

Twin Cities Edition

M.D. NEWS

Special Feature

A photograph of two surgeons in an operating room. They are wearing blue scrubs, masks, and hairnets. One surgeon is on the left, wearing a blue hairnet and a white mask, looking towards the right. The other surgeon is on the right, wearing a black hairnet and a light blue mask, looking towards the left. They are both wearing white gloves and are positioned over a patient on an operating table. In the background, there is a Philips monitor displaying medical data and a large surgical light fixture. The overall scene is brightly lit with a blue tint.

Midwest Fetal
Care Center

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By Marian Deegan

Pregnancy is one of the most meaningful events in a woman's life. For women carrying twins, however, potentially life-threatening complications can cast a pall over an otherwise joyful time. One-third of all identical twins are at risk for developing twin-to-twin transfusion syndrome (TTTS), a condition where the fetuses develop unbalanced perfusion through shared placental vasculature. The syndrome occurs only in identical twins that are monochorionic and diamniotic. Without treatment, mortality for both twins is as high as 90%.

Fetoscopic laser ablation therapy is the latest advance in maternal-fetal medicine to treat TTTS. Until last year, this therapy was not available in the Upper Midwest, despite the fact that the Twin Cities claims the largest group of practicing perinatologists in the country, and one of the largest groups of pediatric surgeons.

Nationally, operative fetal therapies are performed by a handful of pediatric surgeons and perinatologists in specialty practices. Unlike other specialty therapies, where training is readily accessible, in utero fetal procedures are still treated like proprietary knowledge. Fellowship training programs in both pediatric surgery and perinatology rarely teach operative fetoscopy procedures. In some cities, pediatric surgeons control in utero fetal services; in others, perinatologists control the specialty. Collaboration is the exception, not the rule. It has been estimated that annually, only 10% of patients eligible for this procedure in the United States are actually able to access it.

The unmet patient need in the Upper Midwest was a concern for two private practices in the Twin Cities. Two years ago, Minnesota Perinatal Physicians and Pediatric Surgical Associates, LTD got together to explore establishment of a fetal therapy program here. Pediatric ENT physician Dr. James Sidman was instrumental in uniting the two practices and approaching both Abbott Northwestern Hospital and Children's Hospitals and Clinics of Minnesota for funding. It was the first time the two hospitals had an opportunity to collaborate.

"Instead of fighting over who would have the turf," chuckles Dr. Brad Feltis, a pediatric surgeon with Pediatric Surgical Associates, "we wanted to work together and utilize the specialized skills of both practices. Our practices hadn't collaborated before, but in utero procedures are perfect for double teaming a maternal-fetal specialist and a pediatric surgeon. At other big centers, it frequently seems that the two groups aren't collaborating well, if at all. To our groups, this seemed a natural area for collaboration. There's also quite a bit of secondary gain for surgeons to learn new techniques. It's exciting. We were each able to expand our skill sets."

"The idea of a collaboration of different skill sets is what motivated our practices," agrees Dr. William Block, maternal fetal medicine specialist with Minnesota Perinatal Physicians. "Brad certainly has much more endoscopic surgery experience than I could hope to have, though he had never operated inside the uterus. I have the prenatal diagnosis and the placental physiology and fetal diagnostic skills, as well as fetal therapy training to do fetal transfusions and other in utero procedures."

"There's no blueprint for establishing a fetal therapy program,"

says Dr. Feltis. "Once our practices had committed to learning and offering this therapy, we made inquiries and found that there wasn't a lot of enthusiasm nationally to train us or give us information."

"Fellowships give you the applicable skill set for the technique," says Dr. Block, "but surgeons here aren't teaching how to adapt those skills for twin-to-twin transfusion. That is why we turned to a European program."

Dr. Block had connections with a group in Leuven, Belgium, that did approximately 250 in utero procedures a year. "When it comes to fetoscopy equipment and techniques," Dr. Block explains, "Europe is ahead of us. They formed a consortium between multiple countries and the Storz Endoscopic Company. This allows them a public/private partnership that can fast-track equipment into use. Instruments are designed and tested on demand in a way that U.S. regulations don't allow."

In January and February 2008, Drs. Block and Feltis traveled together to Leuven, Belgium, and to France for six weeks of observation and training.

"Bill and I didn't really know each other before the trip," says Dr. Feltis. "We stayed in a hotel built in 1610, but the hospital was absolutely state

Paula Wickham, a sonographer with Minnesota Perinatal Physicians, performs a sonogram on a patient to detect if her twins are at risk for TTTS.



of the art. Many international visiting surgeons were doing observational fellowships, but most stayed for only three to five days.”

“We were the first two visiting surgeons to stay as long as we did,” notes Dr. Block. “I think it was beneficial. The surgeons certainly were more than willing to show us their techniques and to help us. A few weeks gave us time to build trust with the two main teaching doctors. They shared years of surgery videos to supplement the procedures we observed. The length of our stay also gave us an opportunity to see a greater number of procedures. We were able to observe 25 in utero procedures.”

“The advantage of staying long enough to see several dozen cases,” adds Dr. Feltis, “is in the subtle complexities we were able to observe. One case was in a later-stage gestation. At 23 to 24 weeks, it’s difficult to visualize because there is so much debris in the amniotic fluid. One trick used to address this was to do a slow infusion of normal saline through the catheter. It provided a clear pocket to see around. Unless we’d been present to see that one case, I would have never have picked up on a solution like that.”

“It takes more than just a few procedures to be able to visualize the

Ryleigh and Skylar Hanley were born in January after Drs. Block and Feltis successfully performed fetoscopic laser ablation therapy for twin-to-twin transfusion syndrome.



