PATHOLOGICA 2021;113:410-412;
DOI: 10.32074/1591-951X-204

Letter to Editor

Fibrinous and hemorrhagic pericarditis with cardiac tamponade due to acute myeloid leukemia

Magda Zanelli[1], Maurizio Zizzo[2,3], Francesca Sanguedolce[4], Maria Elena Laurenti[5], Angelo Genua[6], Marina Moretti[6], Giovanni Martino[7], Alessandra Soriano[8], Stefano Ascani[5]

[1] Pathology Unit, Azienda Unità Sanitaria Locale-IRCCS di Reggio Emilia, Reggio Emilia, Italy; [2] Surgical Oncology Unit, Azienda Unità Sanitaria Locale-IRCCS di Reggio Emilia, Reggio Emilia, Italy; [3] Clinical and Experimental Medicine PhD Program, University of Modena and Reggio Emilia, Modena, Italy; [4] Pathology Unit, Azienda Ospedaliera Universitaria "Ospedali Riuniti"di Foggia, Foggia, Italy; [5] Pathology Unit, Azienda Ospedaliera Santa Maria di Terni, University of Perugia, Terni, Italy; [6] Hematology Unit, Azienda Ospedaliera Santa Maria di Terni, University of Perugia, Terni, Italy; [7] Hematology Unit, CREO, Azienda Ospedaliera di Perugia, University of Perugia, Perugia, Italy; [8] Gastroenterology Unit, Azienda Unità Sanitaria Locale-IRCCS di Reggio Emilia, Reggio Emilia, Italy

Key words: myeloid, leukemia, pericarditis

Dear Editor,
a 64-year-old man died after four days of fever, chest pain and dyspnea. Seventeen years before, he had received intensive consolidation chemotherapy and allogenic hematopoietic stem cell transplantation (allo-HSCT) for acute myeloid leukemia (AML). More recently, three years before death, he developed, on full donor marrow, a Jak2-positive myelodysplastic/myeloproliferative neoplasm, unclassifiable (MDS/MPN-U), for which he was receiving hydroxyurea. Two days before death, blood examination showed a high white blood cell count (111,700/mm^3) with low platelet count (62,000/mm^3) and low hemoglobin level (7.9 g/dl). The bone marrow biopsy revealed AML. At post-mortem examination, abundant hemorrhagic fluid was present in the pericardial sac. The heart was enlarged and the pericardium diffusely covered by villus-like projections (Fig. 1, *left*). Death was attributed to cardiac tamponade associated with hemorrhagic and fibrinous pericarditis. Acute myocardial infarction, trauma, surgery, uremia, infections, systemic diseases and neoplasia are the most common causes of fibrinous pericarditis. Histology revealed the pericarditis was the result of AML involving the pericardium and myocardium without forming a tumor mass, but with a rather subtle infiltrate composed by single cells, often within vascular spaces (Fig. 1, *upper right*), positive for myeloperoxidase (Fig. 1, *lower right*), with partial expression of CD68PGM1 (Fig. 2) and CD56. CD34, TdT, CD3, Cd79α, glycoforin and LAT were negative. Liver, spleen, brain, lungs and kidneys showed a similar picture of "intravascular" leukemia, consistent with the diagnosis of full-blown AML with systemic involvement.
AML represents the most common form of acute leukemia in adults [1]. The treatment involves chemotherapy to induce remission, followed by consolidation treatment with hematopoietic stem cell transplantation (HSCT) to reduce the risk of relapse [2]. Extramedullary relapse after allo-HSCT is considered a rather rare occurrence, ranging from 0.65% to over

Received: September 29, 2020
Accepted: September 30, 2020

Correspondence
Maurizio Zizzo
Surgical Oncology Unit, Azienda Unità Sanitaria Locale-IRCCS di Reggio Emilia, Viale Risorgimento, 80, 42123 Reggio Emilia, Italy
E-mail: zizzomaurizio@gmail.com
Tel.: +39-0522-296372
Fax: +39-0522-295779

Conflict of interest
The Authors declare no conflict of interest.

