

## Tailored Therapy for Treating Bone Marrow Disorders in Jehovah's Witness Patients

Treatment decisions in Jehovah's Witness patients with bone marrow disorders involve a careful assessment of potential risks and benefits. The physicians at MGUH are developing optimal treatment strategies that will benefit the Witness patient while not violating their religious beliefs.

Disorders of the bone marrow include a wide range of diseases, from benign conditions that do not require any immediate treatment, to life-threatening cancers. The bone marrow is located in the hollow spaces of the bones and serves as the "factory" for the body's production of disease-fighting white blood cells, oxygen-carrying red blood cells, and platelets that help the blood to clot. Because bone marrow disorders themselves, or their treatments, often interfere with the body's production of red blood cells and platelets, their management can be especially challenging and complex in patients who decline transfusion of blood products. To illustrate the wide spectrum of bone marrow disorders and the nuances of their treatment, we will outline four case studies of Jehovah's Witness patients treated at MGUH.

### **CASE ONE MYELODYSPLASTIC SYNDROME (MDS)**

#### **Immediately life-threatening: No**

If we continue to use the analogy of the bone marrow as a factory, in MDS, the factory is not producing the number of parts that it should, and those that are being made are often defective. Patients often have one or more of the following noted on blood tests: low white blood cells, low red blood cells (anemia), or low platelets. Often, the platelets and white blood cells that are produced do not function normally. MDS is considered a non-cancerous or benign disorder, but is often thought of as pre-malignant; as some patients diagnosed with MDS will go on to develop leukemia. To definitely diagnose MDS, a bone marrow biopsy is needed. The only known cure for MDS is a bone marrow transplant from a sibling or other matched donor, known as an allogeneic stem cell transplant.

**Patient:** A 49-year-old Jehovah's Witness female diagnosed with MDS in 2006 with a

hemoglobin of 4 (normal range is 11-14) in the setting of heavy periods.

**Treatment:** MDS is generally a disease that affects elderly patients for whom aggressive therapies such as bone marrow transplant may not be an option. Ms. A was diagnosed at an early age compared to most patients. The allogeneic bone transplant was not an option for her since it involves receiving another individual's blood precursors. Nonetheless, she has done well with supportive therapies that are used to treat patients with MDS who are ineligible for, or who do not require, bone marrow transplantation. These include

Treating patients with bone marrow disorders who decline blood transfusions is a challenge, but **certainly** not impossible.

erythropoietin (EPO) shots to stimulate production of her red blood cells, as well as injections to stop her heavy periods, which were a significant source of blood loss.

Currently, her hemoglobin is in the range of 7 – 8. Her platelets have dropped slightly below normal, but are currently more than adequate to prevent any bleeding. The injections that she is receiving involve routine monitoring of her blood levels. We draw all necessary labs in pediatric blood tubes to minimize the amount of blood that we are removing. We have become comfortable with the stability of her blood levels and have decreased the frequency of her blood draws.

### **CASE TWO DIFFUSE LARGE B-CELL LYMPHOMA**

#### **Immediately life-threatening: Usually**

DLBCL is a cancer of a subtype of white blood cells known as lymphocytes. It can affect lymph nodes as well as organs, such as the lungs or liver. Sometimes it affects the bone marrow as well. Even if DLBCL involves multiple regions of the body, treatment with chemotherapy still has the potential to cure the disease. It is one of the most common types of lymphoma seen in middle age to older adults.

**Patient:** A 74-year-old Jehovah's Witness female with high blood pressure and chronic heart failure presenting with shortness of breath and a 25 pound unintentional weight loss found to have a large mass in her chest as well as enlarged lymph nodes. Biopsy of a lymph node showed a diagnosis of DLBCL.

**Treatment:** This patient was treated with six cycles of chemotherapy. Unfortunately, chemotherapy affects the white cells, red cells, and platelets. Almost all chemotherapies will cause some decreases in the blood counts, which if severe enough, will usually be treated with a blood transfusion.

Furthermore, certain chemotherapies have a slight risk of damaging the heart. Given that Ms. B already had difficulties with her heart, one of the drugs in her chemotherapy regimen was replaced with a milder chemotherapy drug. Not only did this minimize the risk of damage to her already compromised heart, but it also decreased the chances that her blood counts would drop to critically low levels. This was especially concerning in Ms. B's case, as older patients with co-existing medical issues do not tolerate low blood counts as well as younger, perfectly healthy patients. She had some delay in her treatments while we waited for her blood counts to recover. She was also supported with EPO shots to stimulate production of her red blood cells. Four years later, Ms. B remains cancer free.

