e- ISSN 0976-0342
Print ISSN 2229-7456

International Journal of Pharmacy & Therapeutics

Journal homepage: www.ijptjournal.com

Case Report

A CASE REPORT ON CHRONIC MYELOID LEUKEMIA

Peddapalli Appa Rao[1*], KV Subrahmanyam[2*], P. Sandhya Rani[2], Smitha Madhuri[2], Nafisur Rahman[1]

[1]Research Centre, IMMA Labs, Hyderabad, Telangana, India.
[2]Samskruti College of Pharmacy, Kondapur, Ghatkesar, R.R District, Hyderabad, Telangana, India.

ABSTRACT

Chronic myelogenous leukemia (CML), also known as chronic myeloid leukemia, is a myeloproliferative disorder characterized by increased proliferation of the granulocytic cell line without the loss of their capacity to differentiate. Consequently, the peripheral blood cell profile shows an increased number of granulocytes and their immature precursors, including occasional blast cells. CML progresses through three phases: chronic, accelerated, and blast. In the chronic phase of disease, mature cells proliferate; in the accelerated phase, additional cytogenetic abnormalities occur; in the blast phase, immature cells rapidly proliferate. CML has three phases: chronic, accelerated, and blastic. Symptoms vary depending on the phases of CML. Tyrosine kinase inhibitors (TKIs) are the initial treatment of choice for most chronic myelogenous leukemia (CML) patients. Imatinib is one of the first TKIs approved for patients with chronic myelogenous leukemia; second-generation TKIs have shown greater efficacy and response compared to imatinib. We report one such case of chronic myeloid leukemia in a 66 years old male who was diagnosed with CML and who was treated by Dr. Appa Rao with the protocol involving Immunonutritive therapy.

Key Words:- Chronic myeloid leukemia, philadelphia chromosome, hyperleukocytosis, Immunonutritive therapy.

Access this article online

Home page: http://ijptjournal.com/

DOI: http://dx.doi.org/10.21276/ijpt.2017.8.3.6

Quick Response code

Received:25.06.17 **Revised**:12.07.17 **Accepted**:15.07.17

Corresponding Author

Peddapalli Appa Rao
Research Centre, IMMA Labs, Hyderabad, Telangana, India.

Email:- vatavapparao@gmail.com

INTRODUCTION

Leukaemia is a blood cancer. Blood cells are made in the bone marrow. The bone marrow is the soft inner part of some of the bones. In most types of leukaemia, abnormal white blood cells are made in the bone marrow. These cells can get into the bloodstream and circulate round the body. They do not develop properly and so do not work normally. They don't give the protection from infection that they should. Because there are too many of these abnormal white blood cells, they stop the bone marrow producing enough healthy blood cells. They can also build up in the lymph nodes and spleen and cause swelling. They may also cause problems in the liver and central nervous system.

There are several types of leukaemia. They are divided into two main groups:

1. Acute leukaemia 2. Chronic leukaemia

Chronic myelogenous leukemia (CML), also known as chronic myeloid leukemia, is a myeloproliferative disorder characterized by increased proliferation of the granulocytic cell line without the loss of their capacity to differentiate. Consequently, the peripheral blood cell profile shows an increased number of granulocytes and their immature precursors, including occasional blast cells. CML progresses through three phases: chronic, accelerated, and blast. In the chronic phase of disease, mature cells proliferate; in the accelerated phase, additional cytogenetic abnormalities occur; in the blast phase, immature cells rapidly proliferate (PDQ Adult Treatment Editorial Board, 2017; Sawyers CL, 1999).

Symptoms

CML has three phases: chronic, accelerated, and blastic. Symptoms vary depending on the phases of CML

Chronic phase. It's the earliest stage and the easiest to treat. Mostly patients are asymptomatic.

Accelerated phase. During this period, the number of blood cells that don't work right increases. Symptoms include : Lethargy, fever, bruises, night sweats, shortness of breath, weight loss, increased appetite, swelling or pain on left side (which could be a sign of an enlarged spleen), arthralgia.

Other symptoms may include stroke, changes in vision, ringing in ears, and prolonged erections.

Blastic phase. The leukemia cells multiply and crowd out healthy blood cells and platelets. In this stage, more severe symptoms are seen, including: Infections, Bleeding, Skin changes including bumps, tumors, Swollen glands,Bone pain (Anonymous 1).

The diagnosis of CML is based on the histopathologic findings in the peripheral blood and the Philadelphia (Ph1) chromosome in bone marrow cells. The workup for CML consists of the following: CBC with differential, Peripheral blood smear, Bone marrow analysis.

