

# A groundbreaking collaborative procedure saves twins

When Stephanie Villers started to have contractions at just 16 weeks gestation, her doctors discovered that her twin boys, Bryce and Broderick, were suffering from twin-twin transfusion syndrome (TTTS)—a severe imbalance in the placental blood circulation in which one twin transfers his blood to the other. Broderick, the “donor” twin, had oligohydramnios, reduced urine production and growth restriction, while Bryce, the “recipient,” had polyuria, polyhydramnios, cardiac enlargement that could lead to heart failure and was at risk for developing hydrops.

TTTS occurs in about 10 percent of all monochorionic twin pregnancies in the United States, amounting to about 2,000 cases per year. Without treatment, it results in fetal demise about 80 percent of the time.

Stephanie’s doctor Lucy Bayer-Zwirello, MD, director of Maternal Fetal Medicine at Caritas St. Elizabeth Medical Center (CSEMC) in Boston, had diagnosed the TTTS and consulted with Russell Jennings, MD, director of the Advanced Fetal Care Center (AFCC) at Children’s Hospital Boston. Together, they decided that immediate intervention was needed, so Dr. Bayer-Zwirello performed a fluid reduction in the larger twin’s amniotic sac that day, reducing pressure and improving uteroplacental blood flow.

Four days later, Stephanie had a full work-up at Children’s AFCC and discussed future treatment options with Dr. Jennings. Radiologists Carol Barnewolt, MD, Judy Estroff, MD, and Susan Connolly, MD, imaged the twins to look for abnormalities or changes in their size, umbilical-artery flow, cardiac function and the amount of fluid in the bladders and amniotic sacs. While the twins’ condition was slightly improved after the reduction, an appointment at CSEMC a few days later led doctors to repeat the procedure.

Because cardiovascular damage in the recipient is a major risk of TTTS and its treatment, Seda Tierney, MD, a Children’s cardiologist, performed echocardiograms that showed that pressure from the excess amniotic fluid was dilating Bryce’s right ventricle. Meanwhile, Broderick’s risks continued to increase. If Bryce died, it could trigger a rapid change in blood pressure that can cause neurological and cardiac damage, and sometimes death, in the other twin.

By 19 weeks, despite serial amniotic fluid reductions, the situation was worsening, and AFCC surgeons were unsure how to proceed. Each case of TTTS is the result of a different vasculature in the placenta, one that is never fully visible to a surgeon. Pathways joining the twins may be artery to artery, vein to vein, or artery to vein. “The shared placental circulation presents an enormous surgical challenge and the research to date is limited,” says Dr. Jennings. “In treating TTTS, you have to balance the risk of watching and waiting against the risk of each intervention.”

Faced with rapid deterioration and increased risk of fetal complications, Drs. Jennings and Bayer-Zwirello recommended a fetoscopic laser ablation operation that would destroy the shared blood vessels. This would increase blood flow to Broderick, the smaller twin, and alleviate stress on Bryce’s heart. Based on the



Stephanie and Ernie Villers with daughter Bianca and sons Broderick and Bryce

results of the few TTTS operations of this magnitude that had been performed, there was a 75 percent chance that one twin would survive and 50 to 60 percent chance that both would survive the operation. “The odds weren’t great,” says Stephanie, “but they were worse if we did nothing.”

On April 6 of last year, Drs. Jennings and Bayer-Zwirello led a team of specialists from Children’s and CSEMC to carry out the procedure at CSEMC, becoming the first team to conduct the high-risk operation in Massachusetts. It was a success. The boys were delivered by cesarian section at 33½ weeks gestation on July 15 at CSEMC. They spent a few weeks in the Level III NICU at CSEMC then the Level II Special Care Nursery at Caritas Holy Family Hospital before going home in early August.

Jennings credits the successful outcome to the coordination of medical teams. “The AFCC is always collaborating with maternal-fetal medicine teams, but quite often they’re only across the street [at Beth Israel Deaconess Medical Center or Brigham and Women’s Hospital],” says Jennings. “This case was a perfect example of how we coordinate with teams across the state and throughout the country to provide families with the best available fetal care.” It’s also another benefit of the new Children’s and Caritas Christi Health System neonatal relationship, which commenced last year.

AFCC nurses Donna Morash, RN, Linda Zaccagnini, RN, MSN, NNP, and Luanne Nemes, RN, MS, PNP, continued the coordinated care regimen, seeing the boys each Tuesday at the AFCC and working with CSEMC to stay on top of their progress throughout the week.

Three months after going home, Bryce and Broderick got follow-up echocardiograms. It appeared that their hearts showed no damage from TTTS or its treatment, and at a visit in January, Broderick and Bryce weighed in at 13 and 13.5 pounds, respectively. “Looking at them now, it’s hard to remember all we went through,” says Stephanie.

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