as a primary endpoint in clinical trials for CML (126). Another endpoint used in CML clinical trials is genetic response, that is, the ratio of expression of BCR-ABL1 gene to the ABL1 gene or to another housekeeping gene. The term "housekeeping gene" refers to a gene used in the day-to-day metabolism of a typical or generic cell in the body, and that maintains constant expression, even when drugs are administered (127).

II. MYELODYSPLASTIC SYNDROMES

Myelodysplastic syndromes (MDS) are a group of disorders involving anemia, neutropenia, and thrombocytopenia. The anemia results in chronic tiredness and shortness of breath, the neutropenia results in increased infections, and the thrombocytopenia (low platelets) results in increased bleeding and bruising. Hence, where a patient presents with anemia, infections, and bleeding, the physician might reasonably suspect MDS. The myelodysplastic syndromes are distinguished in that they can lead to another type of cancer, namely, acute myeloid leukemia (AML) (128). Even though MDS can occur at any age, most patients are older, and just over 70% of MDS patients are age 70 or older (129).

According to Bacher et al. (130) the diagnosis of MDS is not straightforward, and may require a combination of techniques, such as cytochemistry using various stains, flow cytometry, a technique where cells are tagged with antibodies, fluorescent in situ hybridization (FISH), which involves hybridizing fluorescent nucleic acids to fixed cells, and molecular markers.

According to Barzi et al. (131) higher risk MDS patients survive only about 1.5 years, while lower risk MDS patients survive about 3–7 years. The life-threatening aspects of myelodysplastic syndrome are hemopoietic insufficiency associated with severe anemia and fatal infections due to neutropenia (low neutrophil count), plus the additional risk of leukemic transformation (132). Red blood cell transfusions may be used to treat the anemia, while platelet transfusions can be used to treat bleeding (133).

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