Myelodysplastic Syndromes (MDS): Scoring and Treatment

MDS (myelodysplastic syndrome) is a disease of the bone marrow. It happens when the cells that make blood become abnormal, which can lead to low numbers of blood cells. It is a chronic disease, meaning that it will never really go away. It can change into acute leukemia, but that is treated differently.

How is MDS scored?

MDS is given a score to determine treatment and outlook. Before you are given a score you will have tests done, like blood tests and a bone marrow biopsy.

There are two scoring systems used:

Revised International Prognostic Scoring System (IPSS-R)

This system is often used but was made before many of the modern treatments for MDS. This system is based on 5 factors:

- Percentage of blasts (immature white blood cells) in the bone marrow.
- Type and number of chromosome abnormalities in the cells.
- Level of red blood cells.
- Level of platelets.
- Level of neutrophils.

WHO Prognostic Scoring System (WPSS)

This system is based on 3 factors:

- The type of MDS from the WHO classification (see details below).
- Any chromosome abnormalities.
- If you need regular blood transfusions.

Some factors that make up the score along with these two systems are:

- How low your blood counts are.
- The results of your blood tests.
- Any genetic changes you may have.
- How well your body works each day.

You will also be given a risk group. Based on the system used, scores are given to each factor, and when added up, put MDS into 5 risk groups which are:

- Very low.
- Low.
- Intermediate.

- High.
- Very high.

The WHO system also helps predict how likely your MDS is to turn into acute myeloid leukemia (AML), which can help guide treatment. This system also has its limitations and does not include people who have had MDS as a result of having chemotherapy in the past.

What are the types of MDS?

You also need to know what type of MDS you have. The WHO system uses results of both blood tests and bone marrow biopsy results to classify the types of MDS. There are 6 types:

- **MDS with multilineage dysplasia (MDS-MLD):** Out of 2 or 3 cell types, 10% of early cells are dysplastic in the bone marrow, low count of at least 1 type of blood cell, there is a normal number of blasts in the bone marrow, and blasts are not found in the blood.
- **MDS with single lineage dysplasia (MDS-SLD):** Out of 1 cell type, 10% of early cells are dysplastic in the bone marrow, low counts for 1 or 2 types of blood cells, a normal number of blasts, and blasts are not in the blood.
- **MDS with ring sideroblasts (MDS-**RS): 15% of the early red blood cells are ring sideroblasts. There are two subtypes:
    - **MDS-RS with single lineage dysplasia (MDS-RS-SLD**: dysplasia in one type of cell.
    - **MDS-RS with multilineage dysplasia (MDS-RS-MLD):** dysplasia in more than one cell type.
    - **MDS with excess blasts (MDS-EB):** There are more blasts than normal in the bone marrow, low counts of at least one type of blood cell, and may or may not be severe dysplasia in the bone marrow. There are two subtypes:
        - MDS-EB1: 5-9% of the bone marrow is blasts, or 2-4% of the blood is blasts.
        - MDS-EB2: 10-19% of the bone marrow is blasts, or 5-19% of the blood is blasts.
        - **MDS with isolated del (5q):** The bone marrow chromosome is missing part of chromosome number 5, low counts of 1 or 2 types of blood cells, and dysplasia in at least 1 cell type in the bone marrow.
        - **MDS, unclassifiable (MDS-U):** The findings in the blood and bone marrow are not the same as any of the listed types.

MDS is also called primary or secondary. Primary is used when the cause is not known. Secondary is used when there is damage caused by chemotherapy or radiation therapy. This may also be called “treatment-associated MDS.”

What are the treatments for MDS?

MDS is a chronic disease, meaning it never really goes away. Because it is chronic, supportive care is very important. This care helps manage symptoms of MDS and helps you to keep a high quality of life. The goals of treating MDS are:

- Symptom management related to low blood counts.
- Lowering the risk of the MDS turning into acute leukemia.

Treatments that can be used are:

- Blood products and growth factors.
- Immune treatments.

- Chemotherapy.
- Stem Cell Transplants.
- Clinical Trials.

Blood Products and Growth Factors

Transfusions of red blood cells may be used to treat symptoms of anemia (low red blood cells), such as fatigue and shortness of breath. Too many blood transfusions can cause large amounts of iron to build up in the body, causing harm to organs such as the liver, pancreas, and heart. Iron chelation therapy is used to bind up the iron to remove it from the body through the urine. If your platelet count is low, you may be given platelet transfusions.

Growth factors are medications used to help your body make blood cells. Epoetin Alfa (Procrit®, Epogen®) and Darbepoetin Alfa (Aranesp®) can be used to help maintain red blood cell counts without transfusions. Filgrastim (Neupogen®, G-CSF), Pegfilgrastim (Neulasta®), and Sargramostim (Leukine®, GM-CSF) can be used to promote white blood cell counts. Romiplostim (Nplate®) and Eltrombopag (Promacta®) are being studied to see if these medications can help with low platelet counts in patients with MDS.

Immune Treatments

Lenalidomide (Revlimid®) often works well for low-grade or intermediate-risk MDS. It can stop the need for blood transfusions for some time.

Thymoglobulin® (Antithymocyte globulin [rabbit]) also called ATG is a type of immunosuppressant that can help treat subtypes of MDS in people under the age of 60. It is given through an intravenous (IV) infusion in the hospital. It is given in the hospital because it can cause serious allergic reactions. ATG may be given with Cyclosporine (Neoral®, Sandimmune®, Restasis®, Gengraf®), which also can suppress the immune system.

Chemotherapy

Chemotherapy is a group of medications used to treat the disease throughout the body. The chemotherapy that is used depends on the intensity of treatment needed, the goals of therapy, and the patient's overall health. Low-intensity chemotherapy medications are Azacitidine Oral Formulation (Onureg®) and Decitabine (Dacogen®). These medications may decrease the risk of MDS transforming into leukemia. High-intensity chemotherapy, like the chemotherapy used in the treatment of acute leukemia, includes Cytarabine (Cytosar-U®, Ara-C, DepoCyt®), Daunorubicin (Cerubidine®), and Idarubicin (Idamycin®) may be used.

Stem Cell Transplants

Allogeneic stem cell transplants (where the bone marrow comes from a donor) can be used to treat MDS. This is the only potential cure for people with MDS and is mostly used for people who are in good health, younger than 60, and who have a matched donor. In rare cases, a patient may have an autologous stem cell transplant in which they receive their own cells.

Even after a transplant, MDS can relapse. Donor leukocyte infusions (DLI) combined with Azacitidine Oral Formulation (Onureg®) chemotherapy can be used in the treatment of relapsed MDS after a transplant, depending on cytogenetics, comorbidities, and age.

Clinical Trials

You may be offered a clinical trial as part of your treatment plan. To find out more about current clinical trials, visit the OncoLink Clinical Trials Matching Service.

Making Treatment Decisions

Your care team will make sure you are included in choosing your treatment plan. This can be overwhelming as you may be given a few options to choose from. It feels like an emergency, but you can take a few weeks to

meet with different providers and think about your options and what is best for you. This is a personal decision. Friends and family can help you talk through the options and the pros and cons of each, but they cannot make the decision for you. You need to be comfortable with your decision – this will help you move on to the next steps. If you ever have any questions or concerns, be sure to call your team.

You can learn more about MDS at OncoLink.org.