International Journal of Hematology
https://doi.org/10.1007/s12185-022-03321-z

ORIGINAL ARTICLE

Prognostic impacts of serum levels of C-reactive protein, albumin, and total cholesterol in patients with myelodysplastic syndromes

Hiroto Yanagisawa[1] · Hiroshi Kawabata[1,2] · Yusuke Ueda[1] · Kotaro Arita[1] · Haruka Iwao-Kawanami[1] · Tomoyuki Sakai[1] · Takafumi Kawanami[1] · Kazunori Yamada[1] · Shuichi Mizuta[1] · Toshihiro Fukushima[1] · Yasufumi Masaki[1]

Received: 8 November 2021 / Revised: 28 February 2022 / Accepted: 1 March 2022

Abstract
Various systems for predicting the prognosis of patients with myelodysplastic syndromes (MDS) have been developed. However, associations between performance status (PS) and prognosis of MDS require further investigation. To objectively assess the impact of PS on survival, we examined laboratory findings associated with PS, including serum levels of C-reactive protein (CRP), albumin (ALB), and total cholesterol (CHOL). Patients ($n = 123$; male 86, female 37; median age 74 yrs.) diagnosed with MDS or myelodysplastic/myeloproliferative neoplasms at Kanazawa Medical University Hospital between 2010 and 2020 were enrolled and grouped by cutoff values determined by receiver operating characteristic analysis: 0.44 mg/dL for CRP, 4.0 g/dL for ALB, and 120 mg/dL for CHOL. The median follow-up period was 17.6 months. Kaplan–Meier analysis revealed that overall survival (OS) in the high CRP, low ALB, and low CHOL groups was significantly shorter than in the low CRP, high ALB, and high CHOL groups, respectively. Multivariable analysis revealed that elevated serum CRP was an independent prognostic risk factor independent of gender, bone marrow blast percentage, and cytogenetics.

Keywords Myelodysplastic syndromes · Survival · Performance status · C-reactive protein

Introduction

Myelodysplastic syndromes (MDS) are a heterogeneous group of hematologic neoplasms characterized by accumulation of genetic abnormalities and morphological dysplasia in blood cells [1]. The clinical course of patients with MDS varies widely, from indolent disease with no progression in years to aggressive disease with rapid progression to acute leukemia leading to death. Therefore, clinicians should select the optimal treatment for patients by assessing their particular prognostic risks [2]. To determine the prognosis of patients, several systems have been developed, among which the International Prognostic Scoring System (IPSS) and its revised version (IPSS-R) are commonly used worldwide [3, 4]. The former sorts patients with MDS into four risk groups and the latter into five by chromosomal karyotypes, percentage of bone marrow (BM) blasts, and degree of cytopenias (neutropenia, anemia/transfusion dependency, and thrombocytopenia). In addition, various clinical factors including age [4], gene mutation [5, 6], serum ferritin level [7, 8], mean corpuscular volume (MCV) [9, 10], and red cell distribution width [11] have been reported to be associated with the prognosis of patients with MDS. Furthermore, studies have shown that performance status (PS) is inversely associated with their overall survival [12], including those who received azacitidine treatment [13], and allogeneic stem cell transplantation [14]. However, PS is estimated subjectively by attending physicians and its verification is difficult, especially in retrospective studies. In addition, when we reviewed clinical records of patients with hematological diseases in our hospitals, PS at presentation was not routinely recorded. Therefore, we decided to investigate objective values that were routinely measured, and were reported to be associated with PS, in terms of their impacts on prognosis. PS was reported to be significantly influenced by systemic inflammation, which is associated with increased levels of interleukin-6 (IL-6) and serum C-reactive protein (CRP)

✉ Hiroshi Kawabata
hkawabat@kuhp.kyoto-u.ac.jp

[1] Department of Hematology and Immunology, Kanazawa Medical University, Uchinada, Japan

[2] Department of Hematology, National Hospital Organization Kyoto Medical Center, Kyoto, Japan

Published online: 23 March 2022