

UCSD Physicians Breathe Life Into Cutting-Edge Stem Cell Procedure

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Patients living with Myasthenia Gravis (MG) may breathe easier thanks to a rare bone marrow transplant procedure performed at The UCSD/Sharp Blood and Marrow Transplant Program, the only program in the western United States that has attempted this procedure.

Myasthenia Gravis (MG) is a rare neuromuscular autoimmune disease where the body's immune system, which normally protects the body, mistakenly attacks itself. The transmission of nerve impulses to muscles is interrupted, which ultimately prevents the muscles from contracting. Without the proper nerve impulses, muscles that control breathing can't function.

"It's like dying in your own body," said Ewa Carrier, M.D., associate professor of medicine and pediatrics in the UCSD Blood and Marrow Transplant Division at UCSD's School of Medicine.

"Eventually, MG patients can't walk, can't breathe, can't swallow. The signal just doesn't go to the muscles."

This new procedure reprograms the patient's stem cells, destroying them with chemotherapy, before re-introducing purified blood-forming stem cells. After the transplant, the modified stem cells build new bone marrow, renewing the immune system with correct signaling and with cells that don't attack the body.

The Patient

The Myasthenia Gravis Foundation of America estimates only 20 out of 100,000 individuals in the country have been diagnosed with MG. However, MG is considered under-diagnosed and many more are likely affected but do not know it.

Martin Glasser, M.D., is one of the confirmed cases. Every other day for the past three years, he has visited the plasmapheresis clinic at UCSD Medical Center. Plasmapheresis is a procedure much like dialysis which is used to help MG patients feel better for short periods of time.

Glasser's disease was progressing, causing weakness in the legs, arms and diaphragm.

Plasmapheresis made breathing easier “but it’s a very crude way of keeping you alive,” said Glasser.

The Procedure

The procedure was conducted by a team consisting of Ewa Carrier, M.D., Arnold Gass, M.D., professor of medicine at Veterans Affairs San Diego Healthcare System, Geoffrey Sheehan, M.D., UCSD professor of neurosciences and myasthenia gravis specialist and David Ward, M.D., UCSD professor of medicine and Apheresis program founder.

According to the International Bone Marrow Transplant Registry (IBMTR) this rare procedure has previously been performed only three times, all at Northwestern University Hospital in Chicago.

In preparing for the transplant, Glasser’s native bone marrow was literally obliterated. Most of the T cells in the body were destroyed.

“The theory is that if the T cells are destroyed before introducing new stem cells, the new stem cells will not receive the old message to attack. After the transplant, the modified stem cells build new bone marrow, renewing the immune system,” said Carrier.

Glasser’s transplant involved harvesting 16 million of his stem cells. These cells were cleaned with a special device resulting in 8 million pure stem cells. Stem cells at this early stage of development have the greatest chance of producing a healthy line of blood cells.

After the transplant, patients must take antibiotics to protect them from infection. They cannot go to crowded places and must follow special diet requirements until the immune system is fully recovered, which takes about three months.

“There’s a possibility that there’s also some form of tissue repair going on,” said Carrier. “For example, Dr. Glasser did not have feeling in his feet before the transplant and now he has feeling in his feet again, possibly indicating that his peripheral polyneuropathy is improving as well.”

Background

The Rebecca and John Moores UCSD Cancer Center [📍](#) is one of only 40 facilities in the country, and the only one in San Diego County, to receive the Comprehensive Cancer Center designation from The National Cancer Institute (NCI).

The UCSD/Sharp Blood and Marrow Transplant Program is a joint venture between the UCSD Medical Center and Sharp Healthcare and is located at the [Moore's Cancer Center](#) [📍](#) in La Jolla. It is the only Blood and Marrow Transplantation program in the San Diego region that is affiliated with a renowned School of Medicine and accredited by the Foundation for the Accreditation of Hematopoietic Cell Therapy (FACT). This accreditation is the patient's assurance that a BMT program has passed rigorous standards regarding the qualifications and experience of staff, quality management and patient volume.

The UCSD Apheresis Program, founded by David Ward, M.D., F.R.C.P., in 1982, is the only program in North America to receive full accreditation. Now with units at both the Hillcrest hospital and the Moores UCSD Cancer Center, the program treats many different diseases with several different procedures.

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