CONDITION

Twin-to-twin transfusion syndrome

Twin-to-twin transfusion syndrome is an unequal blood flow between twins who share one placenta.

WHAT IT IS
Unequal blood flow between twins sharing one placenta

BODY SYSTEM
Pregnancy and fetal circulation

MAIN SYMPTOMS
Unequal fluid, bladder differences, rapid abdominal growth

WHAT CAUSES IT
Abnormal blood vessel connections in a shared placenta

HOW IT IS DIAGNOSED
Specialist ultrasound and Doppler blood-flow studies

MAIN TREATMENT
Fetal laser surgery and close ultrasound monitoring

CAN IT BE CURED?
Sometimes - laser can stop abnormal placental blood flow

IS IT AN EMERGENCY?
Sometimes - with preterm-labor symptoms or reduced fetal movement

LONG-TERM OUTLOOK
Better with early detection and specialist treatment

Overview

Twin-to-twin transfusion syndrome, often shortened to TTTS, is a pregnancy complication affecting twins who share one placenta. These are called monochorionic twins. Most have separate amniotic sacs, known as a monochorionic diamniotic pregnancy.

Blood vessels from both twins meet within the shared placenta. In TTTS, some connections allow blood to flow unevenly from one twin to the other. The twin sending more blood is called the donor. The twin receiving more is called the recipient.

The donor may have less circulating blood and produce less urine, leading to too little amniotic fluid. The recipient may receive more blood than its heart and circulation can comfortably manage. It often produces more urine, causing too much amniotic fluid.

TTTS matters because the imbalance can become serious for one or both twins. However, its course is not the same in every pregnancy. Some early cases remain stable, while others progress and need fetal treatment. Regular specialist ultrasound is important because TTTS may develop before you notice any symptoms.

Symptoms

TTTS is usually detected by ultrasound rather than by how you feel. Some pregnant people have no symptoms when it is diagnosed.

Possible symptoms include:

These symptoms are not specific to TTTS. They can occur for other reasons in a twin pregnancy.

Ultrasound findings are more reliable. The donor twin usually has very little amniotic fluid, while the recipient has too much. The donor's bladder may appear small or may not be visible because the twin is making less urine. The recipient's bladder is often larger.

A difference in the twins' estimated size may also be found, but TTTS is not defined by one twin simply being smaller. Unequal growth can occur with or without TTTS.

- The abdomen becoming larger or tighter over a short time
- Sudden weight gain related to increased amniotic fluid
- Abdominal pressure, cramping, or contractions
- Shortness of breath caused by a very enlarged uterus

Causes and risk factors

TTTS is caused by abnormal blood vessel connections within a single shared placenta. These connections are present from early pregnancy, but only some lead to a significant blood-flow imbalance.

TTTS can occur only when twins share a placenta. It most often affects monochorionic diamniotic twins. It can also occur in the less common situation where twins share both a placenta and an amniotic sac.

Most twins who share a placenta are identical twins, but being identical is not itself the cause. The important factor is the shared placental circulation.

TTTS is not caused by food, exercise, stress, travel, or anything you did during pregnancy. It is

not generally considered an inherited condition. There is no reliable way to predict from lifestyle or family history which shared-placenta pregnancy will develop it.

Diagnosis

An early ultrasound establishes whether the twins share a placenta. This is called determining chorionicity. It is easiest and most reliable early in pregnancy.

Pregnancies with a shared placenta need regular ultrasound monitoring. Major specialist guidelines recommend scans about every two weeks beginning around 16 weeks, although your schedule may be adjusted to your pregnancy.

TTTS is confirmed by ultrasound showing a marked difference in amniotic fluid between the twins. The scan also checks:

Doppler ultrasound measures the direction and pattern of blood flow. A fetal echocardiogram, which is a detailed ultrasound of the heart, may be used when there are concerns about heart strain.

Specialists often describe TTTS using Quintero stages. Stage I has unequal fluid but a visible donor bladder. In Stage II, the donor bladder is not seen. Stage III includes abnormal blood-flow patterns, Stage IV includes severe fluid buildup within a twin's body, and Stage V means one or both twins have died.

The stage helps describe what the ultrasound shows, but it does not predict the outcome by itself. How quickly findings change, the pregnancy stage, heart function, and other complications also matter.

- Each twin's bladder and growth
- Blood flow through the umbilical cord and other vessels
- Heart function, particularly in the recipient twin
- Signs of fluid collecting within a twin's body
- Cervical length and signs of possible early labor

Treatment and management

Care is usually coordinated by a maternal-fetal medicine specialist, often working with a fetal therapy center. Treatment depends on the TTTS stage, how quickly it is progressing, the condition of each twin, and how far the pregnancy has advanced.

A mild, stable Stage I case may sometimes be managed with very frequent ultrasound monitoring. This allows the team to look for progression and reconsider treatment promptly. Observation does not mean the condition is unimportant.

Fetoscopic laser surgery is the main treatment for significant TTTS during the usual fetal-treatment window. A narrow instrument is passed through the abdomen and uterus into the recipient's amniotic sac. A small camera identifies the shared placental vessels, and laser energy seals the abnormal connections. This separates the twins' circulations while leaving the placenta in place.

