

Cord Blood Transplants

Cord blood transplants treat serious and often fatal diseases such as leukemia, sickle cell disease, lymphoma, immune system disorders, and neuroblastoma. Cord blood, the blood that remains in the umbilical cord after a baby is born, is rich in stem cells, an effective alternative in treating diseases that would otherwise require a bone marrow transplant.

- **Autologous transplants:** patients receive their own stem cells.
- **Syngeneic transplants:** patients receive stem cells from their identical twin.
- **Allogeneic transplants:** patients receive stem cells from their brother, sister, parent, or an unrelated donor.

Since the first cord blood transplant in 1988, thousands of cord blood stem cell transplants have been successfully performed.

Most cord blood transplants in the U.S. are performed on children or small adults because the amount of cord blood available from each unit is very small, but research is expanding to find options for larger adults as well.

Cord blood stem cells, like bone marrow, develop into red blood cells, white blood cells, and platelets. The cord blood stem cells are able to replace other cells in the body that are abnormal, weakened, or destroyed by disease.

The Transplant Procedure and Post-Transplant Activity

Pre-Transplant Activity: Prior to a cord blood transplant, patients may have surgery to remove tumors and undergo multiple rounds of chemotherapy and/or radiation. Physicians hope the chemotherapy and radiation will rid the patient's body of disease and allow the healthy, transplanted cord blood cells to take over.

Cord blood is obtained from a cord blood bank. Cord blood is originally collected from the umbilical cord at birth. A few ounces of blood are drawn from the umbilical cord and placenta, posing no risk to the child or mother. It is then kept frozen in a highly controlled environment at a public or private cord blood bank until needed. Public banks are searchable by physicians to find a match for their patients. Private banks reserve the cord blood only for the child and members of his/her family.

Transplant: The transplant process begins with the patient receiving a high dose of chemotherapy and/or radiation to eradicate any cancer that is left in the patient's body, and to ablate the patient's immune system as well. Then, the patient receives the transplanted stem cells intravenously, similar to a blood transfusion.

Post-Transplant Activity: Once the stem cells have been transplanted into the patient, they enter the bloodstream traveling to the patient's bone marrow. Through a process called "engraftment," the stem cells start to produce new white blood cells, red blood cells, and platelets. The patient is typically kept in isolation for at least two to four weeks while the engraftment process occurs, though it can take months and even years for patients' bodies to restore full immune function. Through blood tests, doctors are able to evaluate and confirm that the cancer has not returned and new blood cells are forming. All cord blood transplant patients have lowered immune systems after their procedures. Some patients may stay in specially designed hospital units designed to keep infections out, which include specialized nursing, a water purifying system, and air system with high-efficiency air filters designed to keep bacteria out and keep clean air in the unit.

Side Effects: Unfortunately, there are many side effects that could occur during the cord blood transplant process. Among them is an increased probability of infection and bleeding from the high dose of chemotherapy and radiation given prior to the transplant. Doctors give antibiotics to prevent or treat this possibility. Patients may also receive transfusions of platelets to prevent bleeding and red blood cells to treat anemia. Other short-term side effects include nausea, vomiting, fatigue, loss of appetite, mouth sores, hair loss, and skin reactions. Long-term side effects caused by the high doses of chemotherapy and/or radiation therapy given prior to the transplant may include infertility, cataracts, new cancers, and liver, kidneys, lungs, and/or heart damage.

Sources: American Cancer Society, National Cancer Institute, Leukemia and Lymphoma Society, and National Cord Blood Program



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