

Chronic neutrophilic leukemia: A case report

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ABSTRACT

Objectives. We present a case report of a patient with malaise, abdominal pain, and vomiting, later underwent bone marrow biopsy and found to have CNL with no genetic mutation.

Case presentation. A 40 years old male came into hospital with malaise, abdominal pain, nausea, and vomiting. Furthermore there were bilateral lymphadenopathy in the neck, hepatomegaly and moderate splenomegaly in abdominal examination. Anemia, leukocytosis and increase of Lactat Dehydrogenase (LDH) were found. Bone marrow aspiration and biopsy was performed and showed predominant neutrophil and the bone marrow biopsy showed hypercellular bone marrow with increased myeloid-neutrophil, increased myeloid erythroid ratio.

Outcome. After further investigation this patient was diagnosed with chronic neutrophilic leukemia based on bone marrow aspiration and biopsy result.

Keywords: malaise, abdominal pain, nausea, vomiting, bone marrow biopsy, lymphadenopathy, hepatomegaly, splenomegaly, anemia, leukocytosis, leukemia

INTRODUCTION

Chronic neutrophilic leukemia is a rare disease. It is part of the myeloproliferative neoplasm, with negative BCR/ABL. The incidence of this cases is estimated one new cases per million, with male predominant, and usually diagnosed at 65 years old. This disease characterized by persistent mature neutrophilia after excluding other possible causes. The clinical manifestation can be vary, from asymptomatic (only neutrophilia) and symptomatic (mild-moderate splenomegaly, lymphadenopathy) [1]. Clinical course may vary. CNL acceleration typically present as refractory neutrophilia with blastic transformation [2]. We would like to describe a 40 years old male with chronic neutrophilic leukemia.

CASE PRESENTATION

A 40 years old male came into hospital with malaise since two weeks before admission. The patient

also complaining worsening abdominal pain, nausea, and vomiting. Since two months before, the patient had recurrence fever, multiple lymph node enlargement, unintentional weight loss 15 kg, and decreased appetite.

Physical examination revealed moderately ill, underweight. Patient look pale, with bilateral lymphadenopathy in the neck. There were hepatomegaly and moderate splenomegaly in abdominal examination. There were no other lymph node enlargement.

Laboratory examination revealed Hb 6.6 g/dL, Hct 14.5%, white blood cell (WBC) count of 119,200 cells/uL, WBC differential count 0.4/0.0/94.4/2.6/2.8, platelet count 997×10^3 cells/mm³, and red blood cells (RBC) 1.82×10^6 cells/uL. Peripheral blood smear showing the predominant band and segment neutrophils, without increasing neutrophil precursor, and no dysgranulopoiesis. RBC and platelet morphology was also normal.

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There was no abnormality of liver function tests such as SGOT and SGPT also kidney function test such as ureum and creatinine. There was increase of Lactat Dehydrogenase (LDH) 535 U/L.

The patient is then planned to undergo a bone marrow aspiration and biopsy. The result of bone marrow aspiration revealed predominant neutrophil (Figure 1) and the bone marrow biopsy showed hypercellular bone marrow with increased myeloid-neutrophil, increased myeloid erythroid ratio (Figure 2 and 3). BCR-ABL and JAK2V617F mutation examination were negative.

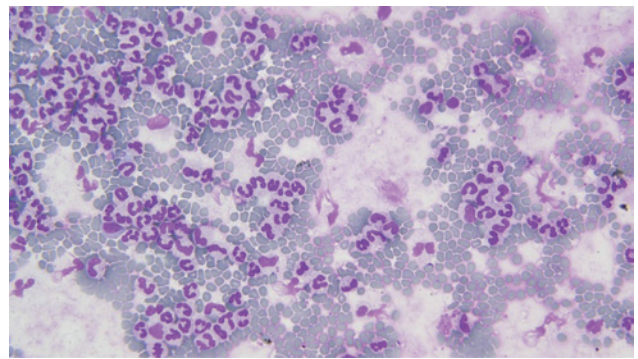
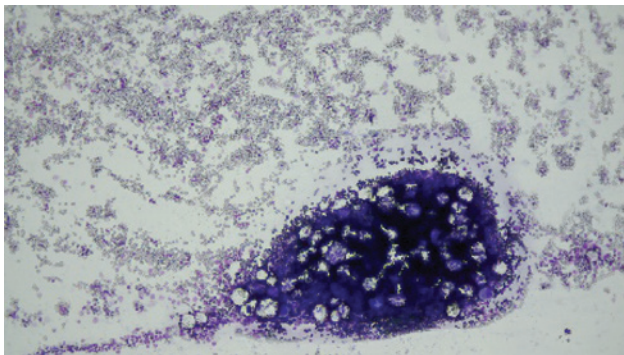
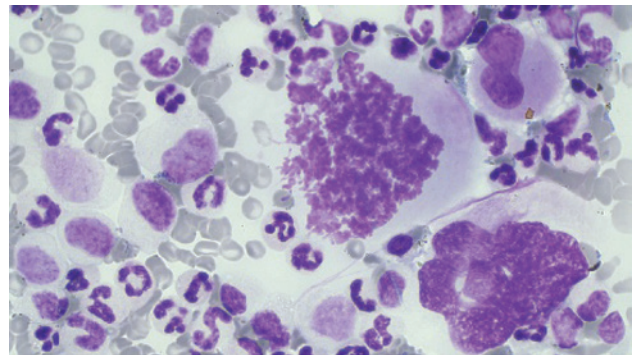


