

Cord Blood Transplants

Cord blood transplants can be curative for malignant and genetic 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 stem cell transplant. Common types of stem cell transplants for cancer treatment include:

- **Autologous transplants:** patients receive their own stem cells.
- **Allogeneic transplants:** patients receive stem cells from a matched relative (usually a fully matched sibling) or an unrelated donor.

Since the first cord blood transplant in 1988, about 35,000 cord blood stem cell transplants have been performed.

Cord blood transplants in the U.S. are more commonly performed for children because the amount of cord blood available from each unit is small compared to other stem cell sources (marrow or blood). Adults and larger children may receive multiple cord blood units.

Cord blood stem cells, like bone marrow, develop into red blood cells, white blood cells, and platelets.

The Transplant Procedure and Post-Transplant Activity

Cord blood is obtained from a cord blood bank. Cord blood is 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, to ablate the patient's immune system, and to ensure enough room in the patient's bone marrow for the new cells. 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 closely monitored in the hospital or through daily outpatient clinic visits while the engraftment process occurs, typically a few weeks, 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 special hospital units designed to keep infections out, which include specialized nursing and an air pressure 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. As the new immune system grows, it may also attack the organs of its new host in a disease called graft versus host disease (GVHD). Cord blood transplants tend to have less GVHD than other stem cell sources. There are also potential long-term side effects caused by the transplant and the high doses of chemotherapy and/or radiation therapy given prior to the transplant.

Sources: American Cancer Society, Be the Match, Leukemia and Lymphoma Society, National Cancer Institute, National Cord Blood Program, and Parent's Guide to Cord Blood Foundation



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