

The Fetal Center

Twin-Twin Transfusion Syndrome

Twin-twin transfusion syndrome (TTTS) is a complication of monochorionic twins, a particular type of identical twins where the fetuses share one placental mass. Vascular connections within the shared placenta allow the exchange of blood, hormones and biochemical products between the fetuses. Normally, this exchange is balanced, but in 10 to 15 percent of cases an imbalance develops, with one twin (the donor) becoming hypotensive (low blood pressure) with reduced amniotic fluid volume, and

the other twin (the recipient) developing hypertension (increased blood pressure), hydrops (increased amniotic fluid volume), and eventually, if left untreated, heart failure.

Diagnosis

Establishing the number of placentas and gestational sacs in twins during the first trimester is very important as it allows for better planning and surveillance of the fetuses throughout the remainder of the pregnancy. Once a diagnosis of monochorionic twins is determined, it is recommended that ultrasounds be performed every two weeks beginning at 16 weeks gestation to look for signs of TTTS, which is usually described in five stages:

- Stage I** - Significant difference in the amniotic fluid volume in each twin's sac
- Stage II** - Discordant amniotic fluid volume and the inability to see the donor twin's bladder in ultrasound
- Stage III** - Abnormal blood flow through the umbilical cord or fetal vessels around the heart of one or both babies
- Stage IV** - Development of hydrops or cardiac failure in either fetus (occurs more frequently in the recipient twin)
- Stage V** - The death of one or both fetuses

Once TTTS is diagnosed, a detailed fetal ultrasound is needed to exclude the presence of any additional fetal anomalies. Amniocentesis may be recommended to evaluate for genetic conditions, particularly if structural abnormalities are seen. A fetal echocardiogram (ECHO), an ultrasound of the fetal heart, should be performed in all monochorionic twins, with or without TTTS, between 18 and 22 weeks of pregnancy due to the increased risk of cardiac anomalies in identical twins. Progression to higher stages of TTTS can occur slowly or very rapidly, which is why active surveillance is key to managing monochorionic twin pregnancies. Untreated, TTTS is associated with a high risk of pregnancy complications, including preterm delivery, fetal and neonatal death and long-term developmental delay in the survivors.

Treatment Options

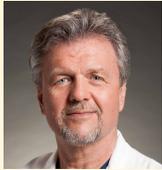
Serial Amnioreduction

The procedure involves an amniocentesis to remove the excess amniotic fluid from the sac of the recipient twin. While providing some symptomatic relief for the mother, this procedure does not stop the transfusion process. The amniotic fluid may re-accumulate, resulting in the need for repeated amnioreductions. While the procedure-related risks

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Meet the Team

The Fetal Center at Children's Memorial Hermann Hospital, affiliated with physicians at UTHealth Medical School, is a leader in diagnosis, treatment and comprehensive care for mothers with high-risk pregnancy conditions and babies with congenital anomalies or genetic conditions. The internationally recognized team of affiliated maternal-fetal medicine specialists has collectively performed more than 850 laser ablations to treat TTTS.



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associated with amnioreduction are less than those associated with laser ablation, the outcomes are not as favorable. Overall survival of one fetus is 70 percent with survival of two fetuses in 50 percent of cases. The average gestational age at delivery is 29 weeks. Neurological compromise to one or both twins may occur in 25 percent of cases.

Selective Reduction

In cases of TTTS with severe discordance in fetal growth between the twins or when fetal malformations are present as well, a selective pregnancy reduction can be considered as an alternative therapy. The goal with this treatment is to decrease risk to the unaffected, normally growing fetus. If there is a spontaneous demise of one of the twins, the presence of vascular connections and additional shunting of blood places the surviving co-twin at a 15 percent risk of death or 26 percent risk of neurological compromise. Selective reduction can be undertaken by bipolar cord coagulation or radiofrequency ablation, with technical considerations determining which procedure is best in each case.

Selective Laser Photocoagulation

Laser ablation therapy of the communicating placental blood vessels between the twins is the optimal therapy for TTTS. A fetoscope (a small telescope) is inserted into the pregnancy sac of the recipient twin and the placental surface is evaluated to find the connecting vessels. When a connection is identified, laser energy is used to ablate it, stopping the further blood exchange between the fetuses. Laser ablation can be performed between 16 and 26 weeks gestation. Survival of at least one twin is seen in approximately 90 percent of cases, with survival of both fetuses in 70 to 75 percent of cases. The average gestational age at delivery is 31 weeks. In up to 18 percent of cases, neurological compromise will occur in one or both twins.

To refer a patient, call 832.325.7288. To view a comprehensive educational video, visit childrens.memorialhermann.org/ttts