After 1 month of the first intravitreal ranibizumab injection, the visual acuity improved to 6/12 and the macular edema started to resolve. When the second injection was given after 8 weeks, the visual acuity improved to 6/9, and macular edema improved. After 7 months of continuous follow-up in the ophthalmology clinic, the pathological changes of the fundus were normalized [Figure 2a-c], and the visual acuity of 6/6 was achieved in both eyes. At the time of writing, the patient is still following up without complications. Central retinal vein occlusion (CRVO) after using TA is very rare. Blood vessel occlusion, including CRVO, can be a side effect of using TA (if it exceeds the maximum recommended daily dose or if it is

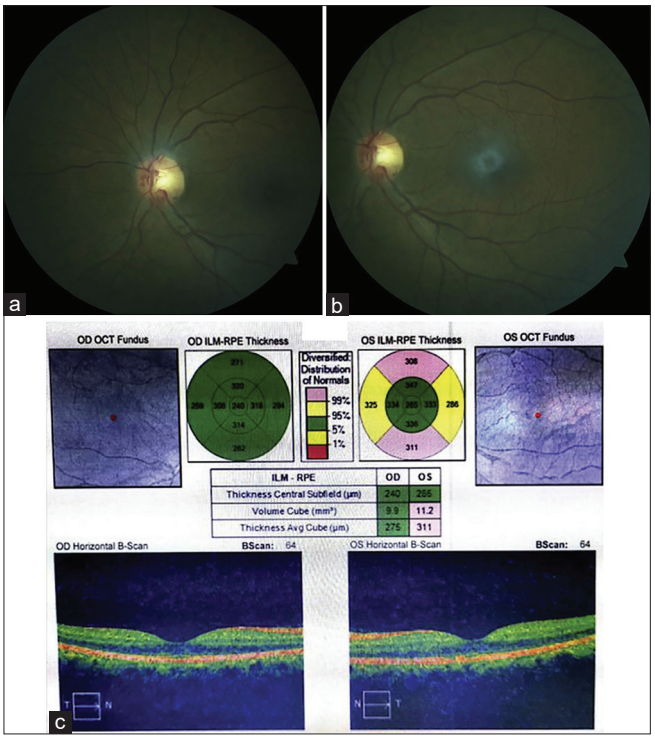

Figure 2: (a and b) After treatment color fundus photo of left eye; (c) optical coherence tomography showing normal appearance after treatment

used for a prolonged period),[1,2,5] especially in hematological disorder patients.[6] Early diagnosis and management of CRVO secondary to TA will give a better outcome, as seen in this case report. Therefore, TA should be considered as one of the causes of retinal vascular occlusion, including CRVO (as in our case) and central retinal artery occlusion (as reported by Wijetilleka *et al.*).[7] Nevertheless, further studies are required to better establish this relationship.

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Conflicts of interest

There are no conflicts of interest.

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