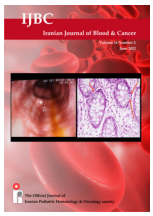
Iranian Journal of Blood & Cancer

Journal Home Page: www.ijbc.ir



CASE REPORT

Unusual ophthalmic manifestation in chronic myeloid leukemia: A case report

Mohsen Vakili [1], Seyed Ahmad Rasoulinejad [2*]

[1] School of Medicine, Babol University of Medical Sciences, Babol, Iran.
[2] Department of Ophthalmology, Ayatollah Rouhani Hospital, Babol University of Medical Sciences, Babol, Iran.

ARTICLE INFO

Article History:
Received: 4/12/2021
Accepted: 17/6/2022

Keywords:
Chronic myeloid leukemia
Visual acuity
Roth's spots
Ophthalmic manifestations.

*Corresponding authors:
Seyed Ahmad Rasoulinejad, M.D
Department of Ophthalmology, Ayatollah Rouhani Hospital, Babol University of Medical Sciences, Babol, Iran.
Tel: +989111114076
Email: rasolisa2@gmail.com

Abstract

Background: Chronic myeloid leukemia (CML) is a myeloproliferative hematopoietic malignancy with a heterogeneous proliferation of hematopoietic cells in the bone marrow. The ocular manifestations are rare symptoms of CML. In this case report, a CML patient with retinal hemorrhage is reported as an uncommon symptom. **Case presentation:** A 35-year-old man was referred due to decreased right eye vision. The reduction of the visual acuity of the right eye (2/10), rounded and diffuse intra-retinal hemorrhage with white-center Roth's spots, and macular edema were seen. No systemic diseases and other ophthalmic manifestations were seen in this case. The white blood cell (WBC) count was 135,000 cells/µl, the platelets were 430,000 cells/µl, and hemoglobin was 12.5 gr/dl. The myeloid progenitor and precursor were present in peripheral blood smear and bone marrow. Also, the quantitative real-time polymerase chain reaction indicated that the BCR-ABL1-to-ABL1 ratio was 0.795. a daily administration of 400 mg of Imatinib was prescribed. Two months later, WBC count reached 6,500 cells/µl, Hb was 11.6 gr/dl, and platelets were 306,000 cells/µl. **Conclusion:** the ophthalmic manifestations may be a symptom of CML. We found the rounded and diffuse intra-retinal hemorrhage, Roth's spots, and macular edema as the ocular manifestation of a CML case.

Please cite this article as: Vakili M, Rasoulinejad SA, Unusual ophthalmic manifestation in chronic myeloid leukemia: A case report; A case report. IJBC 2022; 14(2): 58-60

1. Introduction:

Chronic myeloid leukemia (CML) is a myeloproliferative hematopoietic malignancy with a heterogeneous proliferation of hematopoietic cells in bone marrow [1]. The overexpression of BCR-ABL1 fusion protein with tyrosine kinase activity leads to uncontrollable proliferation in cancer stem cells. The count of white blood cells (WBCs) increases at different stages of CML [1, 2]. Also, eosinophilia, basophilia, and splenomegaly are standard features in CML, but usually, there is no lymphadenopathy [3, 4]. CML can be diagnosed following a complete blood count [5]. It can also present as general symptoms,

i.e., fatigue, anorexia, and symptoms related to splenomegaly, such as abdominal pain and early satiety. Other less common manifestations include excessive sweating, heat intolerance, weight loss, arthritis, priapism, itchy tinnitus, and drowsiness due to blood hyperviscosity [6, 7]. In this case report, a CML patient with retinal hemorrhage is reported as an uncommon symptom.

2. Case presentation:

A 35-year-old man was referred to the Ophthalmology department of Ayatollah Rouhani Hospital, Babol, Iran, due to a decreased right eye vision. On examination, the visual acuity (VA) of the right eye was 2/10, and the VA of the left eye was 10/10. Marcus Gunn's pupil (relative reverse afferent pupillary defect) was negative. No refractive error was found. Also, lens and anterior, posterior, and vitreous chambers were normal. On examination of the fundus of the right eye, rounded and diffuse intra-retinal hemorrhage with a white-center Roth's spot and macular edema was seen in optical coherence tomography (OCT) (Figure 1). The optical disc was normal. Due to the appearance of hemorrhage, systemic diseases were evaluated. He had no history of hypertensive diabetes or any other disease. The WBC count was 135,000 cells/µl, and the patient was referred to a hematologist.

In this patient, the platelet count was 430,000 cells/µl, and hemoglobin was 12.5 gr/dl. The result of the blood differential cell count was as follows: myeloblasts =2%, promyelocytes =3%, myelocytes =16%, metamyelocytes =12%, band cells =4%, neutrophils =49%, lymphocytes =7%, basophils =4%, eosinophils =1% and nucleated RBC =4% (Figure 2). The bone marrow sample showed an increase in cellularity; myeloblasts =2%, promyelocytes =3%, and erythroid progenitors =23% were reported to indicate a myeloproliferative disease. For diagnosis approval and indicating the therapeutic strategy, a quantitative real-time polymerase chain reaction (qRT-PCR) was performed for BCR-ABL1 mRNA. In the qRT-PCR test, the BCR-ABL1-to-ABL1 ratio was 0.795. a daily administration of 400 mg of Imatinib was started for this case. Two months later, WBC count reached 6,500 cells/µl, Hb was 11.6 gr/dl, and platelets were 306,000 cells/µl.

