

Myelodysplastic Syndromes (MDS)

What are Myelodysplastic Syndromes?

Myelodysplastic syndromes (MDS) are a diverse group of diseases in which too few healthy blood cells are produced in the bone marrow.

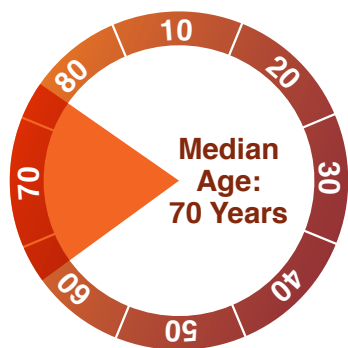


Fig. 1

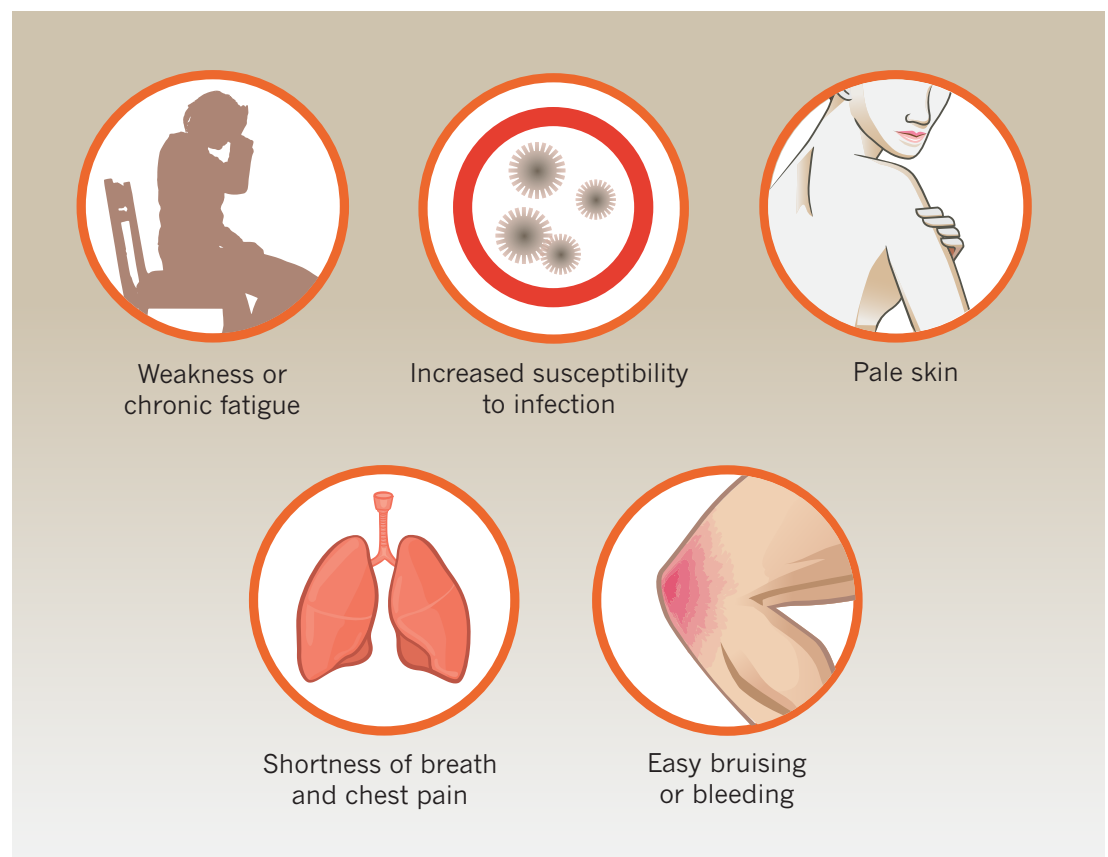
Median age of people diagnosed with MDS

Myelodysplastic syndromes (MDS) are a diverse group of diseases in which too few healthy blood cells are produced in the bone marrow. MDS is also called preleukemia because of the high risk of progression to an aggressive blood cancer called acute myeloid leukemia (AML). AML is characterized by the rapid growth of abnormal white blood cells that accumulate in the bone marrow and interfere with the production of normal blood cells.¹

The median age of people diagnosed with MDS is 70 years, with at least 10 percent of the patients being younger than 50 years of age.²

Symptoms

The symptoms of MDS are often non-specific and can be related to a reduction in the number of blood cells such as:



3. Myelodysplastic Syndromes. Cleveland Clinic Web site. https://my.clevelandclinic.org/health/diseases_conditions/bm_overview/hic_Myelodysplastic_Syndromes. Accessed October 10, 2014.