### **CASE THREE ACUTE LYMPHOBLASTIC LEUKEMIA**

#### **Immediately life-threatening: Yes**

ALL is another cancer that involves lymphocytes, and is usually seen in children and is uncommon in adults. With ALL, the lymphocytes are affected at a very early stage in their development while they are still confined to the bone marrow and blood. ALL is an aggressive type of cancer that requires intensive chemotherapy. Because of the intensity of the chemotherapy, it is a challenge to carry it out without blood transfusion support.

**Patient:** A 41-year-old, otherwise healthy Jehovah's Witness female who initially had blood counts performed as part of an

*continued on reverse*

### Tailored Therapy continued...

evaluation for shoulder pain. Blood counts showed an abnormal number of immature white blood cells.

**Treatment:** The patient was initially treated with the standard therapy for ALL at slightly lower doses to see how she would tolerate it without the help of blood transfusions. She was also given EPO injections to stimulate red blood cell production as well as IV iron infusions to ensure that her body had easy access to the nutrients needed to build red blood cells. Although she became significantly anemic her young age, and otherwise good health, allowed her to tolerate her anemia without much difficulty. She was observed in the hospital for her first cycle of treatment to allow for close monitoring of her condition. After seeing how well she tolerated her initial cycle of chemotherapy, she is receiving standard doses of the chemotherapy drugs with hopes of increasing her chances of a cure.

### CASE FOUR APLASTIC ANEMIA

**Immediately life-threatening:** Usually

AA is not cancer, but it does involve destruction of the cells in the bone marrow that are the precursors to white blood cells, red blood cells, and platelets. Thus, the term AA is somewhat of a misnomer as all cell lines are affected in this condition. The destruction may be caused by certain medications, toxins, or viruses; however, when none of these are identified, it is believed that the body's own immune system may be responsible for the destruction of these precursor cells.

**Patient:** A 57-year-old Jehovah's Witness male who developed lightheadedness and sweats while driving one day. He pre-

sented to the emergency room and was found to have significantly low white blood cells, red blood cells, and platelets. Prior to this, he had been followed for mildly low blood counts. A bone marrow biopsy was

### PHARMACOLOGIC AGENTS USEFUL IN THE MANAGEMENT OF JEHOVAH'S WITNESS PATIENTS

#### DARBEPOETIN ALFA (Aranesp)

Stimulates the bone marrow to increase red blood cell production. Dosing: Subcutaneous injection

#### EPOETIN ALFA (Procrit)

Stimulates the bone marrow to increase red blood cell production. Dosing: Subcutaneous injection

#### INTRAVENOUS IRON

Used to deliver this building block of the red blood cell to the body when absorption of oral iron is problematic or when anemia is severe enough that oral iron would take too long to be effective.

Dosing: Intravenous

#### ELTROMBOPAG (Promacta)

Stimulates the bone marrow to increase platelet production. Used in the autoimmune destruction of platelets or in patients with severe aplastic anemia.

Dosing: Oral

performed which showed AA.

**Treatment:** No drugs, toxins, or viruses were identified in Mr. C's case. Thus, initial treatments were aimed at quieting his immune system with strong immunosuppressants, but unfortunately he did not respond. Further testing was performed to see if an alternate type of treatment that focuses specifically on one aspect of the immune system, called **complement**, could work. While the testing was not strongly suggestive that this therapy would work, it was felt to have minor toxicities. Because Mr. C was unwilling

to accept blood product transfusions, we strongly felt that we had to explore any other reasonable alternatives.

He was started on the complement-blocking therapy and had a remarkable response with normalization of his red blood cell count. His platelet count remained low, so he was later started on a medication to stimulate platelet production. While his platelet levels have not normalized, this medication has helped to increase them to safer levels, and he continues to do well.

These four cases demonstrate that treating patients with bone marrow disorders who decline blood transfusions is a challenge, but certainly not impossible. Keys to success include identifying and treating conditions early. Using growth factors to stimulate production of red blood cells and/or platelets is often employed, especially when treatment involves chemotherapy likely to significantly decrease red blood cells and platelets. Age and overall health status are important factors in determining if our patient will tolerate a very low blood count.

For Witness patients, we tailor the chemotherapy treatments so that the potential for dangerously low red blood cell or platelet counts are minimized. Their anemia status will determine how specifically tailored the chemotherapy treatment will be. We continue to think "outside the box" to successfully treat Jehovah's Witness patients facing a variety of illnesses. It's easy to see why MGUH is the first choice of many patients in the Washington DC region.

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Saturday, November 15, 2014

1:00 – 3:00pm

MGUH'S Gorman Auditorium

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