Clinical Case Report

Medicine®

OPEN

Central retinal venous occlusion in a child with hyperhomocysteinemia

A case report

Zhengfeng Liu, MD[a], Xuemei Pan, MD[b], Wenjun Jiang, PhD[c], Hongsheng Bi, MD, PhD[b,c,*]

Abstract

Rationale: To report a rare case of 8-year-old girl patient with central retinal venous occlusion (CRVO) with hyperhomocysteinemia.

Patient concerns: The patient had a 2-year history on painless visual loss in the left eye.

Diagnoses: All examination results were within normal limits except plasma homocysteine (HCY). Fluorescein angiography (FA) confirmed peripheral capillary non-perfusion (CNP) in the left eye, and OCT showed macular edema. The girl patient was diagnosed as CRVO.

Interventions: Based on all of the test results, laser photocoagulation was performed at peripheral capillary non-perfusion (NP). Ranibizumab was injected into virtreous cavity to reduce the macular edema. Oral folic acid, vitamin B12, and vitamin B6 were performed to the girl.

Outcomes: After 13 months, the girl visual acuity recovered to 20/100 in the left eye.

Lessons: All eye examinations should be performed in young patients, and they should undergo treatments immediately after is diagnosed as CRVO.

Abbreviations: CRVO = central retinal venous occlusion, FA = fluorescein angiography, HCY = homocysteine, OCT = optical coherence tomography.

Keywords: case report, central retinal venous occlusion, child, hyperhomocysteinemia, laser photocoagulation, ranibizumab injection

1. Introduction

Central retinal venous occlusion (CRVO) is an uncommon cause of visual loss in young people. The pathogenesis and risk factors of CRVO are poorly understood in younger people. The percentage of CRVO cases with systemic disease is greater in the older (74%) than in younger patients (40%–67%).[1] Elevated homocysteine (HCY), which is associated with venous thrombosis, has been considered as an important risk factor for RVO.[2] HCY could directly damage the vascular endothelium if it accumulates.[3] Associated medical conditions in younger patients include hyperhomocysteinemia.[4] In the case reported herein, an 8-year-old girl patient presented a CRVO with hyperhomocysteinemia in the left eye.

2. Case presentation

An 8-year-old girl patient presented to our hospital because of a 2-year history on painless visual loss in the left eye. Upon examination, the visual acuity (VA) in the right eye was 20/25 which was 20/20 with −0.75DS, the presenting VA in the left eye was 20/1000 which was helpless with +0.25DS/−1.75DC × 170, both of the intraocular pressures by applanation tonometry were 14 mmHg. The examinations of the right eye were normal (Fig. 1A and B). Anterior segment findings in the left eye showed normal except the presence of afferent papillary defect. On indirect fundus examination, the optic disc had abnormal vessels and blush, and there was presence of dilated and tortuous retinal veins (Fig. 1C). Fluorescein angiography (FA) confirmed peripheral capillary non-perfusion (CNP) in the left eye (Fig. 1D), and optical coherence tomography (OCT) showed macular edema (Fig. 2A). FA also showed that normal choroidal filling, but there was a variable delay in retinal vascular (Fig. 1E–F). High fluorescence accumulated at the posterior pole in the late time (Fig. 2B). Finally, the girl patient was diagnosed as CRVO.

Editor: N/A.

Informed written consent was obtained from the patient for publication of this case report and accompanying images.

This report was supported by Shandong Key R&D Program (2017CXGC1211) and The Excellent Youth Science Foundation of Shandong University of Traditional Chinese Medicine (2018zk26).

All authors listed declare that they have no competing interests.

[a] Shandong University of Traditional Chinese Medicine, [b] Affiliated Eye Hospital of Shandong University of Traditional Chinese Medicine, [c] Eye Institute of Shandong University of Traditional Chinese Medicine, Jinan, China.

[*] Correspondence: Hongsheng Bi, Affiliated Eye Hospital of Shandong University of Traditional Chinese Medicine, Yingxiongshan Road 48#, Shizhong District, Jinan 250002, Shandong Province, China (e-mail: bihongshengeye@163.com).

