

Cord Blood Update)

KRABBE DISEASE

BY JOHANNA HANEY

A GLIMPSE INSIDE THE DISEASE AFFLICHTING FOOTBALL HALL-OF-FAMER JIM KELLY'S SON, HUNTER

Jim Kelly, former Buffalo Bills quarterback and National Football League hall-of-famer, and his wife, Jill Kelly, were ecstatic that their new baby was on the way just weeks after Jim retired from professional football. Hunter Kelly was born in February 1998. But after Hunter's birth, he displayed irritability, stiffness and difficulty eating. Hunter's doctors told Jim and Jill that Hunter had colic. "We changed his formula, brought him to a feeding doctor and eventually he was diagnosed with cerebral palsy. But he continued to get worse, and he cried all the time," says Jim.

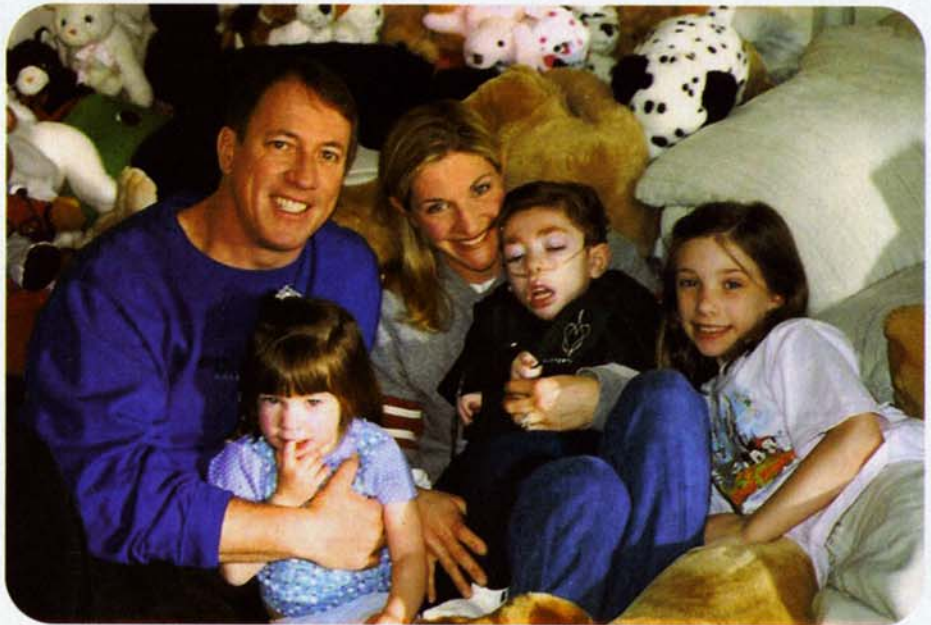
TYPICALLY, BABIES WITH KRABBE DISEASE DIE BEFORE AGE 2 WITHOUT TREATMENT. THIS IS EXACTLY WHAT DOCTORS TOLD JIM AND JILL KELLY.

After months of incorrect diagnoses and frustration, the Kellys brought Hunter to a neurologist. "They called us and asked us to come into their office. Of course, anytime they ask you to come into their office you know something is really wrong. You expect the worst," Jim says.

And they got the worst. Hunter was diagnosed with Krabbe disease. Krabbe (pronounced "crab-A") disease is a rare genetic disorder in which the enzyme galactocerebrosidase (GALC) is deficient. Without this enzyme, the white matter in the brain called myelin, which is responsible for protecting the nerves of the brain, cannot be produced. This leads to irritability, stiffness, difficulty eating, seizures, loss of motor function and, ultimately, death.

Once other developmental problems emerge, such as a baby's inability to support his head, delayed crawling, loss of the ability to smile and lack of visual focus, the disease has usually progressed too far for treatment to be of any use. Typically, babies with Krabbe disease die before age 2 without treatment. This is exactly what doctors told Jim and Jill Kelly.

"I was ticked off at the world. I didn't want to talk to anyone about it; I didn't want to share it with anyone. I was just mad that it happened to us," says Jim of his son's diagnosis. "But my wife said, 'We can't feel sorry for ourselves. We want to make a difference.' And she was exactly right."



Jim and Jill started the Hunter's Hope Foundation, a nonprofit organization that works to raise money for awareness and research into Krabbe disease. "We turned it around. We've raised millions and millions of dollars. Now we have a treatment for this disease," Jim says.