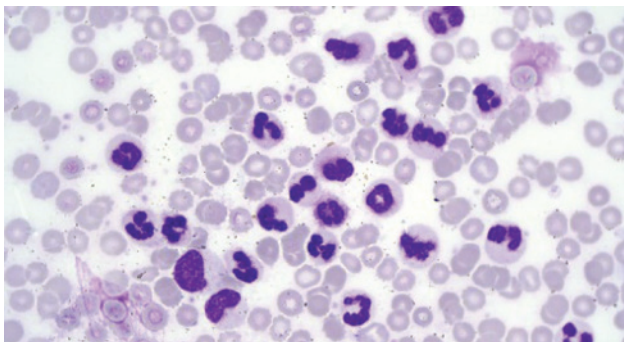
FIGURE 1. Peripheral Blood Smear showing predominant segmented neutrophil (Wright stain; 400x)



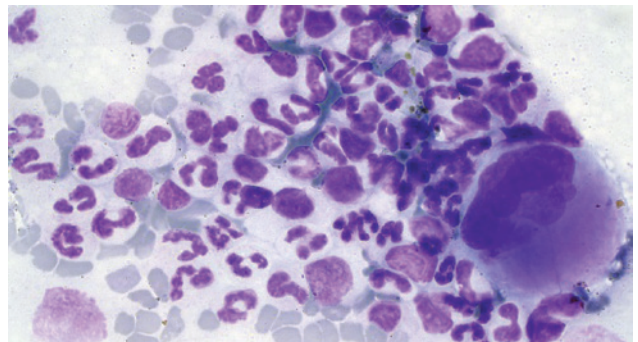
a) Wright stain; 100x



b) Wright stain; 400x



c) Wright stain; 400x



d) Wright stain; 400x

FIGURE 2. Bone marrow morphology showing (a) hypercellularity bone marrow and (b, c, d) predominantly mature neutrophil

DISCUSSION

Chronic neutrophilic leukemia (CNL) is a rare BCR-ABL negative myeloproliferative neoplasm (MPN) characterized by sustained, predominantly mature neutrophil proliferation, bone marrow granulocytic hyperplasia, and hepatosplenomegaly. It was first described by Tuohy in 1920 in a report entitled “A case of splenomegaly with polymorphonuclear neutrophil hyperleukocytosis” [3,4].

Diagnosis of CNL is based on peripheral blood leukocytosis $\geq 25 \times 10^3$ cells/uL, of which $>80\%$ are segmented neutrophils plus band forms and $<10\%$ are neutrophil precursors with rare myeloblasts [1, 3]. In this case, we found the leukocyte count at initial presentation was 119,200 cells/uL, with neutrophil count 112,284 cells/uL, and no neutrophil precursors found. Peripheral WBC, RBC, and platelet

morphology appeared normal, which is in accordance with CNL. Less 10% neutrophil precursor in peripheral blood smear and bone marrow monocytes $<10\%$ of WBC excluded the atypical chronic myelogenous leukemia [3]. In the bone marrow we found hypercellular bone marrow with increased granulopoiesis, myeloblast 2% ($<5\%$), and increased in M : E ratio.

In 2016, the WHO endorsed the presence of CSF3R T618I, or other activating CSF3R mutations, as a key diagnostic criterion for CNL, together with the absence of JAK2 and BCR ABL mutations. The JAK2 and BCR ABL mutations were negative in this case [1].