Blood count and peripheral smear findings

Total WBC count 20,000-60,000 cells/µL, with mildly increased basophils and eosinophils. Mild to moderate anemia, usually normochromic and normocytic. Platelet counts low, normal, or increased. Leukocyte alkaline phosphatase stains very low to absent in most cells. Leukoerythroblastosis, with circulating immature cells from the bone marrow. Early myeloid cells (eg, myeloblasts, myelocytes, metamyelocytes, nucleated red blood cells)

Bone marrow findings

Ph chromosome (a reciprocal translocation of chromosomal material between chromosomes 9 and 22). *BCR/ABL* mutation. Hypercellularity, with expansion of the myeloid cell line (eg, neutrophils, eosinophils, basophils) and its progenitor cells. Megakaryocytes are prominent and may be increased. Mild fibrosis in the reticulin stain

Other laboratory abnormalities include hyperuricemia, which is a reflection of high bone marrow cellular turnover, and markedly elevated serum vitamin B-12–binding protein (TC-I). The latter is synthesized by the granulocytes and reflects the degree of leukocytosis.In all three phases, supportive therapy with transfusions of red blood cells or platelets may be used to relieve symptoms and improve quality of life. The major goal of treatment during this phase is to control symptoms and complications resulting from anemia, thrombocytopenia, leukocytosis, and splenomegaly (Hochhaus *et al*., 2017; Imatinib Changed Everything, 2017)

General treatment recommendations for chronic myelogenous leukemia

Tyrosine kinase inhibitors (TKIs) are the initial treatment of choice for most chronic myelogenous leukemia (CML) patients (Baccarani *et al*., 2009) Imatinib is one of the first TKIs approved for patients with chronic myelogenous leukemia; second-generation TKIs have shown greater efficacy and response compared to imatinib (Tang *et al*., 2011). Compared with imatinib, the second-generation TKIs nilotinib and dasatinib produce significantly higher rates of major molecular response (MMR) and complete cytogenetic response (CCyR), as well as lower rates of disease progression (Larson *et al*., 2012; Kantarjian *et al*., 2012). Higher-dose imatinib (600 or 800 mg), if tolerated well, was shown to result in faster and higher CCyR and MMR early on, but no difference in response rates was evident at 12 months (Hochhaus *et al*., 2002; Francis *et al*., 2013; Synribo, 2011).

CASE PRESENTATION

A 66 year old male patient presented with history of increasing fatigue and abdominal fullness with accompanying loss of appetite in September 2013. There was no history of fever, jaundice or bleeding manifestations. There was no history of any antecedent hematologic disorder. There was no palpable spleen. Physical examination was otherwise unremarkable. Patient was adviced for routine investigations (routine urine examination, bleeding time, clotting time, serum creatinine, blood urea, ESR and complete blood picture). All reports were in normal limits except for CBP which showed incidental hyperleukocytosis. (Hemoglobin – 14.4 g/dl; Leukocyte count – 55100 cell/cc (neutrophils 56%, lymphocytes 12%, basophils 4%, myelocytes 20%, metamyelocytes 8%) and platelet count 2.18 lakhs/cc with occasional large platelets.) Chronic myeloproliferative disorder was considered in differential diagnosis and was adviced for bone marrow biopsy which revealed 90% cellularity with myeloid predominance. Mega karyocytes were increased with focal crowding and frequent dwarf forms blasts are 1% of marrow cells. Myelopoeisis shows prominence of myelocytes. Erythropoeisis is normoblastic. ME ratio is 8:1. Pearl stain shows decreased iron stores.Marrow h9;22istology, cytology and peripheral blood findings favour MPN-CML. Chromosome analysis by Fluorescense in situ Hybridisation (FISH) for philadelphia chromosome {t (9;22) q34:q11)} showes positive for philadelphia chromosome BCR/ABL in all the interphase studied. Karyotype was : 46, XY, t (9:22) (q34:q11) Cytogenetic report showed reciprocal translocation between the long arms of one of the chromosome 9 and 22, between the regions q34 and q11.2 respectively, found in all the metaphases studies suggesting of philadelphia positive chromosome complement.

Patient was diagnosed with chronic myeloid leukemia and was started on Immunonutritive therapy by Dr. Appa Rao. Patient condition has improved with immunonutritive therapy.

DISCUSSION

CML usually develops gradually, during the early stages of disease, and progresses slowly over weeks or months. Diagnosed with CML have a genetic abnormality in their blood cells called the Philadelphia (Ph) chromosome. The Ph-chromosome causes the production of an enzyme called tyrosine kinase which leads to CML. It is unclear why this genetic abnormality occurs in the first place, but there are likely to be a number of factors involved. In rare cases it may result from exposure to very high doses of radiation, either accidentally (nuclear accident) or therapeutically (to treat other cancers). Treatment will vary depending on the phase of disease, general health and age. This can involve chemotherapy, usually taken in tablet form at home. Treatment is likely to involve the use of a type of tyrosine kinase inhibitor (TKI) - which blocks the leukaemia-causing effects of a substance called a tyrosine kinase, forcing the cell to then die. A stem cell transplant may be an option for some younger patients, or patients who are intolerant or resistant to TKIs - providing them with a better chance of cure.