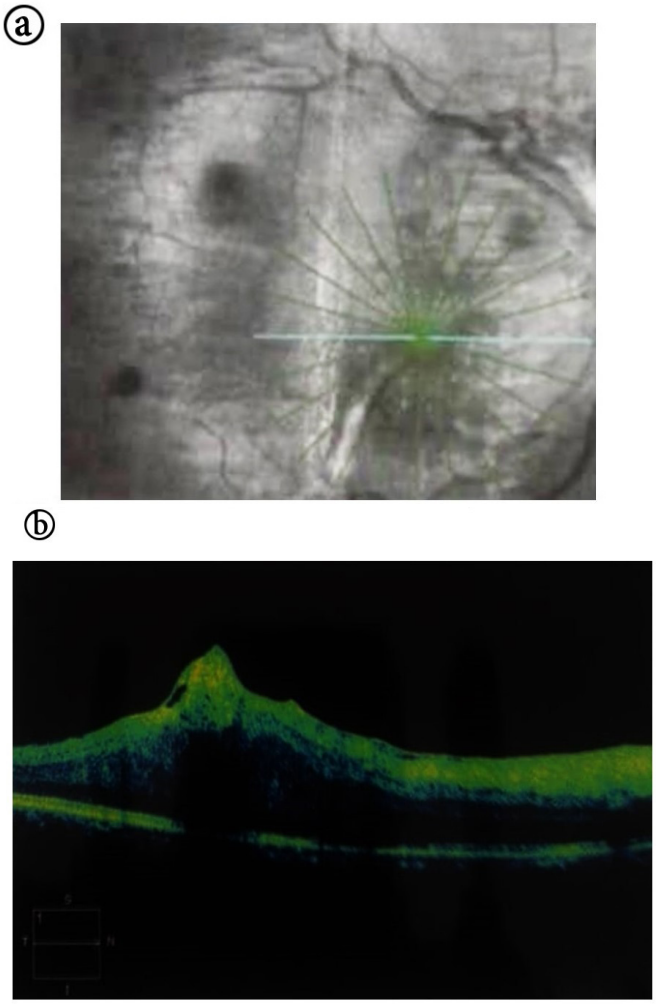


Figure 1: OCT image of involved eye. Roth's spots **(a)** and macular edema **(b)** are shown in the OCT image of the involved eye. OCT: optical coherence tomography.

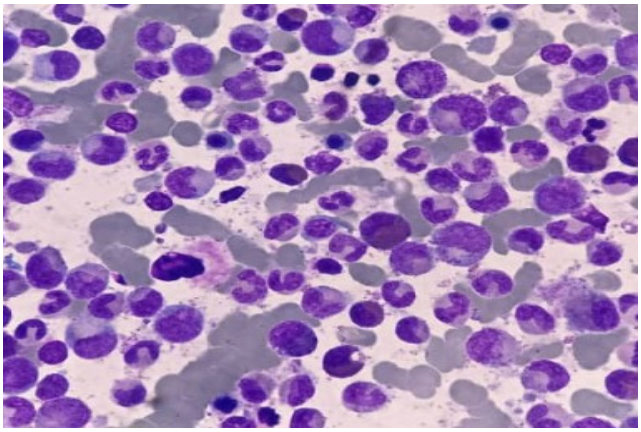


Figure 2: Giemsa staining of peripheral blood smear of this case, before Imatinib therapy. Myeloid progenitors and precursors indicated a myeloproliferative disease.

3. Discussion:

Complete blood count routinely diagnoses CML, but usually, there are no clinical symptoms [1, 5]. Some general symptoms, including fatigue, anorexia, splenomegaly, and abdominal pain, are seen in CML patients [2]. In this case report, we introduce the unusual ocular manifestations as a symptom of CML. The reduction of visual acuity in one eye, rounded and diffuse intra-retinal hemorrhage, Roth's spots, and macular edema were seen in this case. The hemorrhage is an unusual symptom in leukemic patients which occurs due to the aberration in megakaryopoiesis [8]. Roth's spot, also known as Litten spot, was firstly reported in 1872 [9]. In addition to leukemia, this retinal manifestation is also present in diabetes, hypertension, infective endocarditis, and acquired immune deficiency syndrome. The accumulation of platelets, malignant cells, and fibrin create Roth's spots in a leukemia patient, which is seen in this present case [10, 11]. Also, macular edema was another ocular manifestation in this patient. This feature occurs when proteins and fluids accumulate under the retina. Also, inflammatory conditions worse the edema [12]. Macular edema is rare in leukemic patients, but it was present in our case, which may be due to the accumulation of malignant cells or overexpression of the inflammatory protein.

Other ocular conditions are present in leukemia patients. For example, post-hematopoietic stem cell transplantation (HSCT)-associated cytomegalovirus (CMV) infections may occur due to the immunosuppression of leukemia patients after HSCT. Huang et al. reported a leukemic case with cystoid macular edema following post-HSCT CMV-retinitis. In this ocular manifestation in leukemia, the patient was managed by oral valganciclovir and intravitreal methotrexate [13].

As a conclusion of this case report, it should be noted that the ophthalmic manifestations may be a symptom of CML. We found the rounded and diffuse intra-retinal hemorrhage, Roth's spots, and macular edema as ocular manifestations of a CML case. The reduction in visual acuity and unusual hemorrhage in the retina alerted the ophthalmologist to a coagulative blood disorder. Finally, the results of cell count showed the CML in this case. We recommend more investigation into the diagnostic role of ocular manifestations in leukemia.

Acknowledgments

All authors declare there is no acknowledgment in this manuscript.

Declarations of interest

None

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