The patient in this case has a poor prognosis, as it has been known for CNL. This is consistent with Szuber et al [3] finding that, generally, CNL cases have a weak response to treatment. Patients' age

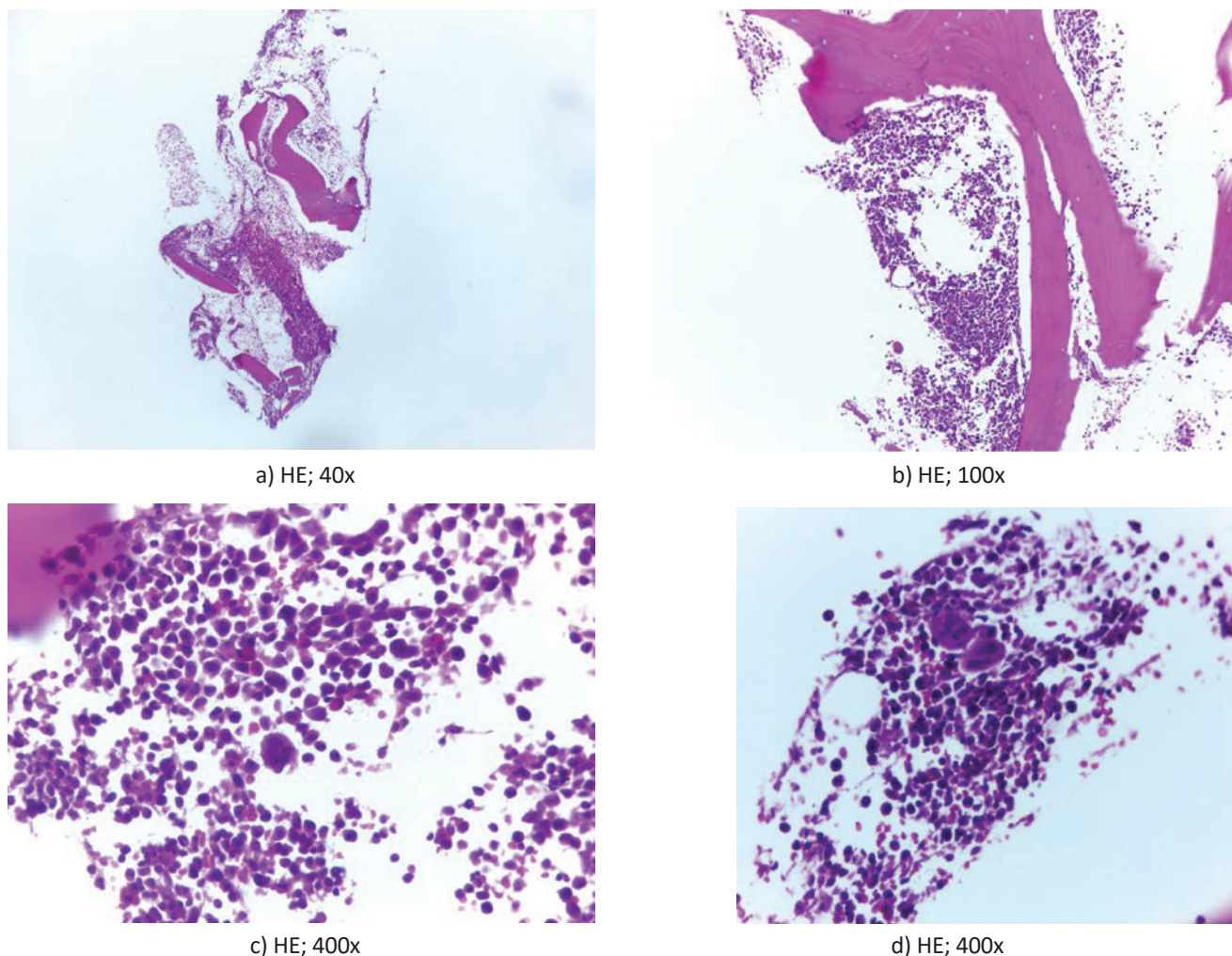


FIGURE 3. Bone marrow biopsy hypercellular marrow (a and b). Bone marrow biopsy showed increased myeloid: erythroid ratio (M:E ratio), myeloid to segment neutrophil maturation, small-sized (dwarf) megakaryocytes with scattered blast cells stained with hematoxylin-eosin (c and d)

and male gender also contribute to the prognosis. Chemotherapy such as hydroxyurea and Busulfan were commonly used as the standard treatment other than hematopoietic stem cell transplantation [3, 5]. Other agents including interferon can also be used. Given the accessibility, the only available treatment which has been given to this patient was hydroxyurea [3].

Meanwhile, CSF3RT618I mutation in this case are not evaluated as the facilities are not available in Indonesia. In the absence of CSF3RT618I muta-

tion persistent neutrophilia more than 3 months, no identifiable cause of reactive neutrophils. In this case there were no other malignancies and any identifiable source of infection [3].

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Conflict of interest. The authors declare that there is no any conflict of interest regarding the publication of this case report.

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