Medicine (2019) 98:23(e15813)

Received: 17 December 2018 / Received in final form: 15 April 2019 / Accepted: 29 April 2019

http://dx.doi.org/10.1097/MD.0000000000015813

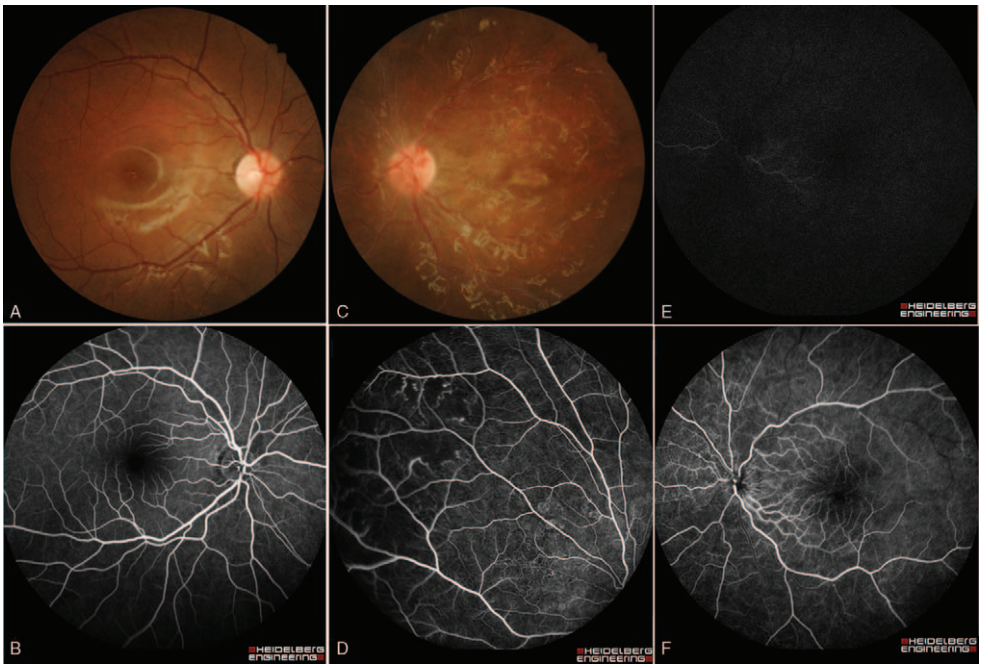

Figure 1. (A and B) The examinations of the right eye were normal. (C) The optic disc had abnormal vessels and blush, the macular scar, and there was presence of dilated and tortuous retinal veins in the left eye; (D) FA showed peripheral capillary NP; (E–F) there was a variable delay in retinal vascular. FA = Fluorescein angiography, NP = non-perfusion.

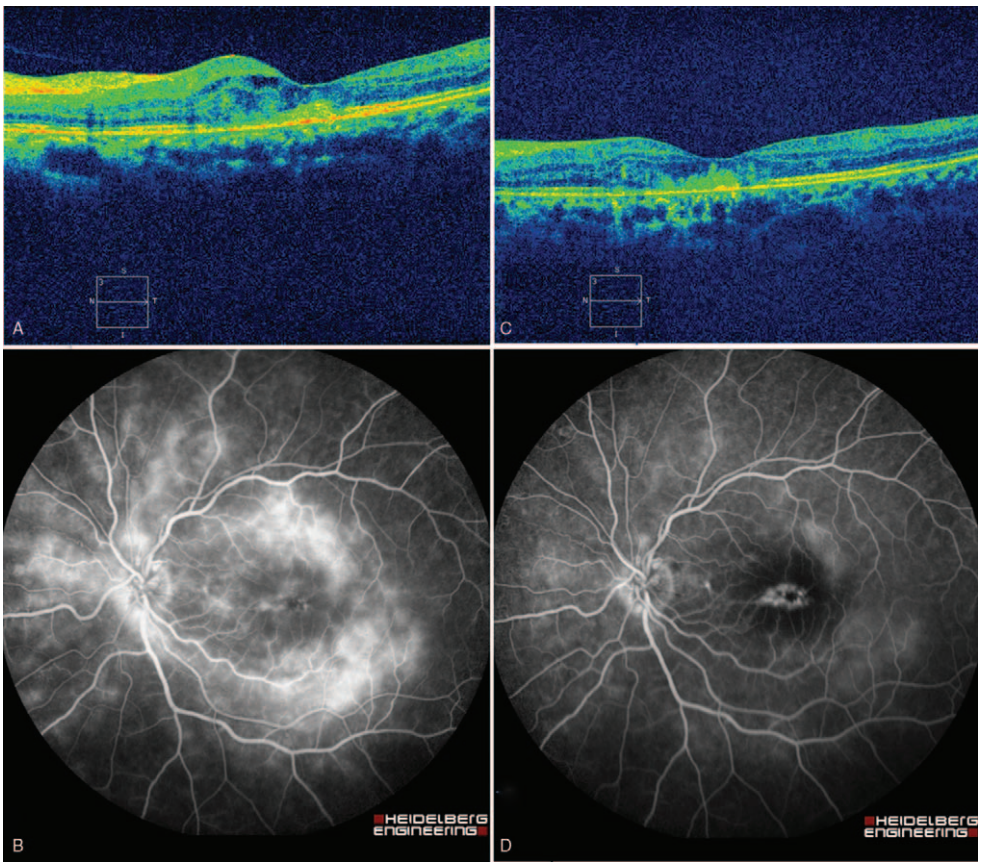

Figure 2. (A) OCT showed macular edema; (B) high fluorescence accumulated at the posterior pole in the late time. (C) The macular recovered to normal; (D) a small amount of fluorescence leakage at the macular. OCT = optical coherence tomography.