How to cite this article: Zanelli M, Zizzo M, Sanguedolce F, et al. Fibrinous and hemorrhagic pericarditis with cardiac tamponade due to acute myeloid leukemia. Pathologica 2021;113:410-412. https://doi.org/10.32074/1591-951X-204

© Copyright by Società Italiana di Anatomia Patologica e Citopatologia Diagnostica, Divisione Italiana della International Academy of Pathology

OPEN ACCESS

This is an open access journal distributed in accordance with the CC-BY-NC-ND (Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International) license: the work can be used by mentioning the author and the license, but only for non-commercial purposes and only in the original version. For further information: https://creativecommons.org/licenses/by-nc-nd/4.0/deed.en

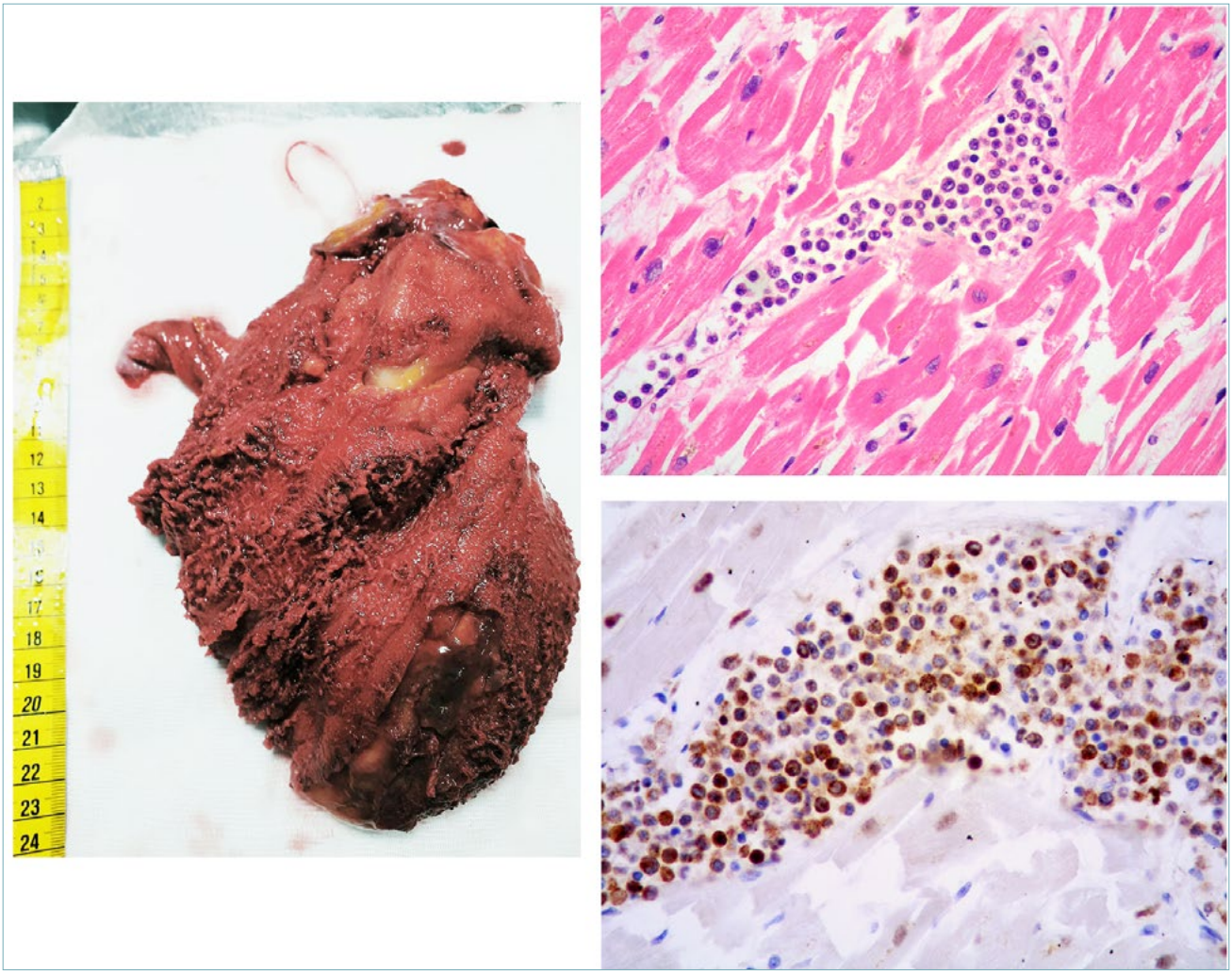

Figure 2. Figure 1. *Left* - Macroscopic view of the heart with the pericardium diffusely covered by villus-like projections; *upper right* - Single neoplastic cells identified within vascular spaces in the myocardium (HE 200x); *lower right* - Myeloperoxidase positivity of intravascular neoplastic cells (immunostain 200x).