THE HOPE OF CORD BLOOD

That treatment is umbilical cord blood transplantation. Blood saved from the umbilical cord of a newborn child is rich in stem cells, which are immature cells capable of replacing entire immune systems. When these cells are transplanted into patients with Krabbe disease the stem cells rebuild the system with new, healthy cells. Cord blood also helps in the treatment of a host of other genetic disorders and cancers.

But so far, the only Krabbe patients who have been able to take advantage of this treatment did so at a devastating cost: the loss of an older sibling to the disease. Why? Krabbe disease is very difficult to

diagnose. Dr. Joanne Kurtzberg, a pioneer in Krabbe treatment, director of the Pediatric Stem Cell Transplant Program at Duke University Medical Center and director of the Carolinas Cord Blood Bank at Duke, says, "Typically, moms are told [their baby] has colic or acid reflux. In general, pediatricians don't think to test for it." She says babies aren't tested for it for quite some time because "The [parents] usually get blown off for at least 2-4 months." But once a sibling has been previously diagnosed with Krabbe disease, parents and doctors will know the risk a new child faces, will have testing done for the disease early on and can begin treatment before it's too late.

When Nick Rugari was born in May 1986, his mother, Anne, was unnerved by his frequent crying and the difficulty she had breastfeeding. At his first checkup, Nick's pediatrician told Anne he had colic and that she was being overly nervous. Another visit to the doctor for immuniza-

tions sent Nick into fits of screaming and arching his back. He started getting frequent fevers. Finally, his doctor took Anne's complaints seriously and ordered a battery of tests. 3-month-old Nick was having difficulty swallowing, spit up more often than is normal and stopped gaining weight. The tests came back normal, and Nick was diagnosed with "failure to thrive," a catch-all explanation of his eating problems. Doctors placed a feeding tube in Nick's stomach and sent Anne home with her baby.

The next 2 months brought frequent seizures. Nick lost his eyesight. Frustrated and unable to get any clear answers, Anne and her family moved to Florida, where she had family members who could help her take care of Nick on a day-to-day basis. A new pediatrician saw Nick and immediately sent him to a pediatric neurologist.

On December 23, 1986, Nick was diagnosed with Krabbe disease. In 1986, a Krabbe disease diagnosis was a death

disease in utero, the Rugaris decided to wait until their baby was born and have her tested then. "There was a 75% chance everything would be okay. We said to ourselves, 'Let's just be really positive about this pregnancy,'" Anne remembers.

Gina Rugari was born in December 1999, almost 13 years to the day that her big brother died. Doctors tested Gina for Krabbe disease immediately. In the 2 weeks before the test came back, Anne was relieved to find that Gina was a calm baby who nursed well and seemed perfectly normal.

When Gina tested positive for Krabbe disease, Anne was devastated. Her pediatrician told Anne and her husband to speak with Dr. Kurtzberg at Duke University Medical Center. After a 2-hour phone conversation, Dr. Kurtzberg said, "How fast can you get here? There's hope." Within 24 hours of their initial phone conversation with Dr. Kurtzberg, the Rugaris were making the 8-hour drive to Duke. They would be there for 6 months.

After scores of testing, including

road to transplantation with a 9-day course of chemotherapy on January 20, 2000, when she was just 5 weeks old. The chemicals coursing through her fragile veins wiped out everything in their path — red blood cells, white blood cells and platelets — to make way for the healthy stem cells to come. At the end of her chemotherapy, Gina had no safeguards against even the most innocuous germ.

Anne describes the actual transplant as anticlimactic. "It's just this little bag that looks like blood, and they put it in Gina's IV," she says. "The transplant took about 30 minutes." In the days that followed, Gina received over fifty blood transfusions while her family and doctors waited to see if she would begin to grow new cells of her own. 13 days post-transplant, she did.

But her doctors had to determine whether the new cells Gina was growing were from the donor. If even a single cell originally from Gina survived the chemotherapy, the GALC enzyme would not be present in her blood and the trans-

PRIOR TO CORD BLOOD TRANSPLANTS, A KRABBE DISEASE DIAGNOSIS WAS A DEATH SENTENCE.

sentence. Prior to cord blood transplants, Krabbe babies usually died around 14 months of age.