PHOTO COURTESY OF CHILDREN'S HOSPITALS AND CLINICS OF MINNESOTA

vascular mapping and get a feel for the interrelationship between the placenta and the vessels,” agrees Dr. Block. “There was tremendous graciousness on the part of the teaching doctors to let us interlope in their realm.”

Upon the doctors’ return to the Twin Cities, the Midwest Fetal Care Center (MFCC) was founded. Another surgeon in this collaborative effort, Dr. David Lynch-Salamon, subsequently trained in Leuven, and now joins Drs. Block and Feltis to compose the MFCC fetal therapy team. They are supported by an interdisciplinary team of ultrasonographers, nurses and care coordinators, as well as the specialized capabilities of Abbott Northwestern Hospital and Children’s Hospitals and Clinics of Minnesota.

“All of our outcome data is tracked in real time,” says Dr. Feltis. “We are exceeding the national average in survival outcome data, and we are very happy with our program’s development.”

The surgeons attribute some of their success to the collaboration of their pediatric surgery and perinatology practices. “Our program was established to offer fetal therapy here in the Twin Cities,” says Dr. Block, “but also to offer this therapy in combination with the skill set of Brad’s

surgical practice as well as our fetal medicine practice. We have meetings to review results with cardiologists, pediatric ENTs, neonatology and our nurses. Everybody weighs in on what we could have done differently and what we could have done better. We are really trying to live a multidisciplinary approach, and I think it’s made a big difference in our approach and our outcomes.”

“Technically, the procedure itself makes it quite beneficial to have two sets of eyes to identify every single vessel and follow from one cord insertion to the other,” Dr. Feltis points out. “These cases are stressful. Twin-to-twin transfusion is one of the few cases with the potential for complications in three separate patients.”

Untreated, the mortality rate for TTTS is 90%. With the laser therapies offered at centers like the MFCC, the survival rate jumps from 10% to a 70-80% survival rate for one child and a 40-50% survival rate for both twins. “The difference from nontreatment to treatment is tremendous for these babies,” says Dr. Block.

“It can’t be overemphasized that with multiple gestation, the number of placentas and sharing of placentas needs to be diagnosed early and followed very closely for any changes and signs of twin-to-twin syndrome,” he continues. “Between 20[%] and 30% of twins sharing a placenta develop complications. The temptation is to follow obstetrical training and see all patients on a monthly basis, but TTTS can develop and accelerate rapidly. In two weeks, you can go from no evidence of complication to full-fledged problems. For this reason, we recommend ultrasound every one to two weeks for at-risk twins, to monitor fluid volumes. The

earlier we can intervene in the disease process, the better the outcome.”

The potential applications of TTTS techniques are broader than the single twin-to-twin transfusion procedure. Fetal therapies for in utero procedures continue to expand every year. Twin-to-twin transfusion procedures are also applicable to twins suffering from growth restriction.

“Operative fetoscopy or in utero surgery is now where laparoscopy was 20 years ago,” explains Dr. Feltis. “In 1985, the general field of laparoscopy was for the most part discounted by the majority of general and gynecologic surgeons. Now we do everything laparoscopically. Today, many people feel that there will never be broad application for fetoscopy. I think that attitude is going to change with the development of new technologies and new instruments. We don’t know, 10 years from now, what conditions are going to be amenable to therapy with the skills we are building.”

Development of single-site surgery techniques is on the immediate horizon in the field of pediatric and general surgery. “The coming generation of laparoscopic instruments will be deployed through a single site,” explains Dr. Feltis. “We’ll be able to put multiple instruments in through one site and those instruments can articulate out and deploy once they are inside. The human uterus

Twin-to-twin transfusion syndrome is treated using fetoscopic laser ablation therapy, which Dr. Block prepares for.



Drs. Brad Feltis and William Block trained as visiting fellows at The Catholic University of Leuven, Belgium, in fetoscopy and lasertherapy for twin-to-twin transfusion syndrome.

PHOTO COURTESY OF CHILDREN'S HOSPITALS AND CLINICS OF MINNESOTA

tolerates a single puncture pretty well, with an acceptable 10-15% rate of membrane leakage or membrane rupture through premature labor. But the human uterus does not tolerate two separate puncture sites. Attempts to use standard laparoscopic surgery inside the womb in the mid- to late '90s required two or three puncture sites. That dramatically accelerated the rate of preterm birth or prolonged rupture of membranes. Within the last year, I've seen emerging courses in my practice using instruments developed for single-site surgeries. I foresee that we'll be able to put different instruments inside the uterus and actually work in three dimensions, possibly repairing abdominal wall defects and multiple other developmental malformations. It's exciting.”

Twenty years ago, little could be done to address TTTS complications, and up to two years ago, there were few resources in the Twin Cities to help patients facing this life-threatening condition. “We established our center for families right here in the Twin Cities,” states Dr. Block. “Our job is to help moms and dads have the opportunity to take these kids home.”

“Many facilitators worked together to make this happen,” emphasizes Dr. Feltis. “Jim Sidman was very instrumental in helping to overcome the inertia involved in starting a new program. Additionally, our partners had to commit significant hours covering our patients so that Bill and I could go to Belgium and learn these skills. Abbott and Children’s supported our efforts. My personal reward is applying the in utero techniques we learned, and seeing the disease process reversed as a result. At our center, we have seen twins born at term without any neurological complications. Nothing feels better than seeing those happy, teary-eyed parents with their babies in their arms.” ■

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