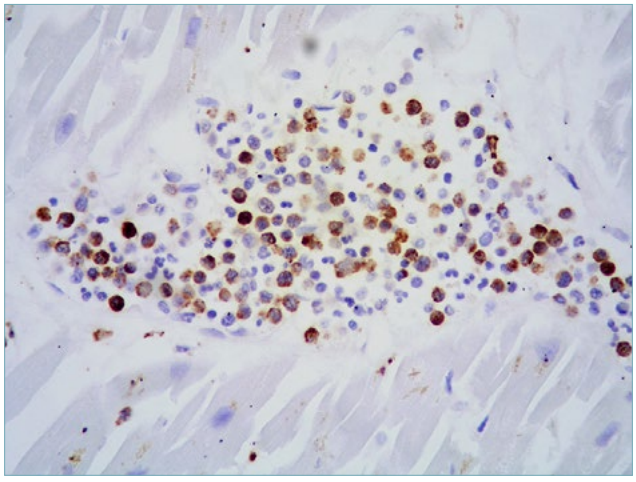

Figure 2. CD68PGM1 expression of intravascular neoplastic cells (immunostain 200x).

20%; most cases of extramedullary relapse after allo-HSCT are concomitant with bone marrow relapse [3]. Extramedullary relapse is reported to develop later than isolated bone marrow relapse and, although not frequently, it can occur even 5-10 years after HSCT [3]. Some interesting features are noted in the present case. AML developed on full donor marrow (transformed MDS/MPN-U), 17 years after allo-HSCT for AML. Post mortem showed multi-organ leukemic involvement and an impressive hemorrhagic and fibrinous pericarditis due to cardiac leukemia infiltration. Although pericardial effusions in leukemia patients are not unusual, such a severe pericarditis represents an uncommon event [4]. Neoplasms most often causing cardiac involvement include lung and breast cancer, melanoma and lymphomas.[5] Cardiac relapse after

HSCT for leukemia is seldom reported and apparently mainly in acute lymphoblastic leukemia and more rarely in AML [6-9]. Additionally, in our case multi-organ infiltration by myeloid blasts did not form any tumor mass, and therefore could not be classified as myeloid sarcoma [1]. Lastly, the intravascular pattern of AML is rather infrequently described and the differential diagnosis with other intravascular malignancies such as metastatic carcinoma or intravascular lymphoma is mandatory.

Funding

The authors have no financial ties to disclose.

Ethical approval

Local ethics committee (Comitato Etico dell'Area Vasta Emilia Nord, Italy) ruled that no formal ethics approval was required in this particular case.

Informed consent

Written informed consent was obtained from patient's relatives for publication of this case report and any accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal.

References

1 Swerdlow SH. WHO classification of Tumours of Hematopoietic and lymphoid tissues, 4th ed. Lyon, France: International Agency for Research on Cancer 2017.

2 Finn L, Sproat L, Heckman MG, et al. Epidemiology of adult acute myeloid leukemia: impact of exposures on clinical phenotypes and outcomes after therapy. Cancer Epidemiol 2015;39:1084-1092. https://doi.org/10.1016/j.canep.2015.09.003

3 Clark WB, Strickland SA, Barrett AJ, et al. Extramedullary relapses after allogenic stem cell transplantation for acute myeloid leukemia and myelodysplastic syndrome. Haematologica 2010; 95:860-863. https://doi.org/10.3324/haematol.2010.025890

4 Sampat K, Rossi A, Garcia-Gutierrez V, et al. Characteristics of pericardial effusions in patients with leukemia. Cancer 2010;116:10.1002/cncr.24946. https://doi.org/10.1002/cncr.24946

5 Goldberg AD, Blankstein R, Padera RF. Tumors metastatic to the heart. Circulation. 2013;128(16):1790-4. https://doi.org/10.1161/CIRCULATIONAHA.112.000790

6 Wright TL, Bardy PG, Disney P, Moore S, Horvath N. Isolated cardiac recurrence of acute lymphoblastic leukemia characterized by t(11;19) two years after unrelated allogenic bone marrow transplantation. Cancer Genet Cytogenet. 2002;137:146-149. https://doi.org/10.1016/s0165-4608(02)00559-9

7 Chang K, Kim DY, Lee KH, et al. An isolated cardiac relapse after allogenic hematopoietic stem cell transplantation for acute lymphoblastic leukemia. Korean J Intern Med 2017;32:753-757. https://doi.org/10.3904/kjim.2015.115

8 Facenda-Lorenzo M, Sanchez-Quintana A, Quijada-Fumero A, et al. Cardiac relapse of acute myeloid leukemia after allogenic hematopoietic stem cell transplantation. Case Rep Oncol Med 2016;2016:5091021. https://doi.org/10.1155/2016/5091021

9 Wong R, Durand JB, Luna MA, et al. Images in cardiovascular medicine. constrictive pericarditis in a patient with relapsed acute myelogenous leukemia after allogeneic bone marrow transplantation. Circulation 2004;109:e146-149. https://doi.org/10.1161/01.CIR.0000121315.05592.CE