



Victorian
Fetal
Therapy
Service

Fetoscopic Laser Coagulation for the management of severe Twin-Twin Transfusion Syndrome

PATIENT INFORMATION SHEET

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Twin-Twin Transfusion Syndrome (TTTS)

Twin-Twin Transfusion Syndrome (TTTS) is a serious complication of identical twin pregnancies in which there is only one placenta. TTTS occurs in 10-15% of identical twin pregnancies when there is an unequal sharing of blood between two fetuses due to blood vessels that communicate between the two fetuses in the single placenta. In the most serious cases, one fetus (called the recipient twin) is larger and surrounded by an excessive amount of amniotic fluid, while the other fetus (known as the donor twin) is smaller and appears to be stuck against the uterine wall due to the reduced amount of amniotic fluid.

In the early stages of the disease, ultrasound may reveal a large amount of fluid around the larger (recipient) twin and a small amount of fluid around the smaller (donor) twin. The bladder of the donor twin can usually still be seen at this stage. As the disease progresses the donor twin's bladder may no longer be visible, and it might have only a very small amount of amniotic fluid, or sometimes no amniotic fluid, around it. This is referred to as stuck twin because the twin appears to be stuck to the uterine wall and wrapped up in the amniotic membrane.

Ultrasound Doppler studies provide information about the condition of the blood circulation for both of the twins. As TTTS worsens the donor twin does not receive enough blood and the recipient twin receives too much blood. In the advanced stages an excessive amount of fluid builds up within the recipient twin's body, or under its skin, due to heart failure. This is called hydrops. Either twin can develop hydrops but more often it occurs in the recipient.

The pregnancy may be lost from heart overload in the larger twin, lack of enough blood getting to the smaller twin, or preterm (early) labour because of the excess fluid causing the uterus to be 'overstretched'.

1. Staging of TTTS based on ultrasound findings

TTTS is staged in an effort to offer the most appropriate treatment for the severity of the TTTS. The treatment options are discussed in the next section.

In **Stage I** there is a reduced amount of amniotic fluid (known as oligohydramnios) around the donor twin, and an increased amount of amniotic fluid (polyhydramnios) around the recipient. At this stage close observation is usually the appropriate management option.

In **Stage II**, along with the changes in amniotic fluid volumes as above, there is no visible bladder in the donor. At this stage laser surgery should be considered. Laser surgery is discussed in the next 2 sections.

Stage III is characterized by Critically Abnormal Doppler (CAD) studies, which means one, or both, of the babies, has abnormal blood flow in its arteries or veins. Laser surgery is usually appropriate for this stage. Umbilical cord ligation may also be considered.

In **Stage IV** all of the above findings are present and one of the baby's is hydropic. This means there is collection of fluid within the baby's body or under its skin. It occurs when the heart contracts poorly and heart failure is present. In this situation the baby is very likely to die unless treatment is offered very soon.

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2. Management options

If not treated, severe TTTS (stages III & IV) will result in the death of nearly 100% of twins affected by the condition. Current treatment methods include:

- Serial Amnioreduction
- Umbilical Cord Ligation
- Fetoscopic Laser Coagulation (FLC) of the communicating placental vessels
- Termination of the pregnancy

a. Serial Amnioreduction

Serial amnioreduction involves the removal of excess amniotic fluid from around the recipient twin. Each time amnioreduction is performed up to 3000ml of fluid may be removed and often repeated removal of the fluid is necessary. Serial amnioreduction is usually used for mild TTTS (stages I & II) and for pregnancies that develop TTTS after 26 weeks gestation. Serial amnioreduction can improve pregnancy outcome by preventing preterm labour.

