

“String of beads” appearance on fundus fluorescein angiography as a clinical clue for leukemia-related proliferative retinopathy

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Key words: Fundus fluorescein angiography, leukemia, leukemic retinopathy, proliferative retinopathy, Roth spots

A 58-year-old male presented with blurring of vision and floaters in the right eye (OD) since 1 month. His best-corrected visual acuity was 20/20, N6 OD and 20/20, N6 left eye (OS). He was a known case of type II diabetes mellitus under oral hypoglycemic agents with controlled sugar levels. He gave history of 9 kg weight loss in the past 2 months and an episode of fever 2 months ago. His anterior segment examination was normal in both the eyes. Fundus examination showed presence of bilateral multiple retinal hemorrhages, Roth spots, perivascular sheathing, and retinal infiltrates with vitreous haemorrhage in the right eye [Figs. 1 and 2]. With differential diagnosis of infectious retinal vasculitis, occlusive vascular retinopathy, and masquerades, fundus fluorescein

angiography (FFA) and systemic work up were advised. FFA revealed bilateral multiple hyperfluorescent dots, leakage suggestive of neovascularization of the disc and elsewhere, multiple capillary nonperfusion areas [Figs. 3 and 4], and a peculiar bumpy appearance of vessels similar to a “string of beads” [Fig. 5]. This appearance of vessels was seen in arteries, arterioles, and capillaries but was most prominent in capillaries. On systemic work up, the patient was found to have leucocytosis (2,085,000/ μ L), erythrocyte sedimentation rate of 34 mm/h, C-reactive protein positive, and presence of myeloblasts and immature granulocytes on peripheral smear. Mantoux test, treponema pallidum haemagglutination assay, HIV-1 and 2, and polymerase chain reaction for common viral genomes were negative. In view of leukocytosis, bone marrow biopsy was done, which revealed presence of Philadelphia translocation “t(9;22)(q34;q11).” He was diagnosed to have chronic myeloid leukemia (CML; chronic phase). The patient was subjected to laser pan-retinal photocoagulation and

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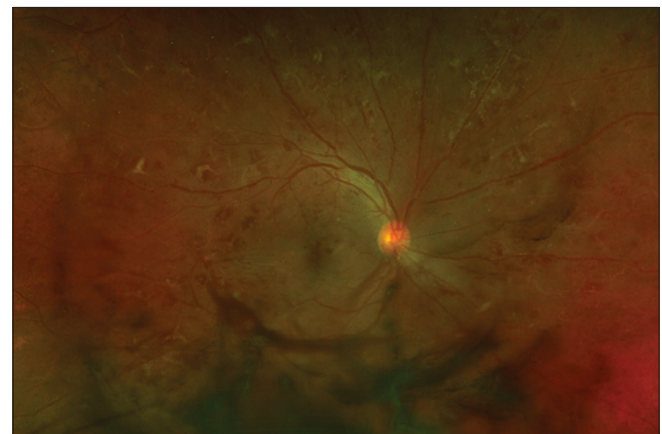


Figure 1: Colour fundus photograph of right eye showing vitreous haemorrhage with multiple retinal hemorrhages, Roth spots, perivascular sheathing, and retinal infiltrates

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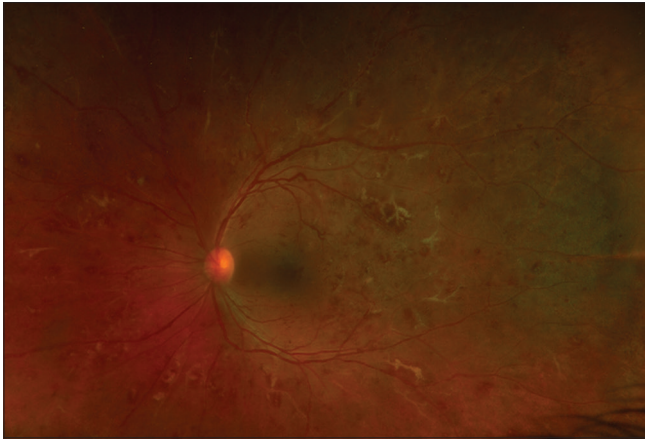


Figure 2: Colour fundus photograph of left eye showing multiple retinal hemorrhages, Roth spots, perivascular sheathing, and retinal infiltrates

