Case Report

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Chronic myelomonocytic leukemia in a 72-year-old male from Nepal: A case report

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Introduction: Chronic myelomonocytic leukemia (CMML) is a rare disease of clonal hematopoietic stem cells with an inherent risk of leukemic transformation, seen in an elderly male.

Case Presentation: Herein, the authors report a case of CMML in a 72-year-old male who presented with fever and abdominal pain for 2 days with a history of easy fatigability. Examination revealed pallor and palpable supraclavicular nodes. Investigations showed leukocytosis with a monocyte count of 22% of white blood cell count, 17% blast cells in bone marrow aspiration, increased blast/promonocytes, and positive markers in immunophenotyping. The patient is planned for injection of azacitidine, 7 days cycle for a total of six cycles.

Clinical Discussion: CMML is classified as overlapping myelodysplastic/myeloproliferative neoplasms. It can be diagnosed based on a peripheral blood smear, bone marrow aspiration and biopsy, chromosomal analysis, and genetic tests. The commonly used treatment options are hypomethylating agents like azacitidine and decitabine, allogeneic hematopoietic stem cell transplant, and cytoreductive agents like hydroxyurea.

Conclusion: Despite various treatment options, the treatment is still unsatisfactory, demanding standard management strategies.

Keywords: case report, chronic myelomonocytic leukemia, hematopoietic stem cell transplant, Nepal

Introduction

As per the revised (2016) WHO classification of myeloid neoplasms and acute leukemia, chronic myelomonocytic leukemia (CMML) is a subtype of myelodysplastic/myeloproliferative neoplasms (MDS/MPN)[1]. It is an uncommon disease seen in elderly males with a poor prognosis[2,3]. It arises from the clonal proliferation of hematopoietic stem cells with an increase in monocytes and dysplasia of myeloid precursors[2,3]. The age-standardized incidence rates for CMML was 0.3[4]–0.4[5] per 100,000.

Herein we report a case of CMML in a 72-year-old elderly male. This case has been reported in line with the SCARE 2020 criteria[6].

HIGHLIGHTS

- Chronic myelomonocytic leukemia is an unusual disorder of hematopoietic stem cells.
- It is a subtype of myelodysplastic/myeloproliferative neoplasms.
- It is seen in elderly males and has an inherent risk of leukemic transformation.
- Despite various treatment options, the treatment is still unsatisfactory.

Case presentation

A 72-year-old male presented with fever and abdominal pain for 2 days. The fever was continuous in nature without chills or rigor, and was controlled by taking medications. The maximum recorded temperature was 100°F. He also had epigastric pain for 2 days, localized, nonradiating, and burning in character, with no specific aggravating or relieving factors. He also had a history of easy fatigue and decreased appetite. He was a nonsmoker and nonalcoholic with a history of chronic diseases like coronary artery disease, hypertension, and heart failure with reduced ejection fraction (20%) taking medications regularly.

On examination, the averagely built patient appeared ill but conscious, calm, and well-oriented to time, place, and person. His vital parameters were within normal limits. Pallor was present on bilateral lower palpebral conjunctiva and skin, and the right supraclavicular lymph node was palpable. Respiratory, cardiovascular, gastrointestinal, and nervous system examinations were normal.

At presentation, his hemoglobin level was 3.8 g/dl and a total leukocyte count of 41,800 cells/mm^3 with 44% neutrophils, 33% lymphocytes, and 22% monocytes (Table 1). Random blood sugar, liver, and renal functions were within normal range. Peripheral blood smear revealed normocytic normochromic anemia with leukocytosis and thrombocytosis with blast cells. On bone marrow aspiration, excess blast cells (17%) were seen and advised for bone marrow biopsy that suggested a diagnosis of

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TABLE 1

Laboratory values before and after treatment

Hematologic parameter	Result (pretreatment)	Result (after four cycles of treatment)	Reference range
Total leukocyte count (per microliter)	41,800	3200	4000–11,000
Neutrophil count (%)	44	32.9	40–80
Lymphocyte count (%)	33	54.1	20–40
Monocyte count (%)	22	7.2	2–10
Hemoglobin (g/dl)	3.8	10.3	13–17
Mean cell volume (fl)	115	106	80–100
Platelet count (per microliter)	73,000	99,000	150,000–450,000
Blast cells (%)	17	0	

CMML. Multicolor flow cytometry using CD45 versus scatter gating revealed 21.6% blast/promonocytes of myeloid phenotype with 5% mature monocytic component (Fig. 1). Myeloid/monocytic markers/maturation markers such as CD13, CD33, MPO, CD64, and CD36 were positive while immature markers such as CD38, HLA-DR, and CD117 were positive in

