Autoimmune hemolytic anemia in a patient with chronic myeloid leukemia: Case report.

BENZINEB Brahim*, BELHADEF Hanane, CHEKKAF Ismahane, MESLI Naima.

Centre hospitalo-universitaire de Tlemcen, Algeria.

ABSTRACT

Autoimmune hemolytic anemia is an unusual complication in chronic myeloid leukemia on Imatinib. In this case report, it had appeared in 76 year old male patient with major molecular response treated by Imatinib. During the etiological research, we had kept the drug or idiopathic causes. We had treated the patient as idiopathic autoimmune hemolytic anemia without Imatinib interruption and we had noted an improvement in anemia without losing the major molecular response.

KEYS WORDS: CML, AIHA, Imatinib.

INTRODUCTION:

Autoimmune hemolytic anemia (AIHA) is a heterogeneous disease [1], due to the destruction of red blood cells by auto-antibodies. It can be idiopathic as it can be secondary to an infectious diseases, drugs, connective tissue disease, solid cancer or lymphoid neoplasm [2]. AIHA is characterized by the presence of anemia, increased of reticulocytes rate, indirect hyperbilirubinemia and the positivity of the direct antiglobulin test (DAT) [2, 3].

Chronic myeloid leukemia (CML) is a chronic myeloproliferative neoplasm [4]. The gold standard therapy remains the Tyrosine kinase inhibitors (TKI). The first TKI approved in CML was Imatinib [5]. The CML can be enameled of many complications and Imatinib is responsible of some adverse events [6]. In both cases, the occurrence of AIHA is unusual. In this work we report a case of AIHA that occurred during the follow-up of a CML patient treated by Imatinib.

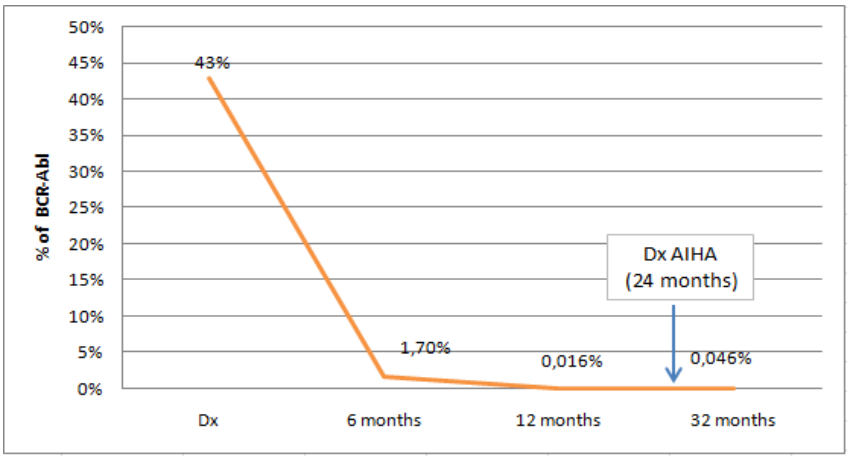
CASE PRESENTATION:

A 76 year old male patient with arterial hypertension. He had been followed for CML in chronic phase since March 2019. He was treated by Imatinib at a dose of 400 mg/day. After 6 months, we obtained a sub-optimal response with a BCR-Abl transcript estimated at 1.7%. **Figure 1** A year later, the major molecular response (MMR) had been obtained with a BCR-Abl transcript of 0.016%. **Figure 1** In November 2021, the patient had presented for asthenia, pallor and jaundice. The CBC results indicated a severe normocytic normochromic anemia at 6.5 g/dL, White blood cell, neutrophil and lymphocyte counts were normal. We temporarily interrupted Imatinib. The reticulocytes rate had been 160 G/L; the indirect hyperbilirubinemia; the high level of LDH and DAT showed anti-IgG without anti-C3 confirm the warm AIHA. Cytological analysis of the blood smear did not find abnormal cells or Gumprecht shadows. The immunological assessment, the HIV and HCV tests were negative. The chest CT scanner, abdominal and pelvic ultrasound had been normal. The patient had been treated by 1.5 mg/kg/day corticosteroid *PO*. **Figure 2** Two weeks later, we had reintroduced back Imatinib at 400

