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EVERGREEN FETAL THERAPY PROGRAM 1-866-FET-SURG
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Laser Photocoagulation of the Communicating Vessels in Twin to Twin Transfusion Syndrome

What you need to know as one of our patients....

What is Twin to Twin Transfusion Syndrome (TTTS)?

Twin to Twin Transfusion syndrome (TTTS) is a serious complication of twin and triplet pregnancies that occurs in 10-15% of twin pregnancies where the babies share the same placenta (the placenta is also known as the afterbirth). Blood from one baby mixes with the blood of the other through small blood vessels in the placenta. If this blood is not shared equally between the babies one of them becomes swollen with too much blood and the other becomes small and underfed because of not enough blood.

When and how is TTTS diagnosed?

TTTS is usually is diagnosed by ultrasound between 16 and 22 weeks of pregnancy. In severe cases, one baby is swollen (we call him or her “**the recipient twin**”) and has a lot of amniotic fluid around it, while the other baby is smaller (we call him or her “**the donor twin**”) and has only a small amount of amniotic fluid around it. TTTS can be mild or severe, depending upon how badly the babies are affected.

How do you decide how bad the condition is?

Twin to Twin Transfusion Syndrome has been divided into different “stages” to help to decide the most appropriate treatment option for the level (or stage) of the condition.

Stage I: A small amount of amniotic fluid (oligohydramnios) is found around the donor twin and a large amount of amniotic fluid (polyhydramnios) is found around the recipient twin. At this stage, we will usually recommend that the pregnancy is closely observed for further deteriorations.

Stage II: Along with the description above, of the twins, the ultrasound is not able to see the bladder in the donor twin. This would be an indication that laser photocoagulation may be helpful.

Stage III: Everything in mentioned in stage II is present, but there is abnormal blood flow in the umbilical cords of the twins. Laser photocoagulation is recommended in this situation.

Stage IV: All of the above findings are present but in addition the recipient twin has a swelling under the skin and appears to be in heart failure. Laser photocoagulation may be attempted, but the chance of survival in this stage is low.

Stage V: In addition to all the elements listed above, one of the twins has died. Usually the donor twin is the twin to die first, but it can happen to either.

What will happen to the babies without treatment?

In severe cases, if TTTS is not treated, both babies will die in the uterus. Those babies that survive the pregnancy have a 1 in 4 risk of brain damage because of a lack of oxygen, blood and other nutrients. The pregnancy may also be lost because the uterus gets over-stretched from the extra fluid, which leads to early labor or miscarriage. In less severe TTTS the outcomes are better, although the majority of pregnancies are still lost.

What are the options for treatment?

There are 3 main treatments offered for TTTS. The choice depends on how bad the condition is and the wishes of the parents. The choices are pregnancy termination, aggressive serial amnioreduction and laser photocoagulation. All of these options are available to you and will be discussed below. You are seeing us because your doctor believes that laser photocoagulation may be helpful in your pregnancy.

What is Laser Photocoagulation?

Laser photocoagulation is the use of laser light to close the blood vessels on the surface of the placenta so that the babies' blood is no longer shared.

How is it done?

The placenta is inspected with a very thin telescope called a "fetoscope". The fetoscope is placed into the uterus through a tiny hole in the skin and under an anesthetic and so is not painful. The telescope identifies the small connecting blood vessels and they are then "coagulated" using laser light from a small fiber passed along it. The surgery is done in an operating room and takes 30-60 minutes. The type of anesthetic is decided between you, the surgeon and the anesthesiologist, but we recommend an epidural. An epidural anesthetic will cause "numbness" from the waist down and is used commonly for cesarean section. Laser photocoagulation is a procedure newly available in the Pacific Northwest and all cases are operated on by a single physician, Martin Walker, M.D., a maternal-fetal medicine specialist who was trained in this procedure in London, England.

What are the results?

Five other institutions in the United States are currently able to use this treatment for TTTS. They have all had encouraging results: in 80% of the cases, one twin survives; in 70% of the cases both twins survive; and less than 5% of surviving twins have brain damage. This compares favorably with the other treatments, where survival is lower and the brain damage rate is higher.

A recent prospective randomized trial (the Eurofetus study) comparing laser ablation to alternative therapies has demonstrated significantly improved survival with a reduction in the rate of mental handicap in the surviving babies.