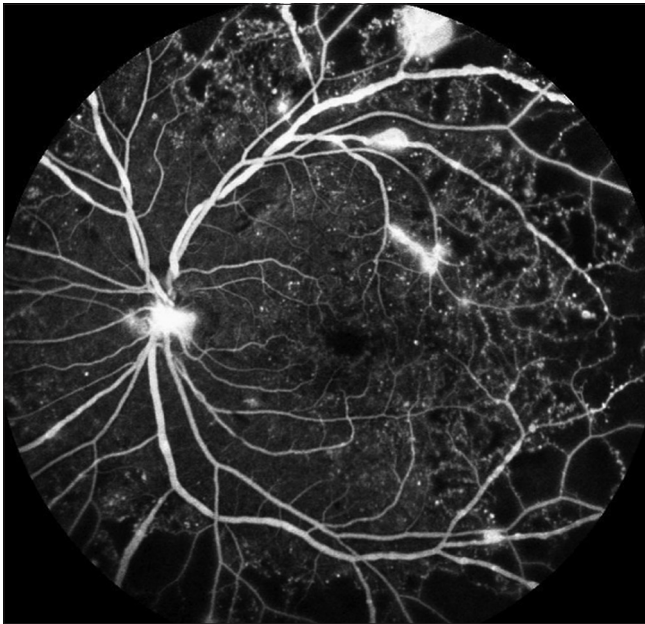


Figure 4: Fundus fluorescein angiogram of left eye showing multiple hyperfluorescent dots, leakage suggestive of neovascularization of the disc and elsewhere, and multiple capillary nonperfusion areas

systemic chemotherapy in the form of T. Imatinib mesylate was started by the hemato-oncologist.

CML is a clonal myeloproliferative disorder of hematopoietic stem cells. Bilateral proliferative retinopathy as an initial presentation of CML has been described previously.^[1-5] The “string of beads” term has been used to describe the radiological appearance of vessels in fibromuscular dysplasia^[6] and as a radiological sign in small bowel obstruction.^[7] In ophthalmology, the term has been used to describe the appearance of vitreous opacities in *Candida* endophthalmitis.^[8] However, the term has not been used to describe the appearance of vessels on FFA yet. CML with leukocytosis leading to hyperviscosity may be an explanation for this particular appearance of vessels. This could be an important diagnostic imaging clue on FFA in cases of proliferative retinopathy

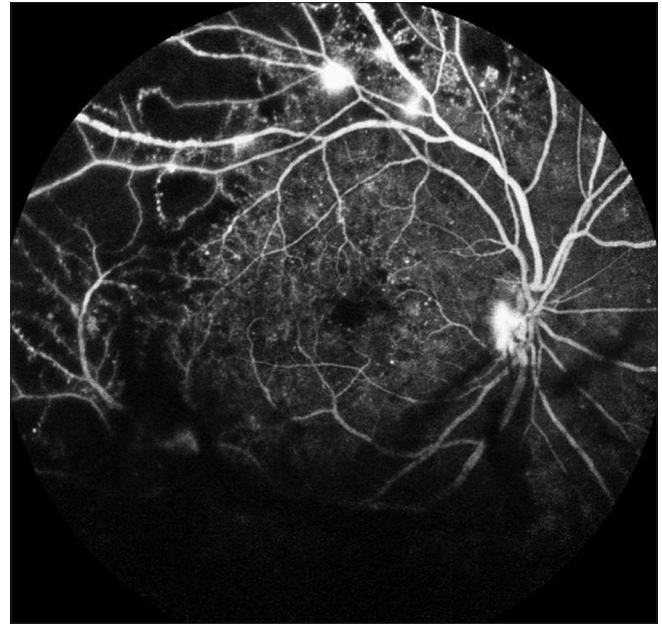


Figure 3: Fundus fluorescein angiogram of right eye showing multiple hyperfluorescent dots, leakage suggestive of neovascularization of the disc and elsewhere, and multiple capillary nonperfusion areas

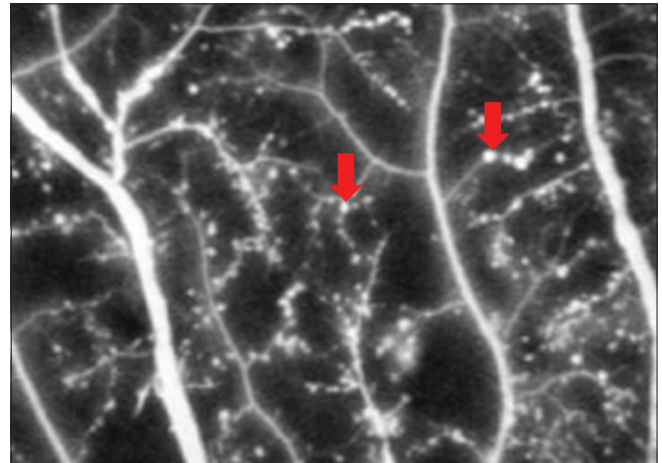


Figure 5: Zoomed-in image of fundus fluorescein angiogram showing a peculiar bumpy appearance of vessels similar to a “string of beads” (solid red arrow)

secondary to leukemia. However, larger case series is required to confirm this observation.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient has given his consent for his images and other clinical information to be reported in the journal. The patient understands that his name and initials will not be published and due efforts will be made to conceal his identity, but anonymity cannot be guaranteed.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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