BONE MARROW TRANSPLANT INS AND OUTS

Bone marrow and blood stem cell transplantation is one of the greatest success stories in cancer care. Pioneered at Fred Hutch by Dr. E. Donnall Thomas, who won the 1990 Nobel Prize in physiology or medicine for his work, and steadily refined by Hutch teams over four decades, the treatment has transformed survival rates for some leukemias and other blood disorders from zero to upwards of 90 percent. For patients with certain diseases, it remains the only therapy available with the potential to cure. For some leukemias and other blood disorders from zero to upwards of 90 percent. For patients with certain diseases, it remains the only therapy available with the potential to cure.

**Steps in the transplant process**

1. **Preparation**
   - Doctors conduct a thorough exam to confirm the best type of transplant.
   - **Autologous transplant** — Patient serves as their own stem cell donor. Most commonly used for patients with lymphomas.
   - **Allogeneic transplant** — Someone other than the patient donates stem cells. Most commonly used for patients with leukemias, blood disorders like aplastic anemia and immunodeficiencies.

2. **Stem Cell Collection**
   - Blood stem cells are collected from one of three sources:
     - Circulating, or peripheral, blood:
       - Donors get an infusion to make — and release into the blood — more stem cells. A few days later, an apheresis machine extracts 15 ounces of stem cells from the donor’s blood and returns the rest to the donor through another vein.
       - Cells can be used immediately or frozen until the patient is ready.
   - **Bone marrow:** 1-2 quarts of marrow, which rapidly replaces in a month, are drawn out of the pelvic bones with a needle.
   - **Umbilical cord blood:** About 5 teaspoons of stem cells. Most commonly used for patients with leukemias, lymphomas, and immunodeficiencies.

3. **Pre-Transplant Conditioning**
   - Next, the patient’s body is prepared to receive the new cells.
   - A Hickman — is surgically implanted to administer drugs and take blood samples without repeated needle sticks.
   - The patient’s body is prepared for the new immune system to work well.
   - Some patients undergo regimens of chemotherapy, total body irradiation or both to eliminate as much of the cancer (or other disease-causing cells) as possible and reduce the chances an allogeneic transplant will be rejected. This preparative regimen leaves patients highly vulnerable to infection.
   - Engraftment is when the donated cells (the graft) take root in the bone marrow and begin to make healthy new red blood cells, white blood cells and platelets.
   - It can take 10 days to several weeks and eventually changes the patient’s blood type to that of his or her donor.

4. **Stem Cell Infusion**
   - A few days after conditioning, patients receive stem cells intravenously, which then flow through the bloodstream and settle in the marrow. The infusion can last several minutes to several hours, depending on the volume of cells delivered.

5. **Engraftment**
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6. **Recovery**
   - The 100 days, patients get daily or weekly check-ups to track their progress and monitor for infections and other complications. It can take a year or more for blood counts to normalize and the new immune system to work well.