Some patients have no symptoms, and in those cases, MDS often remains undiagnosed. A diagnosis of MDS can be made following a routine physical examination accompanied by a blood test called a complete blood count along with other more specific blood tests.³

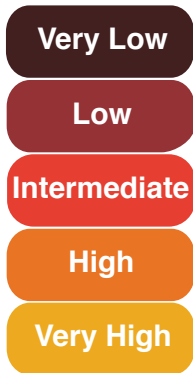


Fig. 2

Risk levels in MDS are based on both survival and progression to acute myeloid leukemia

Causes and Classification

The causes of the genetic lesions in the stem cells that lead to the development of MDS are not known. In about 10 percent of cases, MDS develops following treatment with radiation therapy or chemotherapy for other diseases. Other risk factors that may be associated with MDS are smoking and occupational exposure to solvents or agricultural chemicals.⁴

There are several methods to classify MDS patients. The most commonly used classification system today is the revised international prognostic scoring system (IPSS-R). It considers the following disease characteristics that are most significant in determining the patient's outcome⁵:

- The percentage of abnormal immature blood cells (blasts) in the blood⁵
- The number and appearance of chromosomes of the stem cells⁵
- The number and degree of blood cell reduction, evaluating hemoglobin, platelets and absolute neutrophil count⁵

According to this classification, patients are categorized into prognostic subgroups based on both survival and progression to acute myeloid leukemia (Fig. 2).

Blood Transfusions and Chronic Iron Overload

Most patients with MDS receive regular transfusions of red blood cells due to anemia.⁶ For approximately 40 percent of MDS patients diagnosed with anemia, transfusions are the only option to treat the symptoms of anemia.⁶

Repeated red blood cell transfusions can lead to elevated levels of iron in the body.⁷ Thus, MDS patients who receive transfusions for their anemia are at risk for excess iron or iron overload.⁷ Chronic iron overload is a potentially dangerous condition because excess iron can damage major organs such as the liver.⁷ Symptoms of chronic iron overload may not appear until organ damage has occurred.⁷ Therefore, it is important to identify patients at risk.⁸

Early symptoms of chronic iron overload are typically non-specific, and include symptoms commonly seen in primary care, such as fatigue, joint pain, weight loss and stomach pain.^{9,10}

Later complications of chronic iron overload in MDS patients may include cardiac failure, hepatic complications, diabetes, and damage to organs including the heart and the liver.⁷

References

1. Heaney ML, Golde DW. Myelodysplasia. *N Engl J Med*. 1999;340:1649-1666.
2. Fenaux P, Haase D, Sanz GF, Santini V, Buske C; ESMO Guidelines Working Group. Myelodysplastic syndromes: ESMO Clinical Practice Guidelines for diagnosis, treatment and follow-up. *Ann Oncol*. 2014 Sept; 25, 57-69.
3. Myelodysplastic Syndromes. Cleveland Clinic Web site. https://my.clevelandclinic.org/health/diseases_conditions/bm_overview/hic_Myelodysplastic_Syndromes. Accessed October 10, 2014.
4. Strom SS, Gu Y, Gruschkus SK, Pierce SA, Estey EH. Risk factors of myelodysplastic syndromes: a case-control study. *Leukemia*. 2005 Nov;19(11):1912-8.
5. Greenberg PL, Tuechler H, Schanz J, Sanz G, et al. Revised International Prognostic Scoring System for Myelodysplastic Syndromes. *Blood*. 2012 Sept;120(12):2454-2465.
6. Bennett JM. Consensus statement on iron overload in myelodysplastic syndromes. *Am J Hematol*. 2008;83(11):858-861.
7. Gattermann N, Rachmilewitz EA: Iron overload in MDS-pathophysiology, diagnosis, and complications. *Ann Hematol*. 2011 Jan;90(1):1-10.
8. Shander A. et al., Iron overload and toxicity: the hidden risk of multiple blood transfusions. *Vox Sanguinis*. 2009;97, 185-197.
9. Yen A. W. et al., Revisiting Hereditary Hemochromatosis: Current Concepts and Progress. *The American Journal of Medicine* 2006; 119, 391-399.
10. Kohgo Y, Ikuta K, Ohtake T, Torimoto Y, Kato J. Body iron metabolism and pathophysiology of iron overload. *Int J Hematol*. 2008 Jul; 88(1):7-15.