Myelomastocytic blast cell crisis in resistant tyrosine kinase inhibitor chronic myelogenous leukemia: Case report and review of literature

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Abstract

The case of a 29 year-old male diagnosed with high-risk chronic myeloid leukemia (CML), resistant to the 3 tyrosine kinase inhibitors (TKIs) available for initial treatment, who eventually developed a rare form of blast crisis (BC) with myelomastocytic differentiation is reported.

Background

CML has a 3-phase behavior including a chronic phase (CP), an accelerated phase (AP), and BC, whose clinical presentation, prognosis, and treatment are substantially different.

The BC with mastocytic differentiation is an extremely rare condition: only 2 cases have been reported in the literature worldwide.

Objective

To present a myelomastocytic BC in a patient with CML treated at the Instituto Nacional de Cancerología (INC), a leading cancer treatment center in Colombia.

Case Description

A 29 year-old male diagnosed with CML in high-risk CP was treated at the INC since February 2010. Treatment was started with imatinib 400 mg achieving a hematological response in the second month but with no cytogenetic response in the follow-up at 18 months. It was possible to elucidate that treatment was changed to dasatinib in March 2013 having previously verified the lack of cytogenetic response documenting a level of BCR-ABL transcription of 6.3%, after which period the patient unfortunately received no treatment for 8 months due to insurance issues. In September 2016, a BCR-ABL transcription level of 58% was documented; initiating treatment with nilotinib was then decided.

In March 2017, progression to BC of myeloid origin was diagnosed. A bone marrow (BM) study documented 72% of blasts with karyotype without growth of metaphases. The concomitant infiltrative cutaneous involvement, lytic bone lesions, and hypercalcemia as an oncological emergency for which the use of zoledronic acid was required, were striking. **Image 1**

He received the induction with the 7 + 3 chemotherapy protocol including bosutinib for 14 days, and following several infectious and metabolic complications, 29% blasts and 46% of cells with basophilic *versus* mast cell characteristics were documented through BM flow cytometry **Image 2**.

A basophilic transformation *versus* an aggressive systemic mastocytosis with a clonal, non-mastocytic hematological disorder was suspected. Serum tryptase levels and detection of the KIT D816V mutation were requested, but not reported. Treatment with CLAG M was proposed. However, the patient died promptly because of central nervous system (CNS) bleeding, severe thrombocytopenia, and hyperleukocytosis.

Image 3

Image 1

Image 2

Image 3

Discussion

As a result of the rarity of this condition, there are no treatment guidelines in this scenario. It is assumed that patients with this clinical presentation die promptly after diagnosis. Reporting unusual BC presentations is necessary to define treatment strategies, even those supported by retrospective studies.

Summary

We present a patient diagnosed with CML, resistant to the 3 TKIs available for initial treatment and progressing to blast cell crisis, whose tests showed the existence of a population with mast cell differentiation that was difficult to differentiate from the blast cell population. After a rescue plan with chemotherapy including bosutinib for myeloid blast crisis, the patient died because of CNS bleeding. Proceeding with a scheme based on cladribine as a second rescue was not possible.

References

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