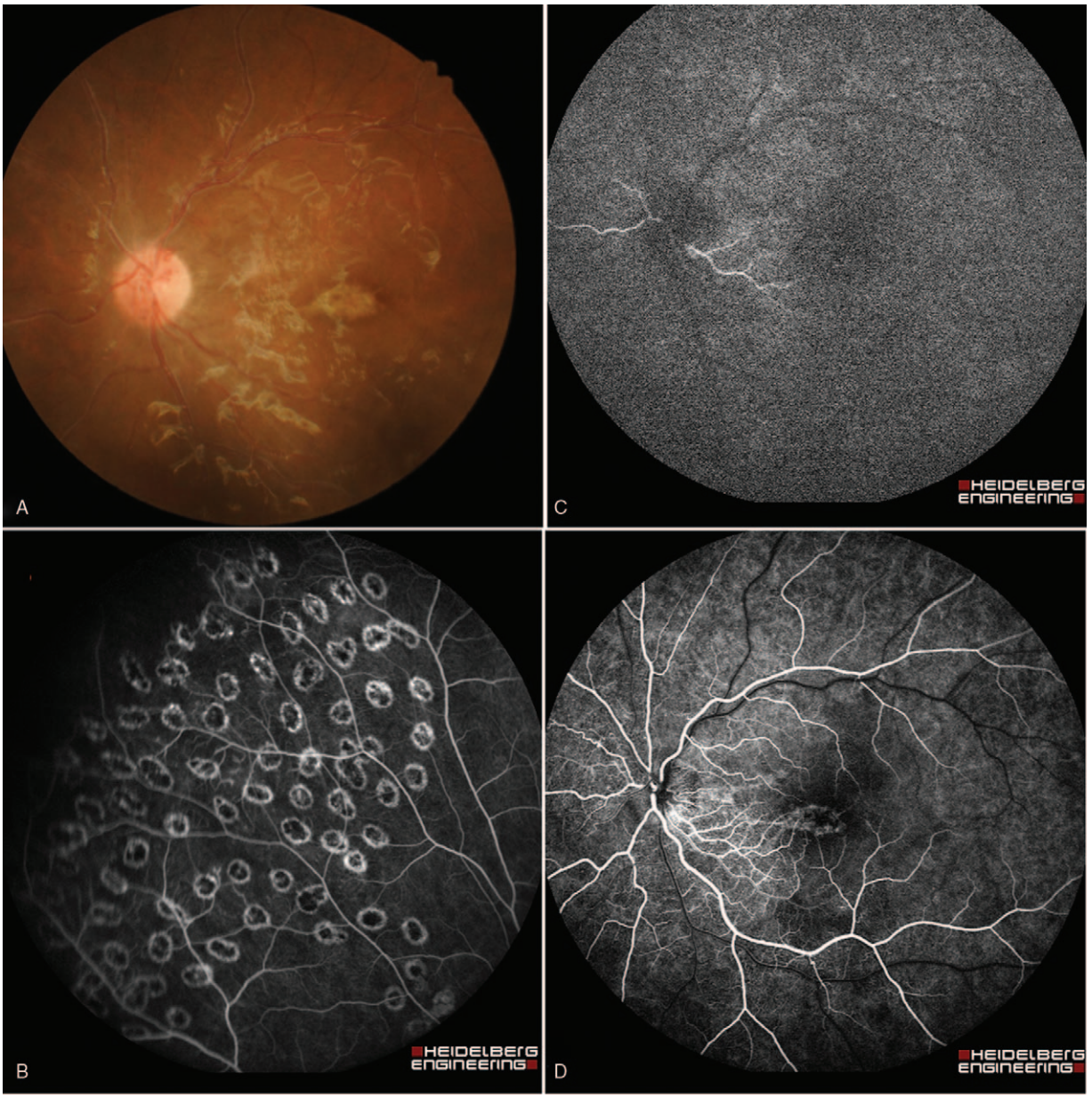

Figure 3. (A) The macular remained scar-shaped. (B) NP area covered with laser spot; (C–D) FA showed generally normal retinal vascular filling. NP = non-perfusion.

All investigations were within normal limits except plasma HCY. The level of HCY for the girl patient was 25.5 μmol/L (normal <15 μmol/L).