Laser treatment addresses the cause of the imbalance. It can improve the chance of survival, but it cannot guarantee that both twins will survive or avoid long-term complications. Risks include bleeding, infection, fluid leakage, early labor, pregnancy loss, and incomplete sealing of placental vessels.

Other management options may include:

Removing fluid can relieve pressure but does not disconnect the shared blood vessels. It may be considered when laser surgery is not suitable or immediately available.

Monitoring continues after any procedure. TTTS can occasionally recur, and another circulation problem called twin anemia-polycythemia sequence can develop if small vessel connections remain. This causes one twin to become anemic while the other develops unusually concentrated blood.

- Removing excess amniotic fluid to reduce pressure
- Delivery when the pregnancy is far enough along
- Supportive treatment to prepare for possible premature birth
- In selected severe cases, procedures intended to protect one twin

Complications

TTTS can affect both twins differently. The donor may have reduced blood volume, poor growth, and reduced kidney urine production. The recipient may develop heart strain, abnormal heart function, or fluid accumulation in the body.

Other possible complications include:

If one twin dies, the shared circulation can place the surviving twin at risk of sudden low blood pressure and organ injury. Specialist assessment is needed, but injury is not inevitable.

- Premature rupture of the membranes

- Preterm labor and birth
- Pregnancy loss involving one or both twins
- Brain injury related to abnormal circulation or prematurity
- Long-term movement, learning, hearing, or vision difficulties

Prevention

TTTS cannot currently be prevented. It results from the way blood vessels form within a shared placenta, not from a modifiable behavior.

Early identification of a shared placenta does not prevent TTTS, but it makes appropriate monitoring possible. Regular ultrasound can detect changes before symptoms develop and allow timely referral to a fetal medicine center.

Bed rest, changing your diet, increasing fluid intake, or avoiding normal activity has not been shown to prevent the abnormal placental blood flow. Follow any activity advice given for other pregnancy concerns, such as contractions or a shortened cervix.

Living with it and what to expect

A diagnosis of TTTS can mean frequent appointments, repeated ultrasounds, and possible travel to a fetal therapy center. The uncertainty between scans can be difficult. Ask the care team to explain which findings are stable, which are changing, and what would lead to treatment.

After laser surgery, scans usually continue throughout pregnancy. They monitor fluid levels, growth, blood flow, heart function, and signs that TTTS or another circulation imbalance has developed. Even after successful treatment, the pregnancy remains higher risk because the twins share a placenta and may be born early.

Delivery plans are individualized. They are influenced by ultrasound findings, previous treatment, the twins' positions and health, and whether labor or another complication begins. Having TTTS does not automatically determine whether birth will be vaginal or by cesarean.

After birth, the babies may need examinations for anemia, heart problems, breathing difficulties, or complications of prematurity. Some need neonatal intensive care. Developmental follow-up may be recommended, especially after severe TTTS, very premature birth, or concerning brain imaging.

Many families go home with one or both babies after treatment and newborn care. Others

experience loss or ongoing health needs. No single outcome can be promised from the stage alone.

When to get medical help

Keep every scheduled ultrasound and pregnancy appointment, even if you feel well. Contact your maternity or fetal medicine team promptly if your abdomen suddenly becomes much larger or tighter, or if you develop increasing pressure, cramping, or shortness of breath.

Seek urgent maternity assessment for:

Call emergency services for heavy bleeding, severe breathing difficulty, collapse, a seizure, or pain that is sudden and extreme.

These symptoms do not always mean TTTS has worsened, but they need timely assessment. Routine questions about scan results, future appointments, delivery planning, or emotional support can be discussed during scheduled follow-up.

- Reduced or changed fetal movement after movements have become established
- Regular contractions or signs of labor
- Vaginal bleeding
- A gush or ongoing trickle of fluid from the vagina
- Severe or persistent abdominal pain
- A severe headache, vision changes, or sudden swelling

Common questions

Can TTTS happen with fraternal twins?

TTTS requires a shared placenta. Fraternal twins almost always have separate placentas and circulations, so they do not usually develop TTTS. Rare placental arrangements can be complex, which is why ultrasound findings matter more than assumptions about whether twins are identical or fraternal.

Can TTTS get better without surgery?

Some mild Stage I cases remain stable or improve, but others progress. It is not possible to tell from symptoms alone which course will occur. Close ultrasound monitoring is essential when observation is chosen.

Does TTTS mean one twin will be much smaller?

Not necessarily. TTTS is defined by unequal blood flow and amniotic fluid, not by a particular size difference. The donor may become smaller, but significant growth differences can also result from unequal sharing of the placenta without TTTS.

Does laser surgery cure TTTS?

Laser surgery can stop the abnormal blood exchange by sealing shared vessels. In that sense, it treats the underlying cause. It does not reverse every effect that has already occurred, and complications such as preterm birth, recurrent TTTS, or twin anemia-polycythemia sequence can still happen.

Can both twins survive TTTS?

Yes, both twins can survive, particularly with early detection and specialist treatment. Outcomes are influenced by the condition's severity, pregnancy stage, response to treatment, premature birth, and whether either twin already has organ injury.

Will TTTS happen in a future pregnancy?

Having had TTTS does not usually create an ongoing medical condition in the pregnant person. It could occur again only if a future pregnancy also includes twins sharing one placenta. Most future pregnancies will not have that placental arrangement.

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