The main disadvantage of serial amnioreduction is that it does not fix the basic problem (unequal sharing of blood). It also carries a risk of up to 1% each time it is performed of causing ruptured membranes, infection or preterm labour which can result in one or both babies dying. If one baby dies from TTTS before birth the shared blood flow between the babies may allow the second twin to bleed into the dead twin. This may cause death (up to 40%) or brain or neurological damage (15 – 25%). Serial amnioreduction may also cause the membranes to detach from the uterine wall. This may make any other form of invasive intrauterine therapy more difficult. Furthermore the success rate with this method is poor when the disease is severe (Stages III & IV – see below for staging of the severity of the disease).

b. Umbilical Cord Ligation

In severe TTTS one of the fetuses may be extremely sick by the time we first scan the pregnancy. It may not be possible to save both fetuses in this situation. Spontaneous death of the sick fetus may result in death or neurological damage to the co-twin as discussed above. One way to protecting the co-twin is to block off the umbilical cord of the sick twin. This will result in the immediate death of this twin but should improve the chances for the surviving co-twin dramatically. The chance of miscarriage following this procedure is 5-10%. Umbilical cord ligation is offered only in severe cases of TTTS.

c. Fetoscopic Laser Coagulation (FLC) of communicating placental vessels

Laser surgery may be performed to stop the sharing of blood between the two fetuses. The object is to seal off the specific blood vessels that allow blood to cross from one fetus to the other, while leaving the other placental vessels. The surgery is usually done under general anaesthesia. A small incision (1cm) is made in the mother's abdomen and an endoscope is inserted into the uterus under ultrasound guidance. The endoscope is a long, narrow telescope with a light and camera on the end. The blood vessels on the surface of the placenta can be seen with the camera. The communicating blood vessels are identified and sealed off with a laser beam that is runs down the endoscope.

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Australian and overseas centres report overall survival rates of around 80% for at least one baby and 50% for both. The incidence of neurological complications is about 4%. The main advantage to this method is that the disease is corrected in the majority of cases with a single treatment. A recent European study has shown better outcomes for babies after laser therapy than repeated amnioreduction.

d. Termination of Pregnancy

After reviewing all information and options, you may decide you do not want to continue this pregnancy, and instead choose to terminate both fetuses. Termination of both fetuses is the only way to completely avoid the risk of one or both of the babies being born with long-term problems.

3. Fetoscopic Laser Coagulation (FLC) of communicating placental vessels

a. Risks and Complications

There are potential complications associated with the surgery:

- **Bleeding:**
 - There is the possibility of bleeding in the mother and/or fetuses, which could prevent the completion of the procedure (in less than 1% of cases)
 - Rarely, bleeding may be of such magnitude that we may need to make an abdominal incision (laparotomy) and place a suture to stop the bleeding
 - In extreme circumstances it may be necessary to remove the uterus to control bleeding (less than 0.1% of cases). This would not allow the mother to have any further children. Severe bleeding could result in damage to many organs, brain damage, or even death.
 - Placental abruption or separation has been reported in approximately 3% of cases
- **Preterm labour and premature rupture of membranes :**
 - These complications occur within the first week after the procedure in approximately 1% and 5% of cases respectively. Treatment may require hospital admission. Infection of the amniotic cavity may also occur and lead to these complications. If infection is diagnosed, delivery is likely to be required to prevent further complications.
- If it looks as if one baby is dying during the procedure, we may tie the cord to that twin to try to save the other twin, but only if your consent for this procedure is given in advance.

We take great care with all surgery and do our utmost to avoid complications. Fortunately the risk of major complications is low.

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b. Preparing for Surgery

Before surgery you will not be allowed to eat or drink for at least 6 hours. This is to prevent the risk of vomiting during surgery. For a morning procedure you will be asked to fast from midnight the night before

An ultrasound will be done prior to going to the operating theatre to check that conditions haven't changed since the last scan. When you arrive in the operating room you will be moved to the operating table. You will be covered with a warm blanket to keep you comfortable during surgery. General anesthesia will be administered to ensure you are completely asleep for the entire procedure. In most cases surgery lasts one to two hours.

c. After Surgery

Following surgery you will be taken to the Recovery Room until fully awake, and then back to the ward. Medication will be given after surgery to relax the uterus and stop any contractions. Pain or discomfort after surgery seldom occurs and if present is usually minimal. If needed pain relief medication will be offered. The day after surgery a follow-up ultrasound will be performed to check the babies. You will remain in hospital one to two days.

d. Follow-up Care

After surgery your original doctor/s will resume your care for the rest of the pregnancy and delivery. Weekly ultrasounds are recommended for the next month. After that time, if all is going well, ultrasounds are performed every two weeks or as directed by your doctor. As this is a new treatment we are carefully monitoring the outcomes of patients and babies during the remainder of the pregnancy and after birth.

If you have any questions or concerns contact:

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