Various newer therapies are still under study. The protocol designed by Dr. Appa Rao is beneficial to many.

CONCLUSION

A 66yrs old male patient presented with history of increasing fatigue and abdominal fullness with accompanying loss of appetite, no history of fever, jaundice or bleeding manifestations. No history of any antecedent hematologic disorder, no palpable spleen. Physical examination was otherwise unremarkable Patient was adviced for routine investigations. CBP showed incidental hyperleukocytosis. Chronic myeloproliferative disorder was considered in differential diagnosis and was adviced for bone marrow biopsy which revealed 90% cellularity with myeloid predominance. Cytogenetic report showed reciprocal translocation between the long arms of one of the chromosome 9 and 22, between the regions q34 and q11.2 respectively, found in all the metaphases studies suggesting of philadelphia positive chromosome complement. Patient was diagnosed with Chronic myeloid leukemia. Immunonutritive therapy was initiated. Patient condition has improved with Immunonutritive therapy.

Treatment schedule and follow-up.

Injection Human normal immunoglobulin (12 mg) and histamine dihydrochloride (0.15 mcg). (Belongs to any manufacturer) 2 vials once in 3days 3 doses followed by 2vials once in a week like that 8 weeks. Aceclofenac 100mg BD for one month. Prednisilone tapperd from others and maintained 5 mg per day. Ranitidine 150 mg per day in the morning.Tomato, Banana fruit, Prawns and milk were restricted in nutrition.

ACKNOWLEDGEMENT

Nil.

CONFLICT OF INTEREST

None.

REFERENCES

Baccarani M, Rosti G, Castagnetti F, Haznedaroglu I, Porkka K, Abruzzese E, *et al*. Comparison of imatinib 400 mg and 800 mg daily in the front-line treatment of high-risk, Philadelphia-positive chronic myeloid leukemia: a European LeukemiaNet Study. *Blood*. 113(19), 2009, 4497-504.

Francis S, Lucas C, Lane S, Wang L, Watmough S, Knight K, *et al*. A population study showing that the advent of second generation tyrosine kinase inhibitors has improved progression-free survival in chronic myeloid leukaemia. *Leuk Res*, 37(7), 2013, 752-8.

Hochhaus A, Kreil S, Corbin AS, *et al*. Molecular and chromosomal mechanisms of resistance to imatinib (STI571) therapy. *Leukemia*, 16(11), 2002, 2190-6.

Hochhaus A, Larson RA, Guilhot F, Radich JP, Branford S, Hughes TP, *et al*. Long-Term Outcomes of Imatinib Treatment for Chronic Myeloid Leukemia. *N Engl J Med*. 376 (10), 2017, 917-927.

http://www.webmd.com/cancer/lymphoma/cml-need-to-know-first#2-3

'Imatinib Changed Everything': The Future Is Now More Hopeful. Medscape Medical News. Available at http://www.medscape.com/viewarticle/876942. March 9, 2017; Accessed: March 10, 2017.

Kantarjian HM, Shah NP, Cortes JE, Baccarani M, Agarwal MB, Undurraga MS, *et al*. Dasatinib or imatinib in newly diagnosed chronic-phase chronic myeloid leukemia: 2-year follow-up from a randomized phase 3 trial (DASISION). *Blood*, 119(5), 2012, 1123-9.

Larson RA, Hochhaus A, Hughes TP, Clark RE, Etienne G, Kim DW, *et al*. Nilotinib vs imatinib in patients with newly diagnosed Philadelphia chromosome-positive chronic myeloid leukemia in chronic phase: ENESTnd 3-year follow-up. *Leukemia*. 26(10), 2012, 2197-203.

PDQ Adult Treatment Editorial Board. Chronic Myelogenous Leukemia Treatment (PDQ®): Health Professional Version. 2017.

Sawyers CL. Chronic myeloid leukemia. *N Engl J Med*, 340(17), 1999, 1330-40.

Synribo (omacetaxine) [package insert]. North Wales, PA: Teva Pharmaceuticals USA, Inc. October, 2012. Ganesan P, Sagar TG, Dubashi B, *et al*. Nonadherence to imatinib adversely affects event free survival in chronic phase chronic myeloid leukemia. *Am J Hematol*. 86(6), 2011, 471-4.

Tang M, Gonen M, Quintas-Cardama A, *et al*. Dynamics of chronic myeloid leukemia response to long-term targeted therapy reveal treatment effects on leukemic stem cells. *Blood*. 118(6), 2011, 1622-31.

Cite this article:
Peddapalli Appa Rao, KV Subrahmanyam, P. Sandhya Rani, Smitha Madhuri, Nafisur Rahman. A case report on chronic myeloid leukemia. *International Journal of Pharmacy & Therapeutics*, 8(3), 2017, 130-133.
DOI: **http://dx.doi.org/10.21276/ijpt.2017.8.3.6**