Doctors told Anne and her husband Nick would likely die before his first birthday, and that their best option was to place Nick in a long-term care facility. The Rugaris were told their baby didn't even know who they were. But Anne couldn't face putting her baby in a facility. "Who's going to love him?" she asked, crying. 1 year and 3 days after he was born, Nick died at home in Anne's arms. "In our heart of hearts, we know Nick knew where we with him," says Anne.

HEARTBREAKING DIAGNOSIS

Although Anne and her husband decided not to have any more children, she became pregnant again 12 years after Nick died. While it is possible to test for Krabbe

Magnetic Resonance Imaging (MRI), electroencephalograms (EEG), spinal taps, nerve conduction studies, blood studies and optic nerve examinations, the Duke team determined that a cord blood transplant could help Gina. They told the Rugaris the good news, but they needed to act fast so they could begin to look for an appropriate umbilical cord blood donor from a public bank. Anne and her husband had to decide right away if they would allow doctors to try an umbilical cord blood transplant. Although no one had tried a transplant on a baby as young as Gina, the Rugaris signed the consent form.

TREATMENT

The process began just 1 week later. Gina underwent surgery to place central lines in her chest so medication could be administered more efficiently. Gina started the

plant would be a failure. In order for doctors to more easily establish whether donor cells are growing after a transplant, patients are usually matched with umbilical cord blood donors of the opposite sex. "If the blood in Gina's body were sent to a lab anonymously, the technicians would have insisted it came from a boy," Anne marvels. In fact, recipients of umbilical cord blood take on the blood type of the donor, so a patient with type A blood could come out of a transplant with type B blood. "30 days after the transplant, Gina's body contained 100% donor cells," Anne says.

While Gina's body was working on growing these new cells, however, her Krabbe disease continued to progress. Although her blood contained normal levels of the GALC enzyme, it takes between 5 and 18 months for the enzyme



to break through the blood-brain barrier. The blood-brain barrier is a collection of tightly woven cells that prevent foreign substances from passing into the brain. Until the enzyme is established enough in the system for the brain to realize it is not a foreign substance, it cannot infiltrate the brain to start making protective myelin around nerve cells. In Gina's case, the GALC enzyme broke through the blood-brain barrier at about 6 months. In those 6 months, Gina suffered peripheral nerve damage in her legs. "She can't walk yet," says Anne, "but she can ride her tricycle!"

LITTLE MIRACLES

Gina was the youngest patient at the time to have an umbilical cord blood transplant, and, as Anne says, "Gina has changed the course of Krabbe treatment." Now Gina is helping pioneer other medical breakthroughs: she is in therapy with Dr. John McDonald, a leader in spinal cord regeneration who also works with Christopher Reeve, to help with research on finding new neural pathways to the brain that could someday lead to breakthroughs in treating paralysis.

But Hunter's Krabbe disease was not detected in time for treatment with umbil-

ical cord blood transplantation. "[The doctors] told us to take him home, make him comfortable and pretty much watch him die," Jim says.

Hunter's life isn't an easy one. He is fed through a tube, has to be on oxygen and has virtually no motor skills. "He still goes through times when he has a hard time breathing, which is why he's on oxygen all the time, he has a tremendous amount of medication he's on, and he has his physical therapy, occupational therapy and speech therapy," says Jill. "But he does a ton of things that no one would have said he would [be] able to do. He blinks once for yes and communicates with us in that way. We had to realize he's living right now, because we were just waiting for him to die all the time. It was exciting when he first started to show us I can tell you what I want. It's such an awesome miracle."

And he truly is a miracle. Hunter has outlived the life expectancy for Krabbe disease by sixfold. Jill says she is amazed at "his tenacity and his will and his fighting spirit — he's just like his dad. He's just a fighter."

And Jim has a special message for parents of every child: "Parents out there need to realize how important their kids are. It doesn't matter whether they're disabled or completely healthy. Share that special time with your kids now, because too many people take it for granted." ☺

About the author: Johannah Haney is a freelance writer in Boston and a contributing editor to ePregnancy Magazine.

HOW YOU CAN HELP

- Go to www.huntershope.org and buy a collectible Boyd's Bear, created especially for the Hunter's Hope Foundation. Proceeds help the Hunter's Hope Foundation fund research on finding a cure for Krabbe disease.
- Talk to your healthcare provider and members of Congress about expanded newborn screening.
- Find out where the nearest public umbilical cord blood bank is located and if you can donate your child's cord blood.