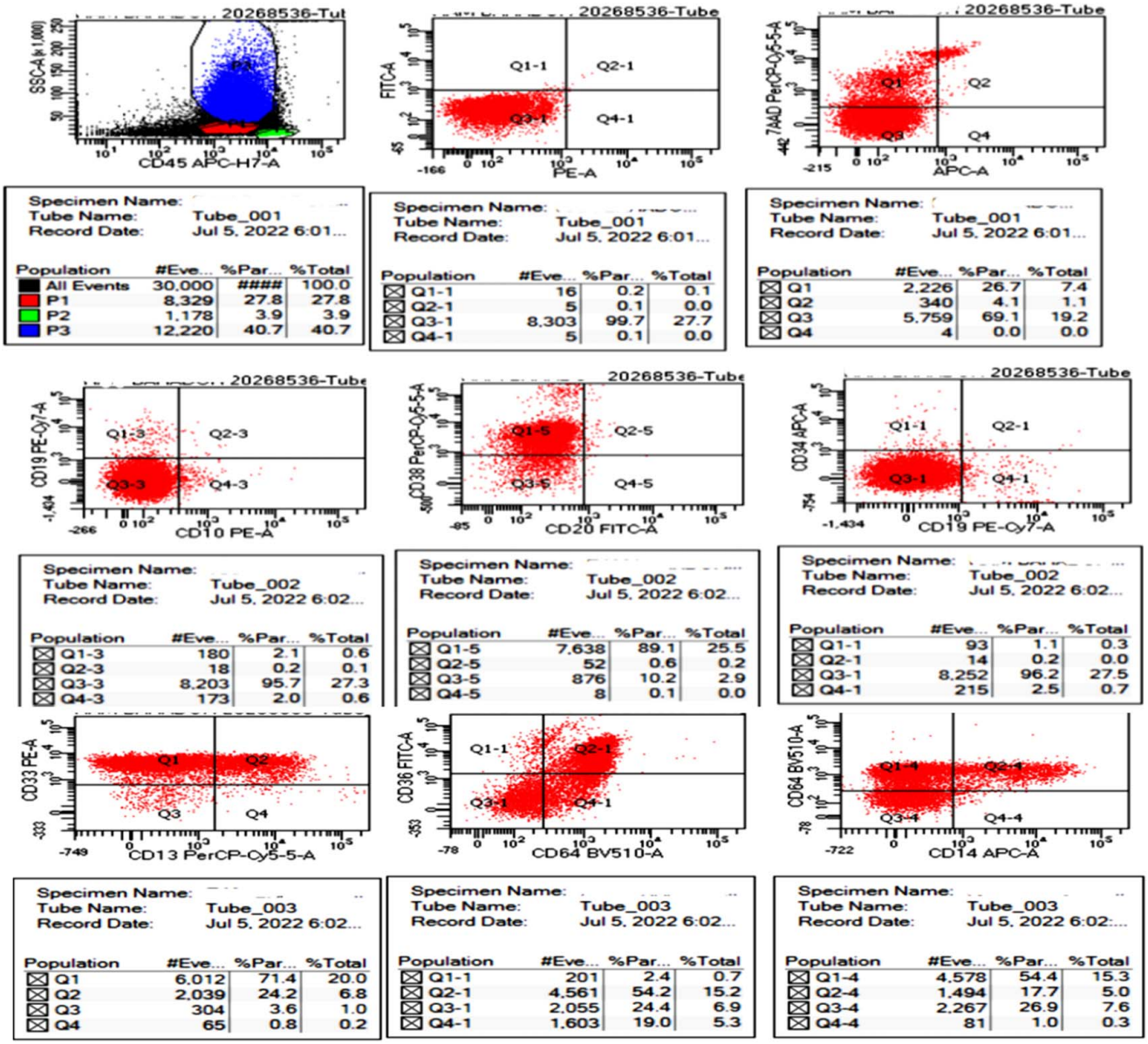

FIGURE 1. Flow cytometry report of the patient.

immunophenotyping. T-cell and B-cell markers were negative. Hence, based on the smear and immunophenotyping findings, a diagnosis of CMML with increased blast/promonocytes was made.

The patient is planned for injection of azacitidine 75 mg/m^2 for seven days cycle, for a total of six cycles with a total cumulative dose of 117 mg. The patient has completed the fourth cycle of treatment. He is improving clinically with increasing hemoglobin and platelet count, decreasing total leukocyte count, and zero blast cell.

