This is an Open Access article licensed under the terms of the Creative Commons Attribution-NonCommercial-NoDerivs 3.0 License (www.karger.com/OA-license), applicable to the online version of the article only. Distribution for non-commercial purposes only.

Cellulitis with Leukocytopenia as an Initial Sign of Acute Promyelocytic Leukemia

Sachiko Sakamoto^a Naoki Oiso^{a, b} Masakatsu Emoto^c
Shusuke Uchida^a Ayaka Hirao^a Yoichi Tatsumi^{b, c}
Itaru Matsumura^c Akira Kawada^a

Departments of ^aDermatology, ^bPatient Safety and Management, and
^cHematology, Kinki University Faculty of Medicine, Osaka-Sayama, Japan

Key Words

Cellulitis · Leukocytopenia · Acute promyelocytic leukemia

Abstract

Patients with hematologic malignancies are immunosuppressive and may develop cutaneous or invasive infections as a primary sign of immune suppression. Acute promyelocytic leukemia (acute myeloid leukemia M3) is caused by translocation of reciprocal chromosomal rearrangement t(15;17), which produces an oncogenic protein. We herein describe a 71-year-old man having cellulitis with leukocytopenia as a first sign of acute promyelocytic leukemia. Dermatologists and hematologists should keep in mind that patients with a hematologic malignancy, such as acute promyelocytic leukemia, can develop cellulitis with leukocytopenia.

Introduction

Individuals with a hematologic malignancy may have an immunosuppressive condition and develop cutaneous or invasive bacterial infections [1]. The infections may be a first sign of a malignancy or a sign of a relapse [2]. Acute promyelocytic leukemia (APL; acute myeloid leukemia M3) is caused by balanced reciprocal chromosomal translocation t(15;17), which produces an oncogenic protein PML-RAR α by fusion of the promyelocytic leukemia gene (*PML*) and the retinoic acid receptor α gene (*RARA*) [3]. APL is created by a blockage of differentiation, resulting in overproduction of immature myeloid cells of promyelocytes in the bone marrow [3]. We herein report a 71-year-old man with cellulitis as a first sign of APL.

Case Report

A 71-year-old man was referred to us on October 2011 with a painful eruption on the right thigh that had appeared 12 days earlier. A physical examination revealed a swollen and painful erythematous lesion with an elevated temperature (38.6°C) on the right thigh ([fig. 1](#)). We diagnosed the lesion as cellulitis. Laboratory blood examination results were as follows: white blood cell count 1,300/μl with neutrophils 18.4% (band neutrophils 10.0% and segmented neutrophils 8.4%), lymphocytes 56.0%, monocytes 0.3%, eosinophils 0%, basophils 0%, metamyelocytes 1.3% and leukemic cells 24.0%; red blood cells $3.29 \times 10^6/\mu\text{l}$; hemoglobin 11.5 g/dl; platelets $11.9 \times 10^4/\mu\text{l}$; C-reactive protein 18.526 mg/dl; soluble interleukin-2 1,249 U/ml; ferritin 607 ng/ml; C3 170 mg/dl; C4 36 mg/dl; CH50 73.8 U/ml; fibrinogen 632 mg/dl; fibrin degradation product 24.1 μg/ml; antithrombin III 109%; thrombin-antithrombin III complex 6.3 ng/ml; plasmin-α2 plasmin inhibitor complex 3.1 μg/ml; D-dimer 15.8/μg/ml, and endotoxin less than 5.0 pg/ml. Blood cultures showed no bacterial growth. G-band testing of twenty bone marrow cells showed 46,XY,t(15;17)(q22;q12) in 19 cells and 46,XY in 1 cell. Fluorescence in situ hybridization analysis identified a PML:15q22/RARA:17q21 rearrangement in 94% of the cells.

Our diagnosis was cellulitis and acute promyelocytic leukemia. Imipenem hydrate, cilastatin sodium, and clindamycin phosphate were immediately administered intravenously. All-*trans* retinoic acid (ATRA), idarubicin hydrochloride, and cytarabine were administered after the bacterial infection had been eliminated. One month after the administration of ATRA, a sample of bone marrow cells contained the following: myeloblasts 2.1%; promyelocytes 3.5%; myelocytes 21.8%; metamyelocytes 20.2%; band neutrophils 12.0%, and segmented neutrophils 5.6%.

Discussion

APL cells can be forced to differentiate in the presence of ATRA [3]. In this case, a bone marrow examination indicated that the APL cells differentiated into maturing cells after the administration of ATRA. Patients with leukemia are predisposed to pancytopenia, and may show infectious disorders resulting from leukocytopenia, purpura resulting from thrombocytopenia, and shortness of breath resulting from erythrocytopenia. Cellulitis may develop secondary to a bacterial infection in patients with leukemia, including APL.

Cellulitis is an inflammation of loose connective tissue of dermal and subcutaneous tissue, and is caused by bacterial infection. Most cases with cellulitis show leukocytosis. However, cellulitis without leukocytosis may be present in patients with malignant hematologic disorders as shown here, or in persons with cold cellulitis by cutaneous leishmaniasis [4] or leprosy [5].

Girmenia et al. [6] reported that their analysis of septicemias in APL patients receiving ATRA and idarubicin showed a significantly lower rate of bloodstream infections, even though patients receiving ATRA occasionally suffered life-threatening and lethal infections. The authors noted that 6 of 89 patients with APL withdrew from antileukemic treatment due to infections [6]. Infection control before and during the treatment is indispensable for individuals with APL, even though septicemias are less frequent in APL than in other leukemias.

We presented a patient having cellulitis with leukocytopenia as an initial sign of APL. Dermatologists and hematologists should keep in mind that patients with a hematologic malignancy, such as APL, can develop cellulitis with leukocytopenia.

Fig. 1. Clinical appearance of cellulitis on the right thigh.

References

- 1 Kluger N, Cartron G, Bessis D, Guillot B, Girard C: *Citrobacter koseri* cellulitis during anti-CD20 monoclonal antibody (ofatumumab) treatment for B-cell chronic lymphocytic leukaemia. *Acta Derm Venereol* 2010;90:99–100.
- 2 Oiso N, Rai S, Kawara S, Tatsumi Y, Kawada A: Genital infection as a first sign of acute myeloid leukemia. *Case Rep Dermatol* 2010;2:18–21.
- 3 de Thé H, Chen Z: Acute promyelocytic leukaemia: novel insights into the mechanisms of cure. *Nat Rev Cancer* 2010;10:775–783.
- 4 Shelleh HH, Khan SA, Al-Shayeb AM, Al-Hateeti H, Khan LA, Kasabah MN: Cold cellulitis. An unusual presentation of cutaneous leishmaniasis. *Saudi Med J* 2002;23:1002–1004.
- 5 Shelleh HH, Al-Shayeb AM, Khan SA, Khan LA, Al-Hateeti HS: Cold cellulitis: an unusual presentation of leprosy. *Saudi Med J* 2001;22:372–373.
- 6 Girmenia C, Lo Coco F, Breccia M, Latagliata R, Spadea A, D'Andrea M, Gentile G, Micozzi A, Alimena G, Martino P, Mandelli F: Infectious complications in patients with acute promyelocytic leukaemia treated with the AIDA regimen. *Leukemia* 2003;17:925–930.