*Tel: 00213674523685; Fax: 0021343410429; E-mail address: Benzineb.brahim@yahoo.fr

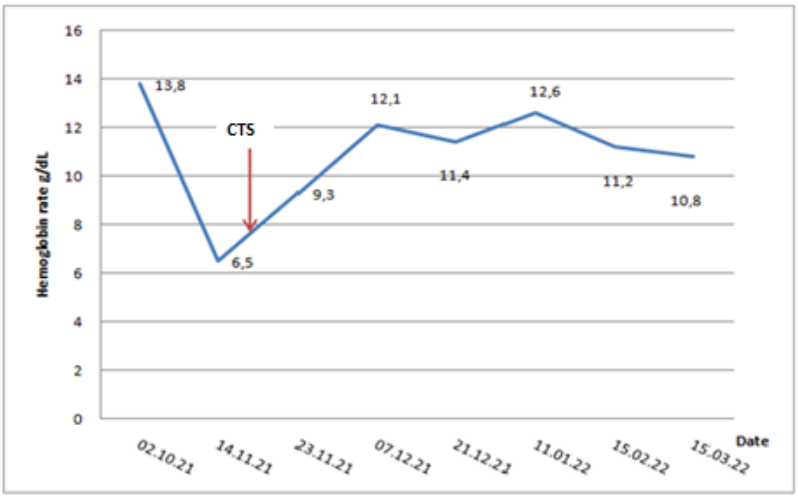
mg/day. During follow-up, we have noted an improvement in anemia. After 04 weeks of corticosteroid therapy, the hemoglobin level was 11.4 g/dL, **Figure 2** followed by a slower taper of doses. We reached the dose of 1mg/kg/day by March 2022 and the hemoglobin level was 10.8 g/dL. **Figure 2** Thus, we carried out a molecular evaluation, and we found that the patient is still in MMR with a BCR-Abl transcript at 0.047%. **Figure 1**

Figure 1: BCR-Abl rate evolution.



Dx: Diagnosis

Figure 2: Hemoglobin level evolution.



CTS: Corticosteroid therapy.

DISCUSSION:

The AIHA is characterized by the presence of anemia, the biological signs of hemolysis and a positive direct antiglobulin test, the warm AIHA is defined by DAT showed IgG with or without anti-C3 [7]. AIHA can be idiopathic as it can be secondary to an infectious disease, connective tissue disease, medication, solid cancer or hematological malignancy [7]. Lymphoid malignancies and especially chronic lymphoid leukemia are the major causes of AIHA secondary to malignant hemopathy [8]. AIHA

is a rare and unusual complication in CML. On the other hand, the current standard treatment for CML is TKIs. Patients will need to take their medication daily and there is evidence that Imatinib interruption can affect treatment response [9]. In a systematic review, Tahseen Hamamyh et al found that AIHA occurs after CML diagnosis [10]. Xiang Li et al reported a case where AIHA preceded the disease [11]. Generally, AIHA appears in patients treated by an allogeneic bone marrow transplant [10]. Alessandro et al reported 02 cases of AIHA in CML treated with Interferon [12]. The AIHA is unusual complication of Imatinib[6]. For this, we had suggested that the AIHA was idiopathic without being related to either Imatinib or CML, moreover, he was in MMR, and we have treated it as such. Discontinue the suspected drug is recommended in the drug induced immune hemolytic anemia, the benefit of corticosteroid is unclear in this disease. In lymphoid neoplasm's AIHA. The choice between AIHA therapies only or in addition with anti-lymphoma therapy should consider the lymphoma type and remission status. In solid organ neoplasia, the surgery is the recommended approach [13]. The first-line treatment of idiopathic AIHA is based on corticosteroid therapy 1 to 1.5 mg/kg/day for at least 2 weeks followed by a slow reduction [7]. The goal of treatment is to increase the level of hemoglobin and slow down the phenomenon of hemolysis, which improves the life quality of patients. Our patient was sensitive to corticosteroid therapy and we have been able to increase the hemoglobin level to 11.5 g/dL. The impact of AIHA on CML treated by ITK is unknown. In 2020, Xiang Li et al reported a case of AIHA with CML treated by Imatinib. Two years after the diagnosis, the patient died of severe infection [11]. On the other hand, it is worth to mention that the patient underwent splenectomy followed by Imatinib, although it is known that these two means increase the risk of infection [7, 14].