Discussion

CMML is a clonal disorder of hematopoietic stem cells with increased monocytes in peripheral blood and dysplastic features in bone marrow[1–3]. WHO has classified it under MDS/MPN according to the updated (2016) WHO classification of myeloid neoplasms and acute leukemia[1]. It is a disease of elderly males and uncommon in young adults, however, survival in young adults with CMML is higher than in elder patients[7]. Our case was also an elderly male aged 72 years. It has an inherent risk of about 15% leukemic transformation over 3–5 years[8].

CMML can present as anemia, normocytic or macrocytic, and extramedullary features like splenomegaly, hepatomegaly, and lymph node infiltration[3]. Our patient had anemia and supraclavicular lymphadenopathy. CMML can be divided into proliferative and dysplastic types which have molecular and clinical differences and the cutoff for white blood cell (WBC) count between the two types is 13×10^9/l. Based on the percentage of blasts in peripheral blood and bone marrow, it can also be classified into three subtypes, CMML-0 with less than 2% blasts in peripheral blood and less than 5% blasts in bone marrow, CMML-1 with 2–4% blasts in peripheral blood and/or 5–9% blasts in bone marrow, and CMML-2 with 5–19% blasts in peripheral blood, 10–19% in bone marrow, and/or when any Auer rods are present[1–3].

CMML can be diagnosed based on the peripheral blood smear, bone marrow aspiration and biopsy, chromosomal analysis, and genetic tests[2]. According to WHO, the diagnostic criteria of CMML[1] includes:

- Persistent peripheral blood monocytosis of 1×10^9/l or greater, with monocytes accounting for 10% or more of the WBC count.
- Not meeting WHO criteria for BCR-ABL1 CML, primary myelofibrosis, polycythemia vera, or essential thrombocythemia.
- No evidence of PDGFRA, PDGFRB, FGFR1 rearrangement, or PCM1-JAK2 (should be specifically excluded in cases with eosinophilia).
- Less than 20% of blasts within the blood and bone marrow.
- Dysplasia in one or more myeloid lineages. The diagnosis of CMML can be made even if myelodysplasia is absent or minimal if the other requirements are met.
- An acquired clonal cytogenetic/molecular genetic disorder present in hematopoietic cells or
- The monocytosis persisted for a minimum of 3 months.
- All other causes of monocytosis are excluded.

Our case had findings of monocytosis with a monocyte count accounting for 22% of WBC count, 17% blast cells in bone marrow aspiration, increased blast/promonocytes, and positive markers in immunophenotyping.

Risk stratification in CMML can be done by various prognostic models for CMML such as MD Anderson Prognostic Score (MDAPS), CMML-Specific Cytogenetic Risk Stratification (CPSS), Mayo-French Cytogenetic Risk Stratification System, Mayo Molecular Model (MMM), and CMML-Specific Prognostic Scoring System (CPSS-Mol) to name some few[2,9].

Treatment can be started after risk assessment. The commonly used agents for the treatment of CMML are hypomethylating agents like azacitidine and decitabine, with a complete remission rate of 7–17%, and allogeneic hematopoietic stem cell transplant, which is the curative treatment option but has a limited role due to its toxicity[2,8,10]. Our case is planned for a hypomethylating agent, injection of azacitidine 75 mg/m^2 for 7 days cycle, for a total of six cycles. Apart from hypomethylating agents and allogeneic stem cell transplant, low-dose cytoreductive agents like cytarabine, etoposide, and hydroxyurea are also options, among which hydroxyurea is commonly used[2].

Conclusion

CMML is an uncommon disorder of hematopoietic stem cells with overlapping features of both MDS/MPN. It is a disease in an elderly male with a bad prognosis. A curative treatment is an allogeneic stem cell transplant, while nontransplant options are hypomethylating agents such as azacitidine and decitabine, as well as cytoreductive agents such as hydroxyurea. Despite these treatment options, the treatment of CMML is still unsatisfactory, which opens the door for researchers to work on new therapeutic options.

Provenance and peer review

Not commissioned, externally peer-reviewed.

Ethical approval

NA.

Consent

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

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None.

Authors' contributions

S.G.: led data collection, concept of the study, contributed to writing the case information. S.K.: literature review, writing the initial draft, revising, and editing the manuscript. M.K.: literature review, revised, and edited the initial draft into the final manuscript. B.B.: literature review, revised, and editing the manuscript. A.A.: literature review, revised, and edited the manuscript. A.N.S.: literature review, revised, and edited the manuscript. All authors were involved in manuscript drafting and revising, and approved the final version.

Conflicts of interest disclosure

The authors declare that they have no financial conflict of interest with regard to the content of this report.

Research registration

None.

Guarantor

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