What are the risks?

As with any surgery, laser photocoagulation does not come without risk. Here is a list of some of the possible problems that may happen with this procedure. These problems happen rarely, and we take every care to ensure that these risks are as low as possible.

- ✧ **Infection** of the amniotic cavity may occur. Antibiotics are given in an attempt to avoid this complication.
- ✧ **Bleeding** in the mother and/or the babies, preventing the completion of the procedure. Extremely small instruments (2-3 mm) are used to decrease the amount of bleeding, however if the bleeding is very heavy, an abdominal skin incision may be needed to stop it. In extreme cases, the bleeding could be so heavy that the uterus must be permanently removed in order to control the bleeding. In this situation, the mother would not be able to have any more children. Severe, continuing bleeding could result in organ damage and even death.
- ✧ **Injury** to the mother or to the babies may occur from the procedure. Ultrasound is used to watch the babies throughout the procedure as a guide to help to prevent injury from occurring.
- ✧ **Premature labor** or leakage of amniotic fluid may happen as a result of the surgery. The very small size of the instruments helps to make this a lower risk. In addition we give medications to relax the uterus and reduce the chance of contractions.
- ✧ **Miscarriage or Fetal death** may occur as a result of this procedure.

Who is suitable for Laser Photocoagulation?

Pregnancies are considered appropriate for laser photocoagulation in TTTS when they have the following:

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- ✧ Single placenta (Monochorionic)
- ✧ Excess fluid (Polyhydramnios) present in recipient twin
- ✧ Low fluid (Oligohydramnios) present in donor twin
- ✧ Prominent bladder in the recipient and an absent or small bladder in the donor
- ✧ Thin dividing membrane between the twins.

Patients with the following situations may not be suitable for laser photocoagulation in TTTS:

- ✧ Pre-term labor with a short or open cervix
- ✧ Prior septostomy (procedure described under alternative treatments)
- ✧ Abnormal genetic studies
- ✧ Ruptured membranes
- ✧ Infection of the amniotic fluid (Chorioamnionitis).

What happens when I come for the procedure?

You will be scheduled for a detailed ultrasound examination of the twins when you arrive. The ultrasound will look at the size of the twins, the amount of amniotic fluid surrounding each twin, the placenta, the bladder of both twins and their heart function. The blood flow in the umbilical cords will also be evaluated. This ultrasound will take about an hour.

During and after the ultrasound, you will meet with Dr. Walker to discuss the ultrasound exam along with the options for treatment, including general prognosis and recommended follow-up care.

If laser photocoagulation is the treatment choice selected, Melissa Dorn, the program coordinator, will discuss the details of how to prepare for the surgery. Instructions on where and when to come for the laser surgery will also be given. Melissa will also assist you with any special needs you may have. You will be given two consent forms—one for the hospital care and a second that will specifically describe the treatment option of laser surgery. Please read these carefully. Melissa will then take you to the admissions department to complete the pre-admission paperwork.

If needed, you may have a consultation with the anesthetist before the procedure to determine your physical condition, review your medical records and address any needs surrounding pain control.

Where can I stay in Kirkland?

You should plan on spending a few days in the Kirkland area— one day for the detailed ultrasound exam and consultation and another for the procedure. Depending on your situation, you may spend a day or more in the hospital or you may be allowed to go home the same day as the surgery. There are a number of close hotels and motels convenient to the hospital.

Preparation for Surgery

Before surgery, you should not eat or drink anything for approximately 6 to 8 hours. This is to reduce the risk of vomiting during the surgery. You might hear the phrase “NPO” in the hospital—this simply means, nothing by mouth.

If your surgery is scheduled in the morning you should not eat or drink anything after midnight. If your surgery is scheduled after 1pm, you can have a regular dinner the night before surgery. After midnight, you can drink only water. After 7am, you should not eat or drink anything. If your surgery is scheduled after 3pm, you may drink water through the night and have clear liquids for breakfast. Clear liquids are any item you can see through—such as tea, apple juice, cranberry juice or jello. After 8am, you should not eat or drink anything.