CONCLUSION:

AIHA is an uncommon complication in CML patients on Imatinib. So in their coexistence, it is wise to eliminate other causes of AIHA, before interruption of Imatinib, in order to not compromise the prognosis of CML. Moreover, the interruption of Imatinib can have harmful consequences on therapy response.

COMPETING INTERESTS:

The authors have stated that they have no conflicts of interest.

AUTHORS' CONTRIBUTIONS

Author BB designed the study, wrote the first draft of the manuscript and managed the literature searches. All authors read and approved the final manuscript.

REFERENCE:

1. Barcellini W, Fattizzo B, Zaninoni A, Radice T, Nichele I, Di Bona E *et al*. Clinical heterogeneity and predictors of outcome in primary autoimmune hemolytic anemia: A GIMEMA study of 308 patients. Blood. 2014; 124: 2930–2936.
2. Wilma Barcellini and Bruno Fattizzo. The Changing Landscape of Autoimmune Hemolytic Anemia. Frontiers in Immunology. 2020; 11: 946.

3. Barcellini W. New insights in the pathogenesis of autoimmune hemolytic anemia. Transfus Med Hemother. 2015; 42:287–293.
4. Shallisa RM, Wang R, Davidoff A, Ma X, Podoltsev NA, Zeidan AM. Epidemiology of the classical myeloproliferative neoplasms: The four corners of an expansive and complex map. Blood Reviews. 2020; 42: 100706.
5. O'Brien S, Guilhot F, Larson RA, Gathmann I, Baccarani M, Cervantes F et al. Imatinib compared with interferon and low-dose cytarabine for newly diagnosed chronic-phase chronic myeloid leukemia. N Engl J Med. 2003; 348: 994-1004.
6. Steegmann JL, Baccarani M, Breccia M, Casado LF, García-Gutiérrez V, Hochhaus A *et al*. European LeukemiaNet recommendations for the management and avoidance of adverse events of treatment in chronic myeloid leukaemia. Leukemia. 2016; 30: 1648–1671.
7. Ronald S. Go, Jeffrey L. Winters, and Neil E. Kay. How I treat autoimmune hemolytic anemia. Blood. 2017; 129(22):2971-2979.
8. Wilma Barcellini and Bruno Fattizzo. The Changing Landscape of Autoimmune Hemolytic Anemia. Frontiers in Immunology. 2020 ; 11 :946
9. Ganesan P, Sagar TG, Dubashi B, Rajendranath R, Kannan K, Cyriac S *et al*. Nonadherence to Imatinib adversely affects event free survival in chronic phase chronic myeloid leukemia. Am. J. Hematol. 2011; 86:471–474.
10. Tahseen Hamamyh, Mohamed A. Yassin. Autoimmune Hemolytic Anemia in Chronic Myeloid Leukemia. Pharmacology, 2020; 105: 630–638.
11. Xiang Li, Sisi Cai, Zhaodong Zhong, Hongxiang Wang, Li Wang, Yong You *et al*. Role of autoimmune hemolytic anemia as an initial indicator for chronic myeloid leukemia: A case report. Medicine. 2020; 99 (9): 1-5.
12. Andriani A, Bibas M, Callea V, De Renzo A, Chiurazzi F, Marcenò R *et al*. Autoimmune hemolytic anemia during alpha interferon treatment in nine patients with hematological diseases. Haematologica, 1996; 81:258-260.
13. Hill QA, Stamps R, Massey E, Grainger JD, Provan D, Hill A. Guidelines on the management of drug-induced immune and secondary autoimmune, haemolytic anaemia. British Journal of Haematology. 2017; 177 (2) : 208-220
14. Buzelé R, Barbierb L, Sauvanet A, Fantin B. Medical complications following splenectomy. Journal of Visceral Surgery, 2016; 153: 277-286.

ABBREVIATIONS: AIHA= Autoimmune hemolytic anemia, **C=** Complement, **CML=** Chronic myeloid leukemia, **DAT=** Direct antiglobulin test, **IgG=** Immunoglobulin G, **MMR=** Major molecular response, **TKI=** Tyrosine kinase inhibitor.