For her retinovascular disease, laser photocoagulation was performed at peripheral CNP area and 0.05 ml intravitreal ranibizumab (Lucentis, Novatis) injection for alleviating the level of edema. For her HCY, oral folic acid, vitamin B12, and vitamin B6 were carried out according to the specialist physician.

After 13 months, NP area covered with laser spot (Fig. 3B), FA showed generally normal retinal vascular filling (Fig. 3C–D), and the macular recovered to normal (Fig. 2C), a small amount of fluorescence leakage at the macular (Fig. 2D). The VA recovered to 20/100 in the left eye. Her HCY was 6.5 μmol/L.

3. Discussion

Hyperhomocysteinemia is increasingly considered an important risk factor for retinal vascular diseases.[2] Clinic-based studies showed an association of hyperhomocysteinemia with CRVO.[5,6] In univariate analyses, participants with HCY > 15 μmol/l were three times more likely to have RVO.[2] In addition, mean HCY levels were significantly higher in the RVO groups than the control group.[7]

In the present case, the girl patient was diagnosed as CRVO with hyperhomocysteinemia in the left eye after comprehensive eye examination. Many studies have shown that vitamin supplementation with folic acid or combined with vitamin B6, and vitamin B12 reduces HCY levels in patients with venous thrombosis and in healthy volunteer, regardless of the underlying cause.[7] Further, the

symptomatic treatment was carried out for the girl patient. And, 3 vitamins, including folic acid, vitamin B12, and vitamin B6, were used to regulate the level of HCY in the blood. There was no presence of intraretinal hemorrhages because the girl had a 2-years history visual loss, possible the hemorrhages has been absorbed (Fig. 1C). Treatment options for CRVO until recently have been limited to largely laser for the neovascular complications of retinal ischemia.[8] Furthermore, laser photocoagulation was used to treat retinal ischemia. Macular edema is a significant cause of vision loss in patients with CRVO. Vascular endothelial growth factor (VEGF) is known to be upregulated in CRVO.[9] Anti-VEGF therapy, such as intravitreal ranibizumab provides an effective treatment against vision-threatening macular edema[10] and help repair the break-down in the blood-retinal barrier.[10] Considering the above-mentioned case, the girl patient was received ranibizumab injection to treat macular edema.

Visual prognosis was poor in most patients despite treatment with CRVO.[4] After 13 months, the VA of the girl recovered to 20/100 in the left eye. However, the macular in the fundus photograph does not change (Fig. 1C and Fig. 3A), it may be too long after CRVO which did not treat result in the formation of scar.

As we can see, the ophthalmologist should take into account thorough examination in the diagnostic evaluation of all young patients with RVO disease. The patients should undergo treatments immediately after CRVO.

Author contributions

Methodology: Xuemei Pan.
Writing – original draft: Zhengfeng Liu.
Writing – review & editing: Xuemei Pan, Wenjun Jiang, Hongsheng Bi.

References

[1] Fong AC, Schatz H, McDonald HR, et al. Central retinal vein occlusion in young adults (papillophlebitis). Retina 1992;12:3–11.
[2] Chua B, Kifley A, Wong TY, et al. Homocysteine and retinal vein occlusion: a population-based study. Am J Ophthalmol 2005;139:181–2.
[3] Parodi MB, Di Crecchio L. Hyperhomocysteinemia in central retinal vein occlusion in young adults. Semin Ophthalmol 2003;18:154–9.
[4] Kuo JZ, Lai CC, Ong FS, et al. Central retinal vein occlusion in a young Chinese population: risk factors and associated morbidity and mortality. Retina 2010;30:479–84.
[5] Cahill MT, Stinnett SS, Fekrat S. Meta-analysis of plasma homocysteine, serum folate, serum vitamin B(12), and thermolabile MTHFR genotype as risk factors for retinal vascular occlusive disease. Am J Ophthalmol 2003;136:1136–50.
[6] Chia EM, Mitchell P, Rochtchina E, et al. Unilateral visual impairment and health related quality of life: the Blue Mountains Eye Study. Br J Ophthalmol 2003;87:392–5.
[7] Battaglia Parodi M, Di Crecchio L. Hyperhomocysteinemia and retinal vascular occlusive disease. Eur J Ophthalmol 2003;13:500.
[8] MacDonald D. The ABCs of RVO: a review of retinal venous occlusion. Clin Exp Optom 2014;97:311–23.
[9] Pe'er J, Folberg R, Itin A, et al. Vascular endothelial growth factor upregulation in human central retinal vein occlusion. Ophthalmology 1998;105:412–6.
[10] Sophie R, Hafiz G, Scott AW, et al. Long-term outcomes in ranibizumab-treated patients with retinal vein occlusion; the role of progression of retinal nonperfusion. Am J Ophthalmol 2013;156:693–705.