You should arrive 2 hours before your surgery is scheduled to start. This time will be given to you by Melissa Dorn. When you arrive at the hospital, you should check in at the Family Maternity Center check-in desk located just inside the blue entrance. An intravenous line (IV) will be inserted by a needle stick to give fluids and medication necessary during the procedure. You may have a support person (a friend or partner) with you during this time, until you are taken back to the operating room. If possible we will also allow one person to come into the operating

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room to sit with you. Melissa and Dr Walker will be available to answer any questions you may have. An ultrasound will be done before heading back to the Operating Room to make sure that the babies' heartbeats are still present. You will then be taken to the operating room on by the nurse and helped up on to the operating table. The anesthesiologist will then give you pain medication – an epidural spinal or local anesthetic, depending on your situation. The skin incisions made for the instruments are pretty small and usually require only a band aid to cover them. The procedure will take between 40 minutes and an hour and a half, but may take longer.

After the Surgery

Following the procedure you will be taken back to your room on the Family Maternity. The nurses there will be monitoring your temperature, pulse, breathing and blood pressure as well as monitoring your uterus for contractions.

Although pain should be minimal, medicine will be available if needed. Antibiotics and medication to help relax the uterus and stop any contractions will be given.

The morning after the procedure, an ultrasound will be done to see if there are any changes in fluid volumes and blood flow in each baby.

Follow-up Care

Your physician can resume your care for the remainder of the pregnancy. Both you and your provider can contact us if there are any questions or concerns.

We recommend weekly ultrasounds for the month following the procedure. If everything looks normal, ultrasounds can then be done every two weeks, or as suggested by your doctor.

We will continue to be interested in your progress and would like to receive copies of your ultrasound examinations and any other relevant information. Information regarding delivery will also be requested from your doctor. We ask that your placenta be sent back to us for evaluation. This is extremely important to evaluate our care and techniques. We will give you the appropriate container and instructions.

We will contact you annually by telephone to see how your babies are doing for at least 2 years.

How can I get more information?

Because this is an uncommon procedure, we have tried to keep this information sheet simple and straightforward. If you would like more detailed information, research papers or a copy of our protocol, please contact Melissa Dorn, Fetal Therapy Coordinator, at 1-866-FET-SURG.

How can I get a referral?

If you are interested in a referral for laser photocoagulation, please contact Melissa Dorn RN, MN at (425) 899-3537 or toll free at 1-866-FET-SURG or email at: MLDorn@evergreenhealthcare.org. Referral information will be discussed to determine if laser surgery is a good option for you. Your provider can also choose to contact us directly to discuss your particular case.

If it is determined that you are an appropriate candidate, you will come to Evergreen Hospital Medical Center's Maternal Fetal Medicine clinic in Kirkland, Washington. Appointments will be made for ultrasound testing as well as consultation with Dr. Walker. We will also schedule a surgery time prior to your arrival. All prenatal records (including ultrasound reports) will be requested. Providing your insurance information prior to any appointments will help to identify if this procedure/testing will be covered by your insurance. Approximately 80-85% of national insurance companies are covering this procedure. All of the insurance companies in the Seattle/Eastside area will cover this procedure at 85%.

What are the alternative treatment options?

Serial amniocentesis

Serial amniocentesis is the removal of the excessive fluid from around the recipient twin using a needle. This procedure may temporarily restore the balance in the amniotic fluid volumes of both. This technique may be useful for milder cases of TTTS, and is often recommended in these cases, but is generally not effective for severe cases. Generally, the need for many amniocentesis procedures has been shown to result in a 40-60% survival rate of one of at least the twins, with approximately 25% of the survivors mentally handicapped.

Septostomy

Septostomy is the creation of a hole in the membrane between the babies using a needle. This causes fluid to move towards the donor's side and balance the fluid levels. Septostomy has not been shown to be a successful therapy, especially in stage 2-5 cases and may create complications such as amniotic bands and cord entanglement.

Umbilical cord ligation

Umbilical cord ligation is a technique that involves tying a knot around the cord of one of the twins to stop its heart from beating, stopping the communication between the fetuses. This is done using similar instruments to the fetoscope. This procedure is used when one of the twins is so close to death that laser ablation is not possible, and is done to protect the other twin from the consequences of that death. The communication between the fetuses is definitively ended, however, this eliminates the chance of survival for one of the twins.

Pregnancy termination

Given the poor prognosis of this condition, when severe, and the need for complicated treatment plans, before 24 weeks, TTTS may be treated with pregnancy termination, generally by labor induction.