



Twin-Twin Transfusion Syndrome (TTTS)

A condition in which the blood passes unequally between identical twins that share a placenta (monochorionic).

Monochorionic twins are a type of identical twins that share a placenta. Within the shared placenta are blood vessels that connect the blood supply of the two fetuses, allowing blood to flow between the twins. In about 15 percent of monochorionic, diamniotic (two amniotic sacs) twins, the blood flow becomes unbalanced, leading to a condition known as Twin-Twin Transfusion Syndrome (TTTS).

In TTTS, the smaller twin (donor) pumps blood to the larger twin (recipient), causing the recipient twin to receive too much blood and the donor to receive too little. The increased volume of blood causes the recipient twin to produce more than the usual amount of urine, which can result in a large bladder, too much amniotic fluid (known as polyhydramnios) and hydrops, a prenatal form of heart failure. The donor twin produces less than the usual amount of urine, resulting in low or no amniotic fluid surrounding it (oligohydramnios) and a small or absent bladder. Without intervention, the condition can be fatal for both twins.

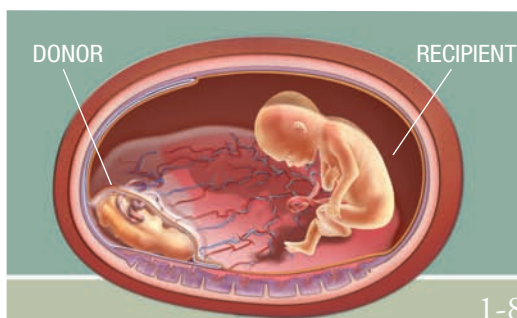
Evaluation

The most important step in evaluating a twin pregnancy for TTTS is to determine whether the twins share a single placenta. Ultrasounds early in the pregnancy (first trimester) are best at making this distinction. Other features of TTTS include same fetal sex and a size and amniotic fluid volume difference between the two fetuses. An anomalous twin may mimic a “stuck” twin. A detailed sonographic assessment rules out any structural anomalies.

With our growing understanding of TTTS as a primarily cardiovascular disorder, it is also important to obtain a thorough assessment of the fetal cardiovascular system. Families visiting CHOP's Center for Fetal Diagnosis and Treatment are scheduled for a comprehensive, one-day evaluation that will require some or all of these tests:

- **Level II (high-resolution) ultrasound** – An examination to rule out structural abnormalities in the twins, confirm placenta location and umbilical cord insertion into the placenta, and assess the membrane between the twins.
- **Fetal echocardiogram (ECHO)** – A focused ultrasound performed by our fetal cardiologist to assess the cardiac aspects of the condition. TTTS may cause serious cardiac strain in the recipient twin, resulting in enlargement of the heart and dysfunction. All twins evaluated for TTTS should undergo a fetal ECHO.
- **Genetic amniocentesis** – A procedure in which a small amount of amniotic fluid is removed from the sacs surrounding the fetuses and tested to rule out any chromosomal abnormalities. An amniocentesis is not necessary if the diagnosis is fairly certain.

continued ►



Vascular communication between monochorionic twins results in recipient twin with excess amniotic fluid and donor twin with a deficiency of amniotic fluid.



Treatment Management of TTTS may include any of the following:

- **Expectant management** – In situations where surgery is not yet indicated, close monitoring via periodic ultrasound is used to evaluate the condition of both fetuses and look for signs of disease progression.
- **Fetoscopic laser surgery** – A minimally invasive surgery performed on the placenta to disconnect some of the communicating blood vessels. This procedure stops the transfusion of blood from the donor to the recipient, hopefully halting the progression of TTTS, and is the preferred treatment for TTTS.
- **Amnioreduction** – Removal of excess amniotic fluid from the larger twin (recipient) which may temporarily help with maternal comfort.
- **Selective reduction** – A minimally invasive surgery used in severe cases of TTTS to stop the blood flow to the dying twin to maximize the outcome for the surviving twin. This is considered as a last option when the disease process is very advanced and the at-risk twin faces imminent demise. This intervention can protect the co-twin from neurologic impairment and/or demise.

The results of tests and these treatments will be discussed in detail after evaluation. We are here to help.

Selected References

Bebbington M. **Twin-to-twin transfusion syndrome: current understanding of pathophysiology, in-utero therapy and impact for future development.** *Semin Fetal Neonatal Med.* 2010 Feb;15(1):15-20. Epub 2009 Jun 17.

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Rychik J, Tian Z, Bebbington M, Xu F, McCann M, Mann S, Wilson RD, Johnson MP. **The twin-twin transfusion syndrome: spectrum of cardiovascular abnormality and development of a cardiovascular score to assess severity of disease.** *Am J Obstet Gynecol.* 2007 Oct;197(4):392.e1-8.



About Our Center

Expectant parents from all 50 states and more than 50 countries have found hope at the Center for Fetal Diagnosis and Treatment at The Children's Hospital of Philadelphia, recognized as a pioneer in the highly specialized field of fetal medicine. We devote every resource to providing comprehensive care focused on the best outcome for babies yet to be born.

Contact us with questions or concerns at 1-800-IN-UTERO (468-8376) or visit fetalsurgery.chop.edu.

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