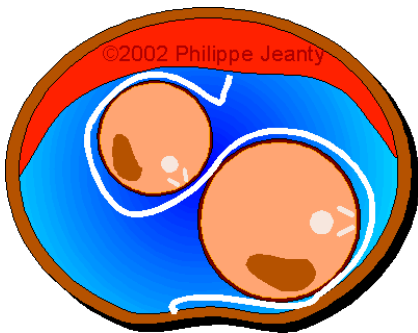




Fetal Distress Condition

Selective Intrauterine Growth Restriction (SIUGR)

Although most pregnancies with monozygotic twins are uncomplicated, the presence of a common placenta does pose a relatively increased risk to the welfare of the fetuses.



Description

Selective Intrauterine Growth Restriction: Although most pregnancies with monozygotic twins (twins that share a common placenta) are uncomplicated, the presence of a common placenta does pose a relatively increased risk to the welfare of the fetuses. The single placenta contains blood vessels that link the blood flow between the twins. Unbalanced flow of blood from one twin to the other twin may lead to a cascade of events that result in twin-twin transfusion syndrome. Another potential problem that may occur in monozygotic twins is the disproportionate distribution of placental mass between the twins (unequal sharing of the placenta). This factor may result in poor nourishment of one of the twins, resulting in subsequent poor overall fetal growth. Because this problem typically affects only one of the fetuses, this condition has been coined selective intrauterine growth restriction (SIUGR). SIUGR is estimated to occur in approximately 10% of monozygotic twin pregnancies.

Severe cases of monozygotic twins with SIUGR show ultrasound evidence of abnormal blood flow through the umbilical artery of the poorly grown twin. In this circumstance, spontaneous death of this baby within the womb may occur in up to 40% of cases. Because of the blood vessels that link the twin's circulatory system together, death of one twin may result in severe drop in blood pressure of the other twin and subsequent brain damage (up to 30%) or death (up to 40%). This complication results from the hemorrhage of blood from the appropriately grown twin into the demised SIUGR twin.

Because the adverse effects to the appropriately grown twin is mediated through the blood vessels that link the circulations of the twins, it has been suggested that obliteration of these vascular communications may result in improved outcomes for the normally grown twin. Separation of the circulations may be done using the surgical techniques which were originally developed for the treatment of twin-twin transfusion syndrome.

Diagnosis

The in utero diagnosis of SIUGR is established by ultrasound. First, the presence of a shared placenta (monozygotic) should be confirmed. Usually ultrasounds performed earlier in the pregnancy may be useful in establishing the chorionicity (number of placentas). Ultrasound findings such as a single placenta, same fetal sex, and a "T-sign" in which the dividing membrane inserts perpendicular to the placenta are helpful in diagnosing a monozygotic twin gestation.

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Once a monochorionic placentation has been established, the diagnosis of SIUGR requires the presence of three important ultrasound findings:

1. The estimated fetal weight (EFW) of one twin measures less than the 10th percentile for the assigned gestational age. The EFW is calculated by measuring standard fetal biometric components via ultrasound. Because prior studies have shown negligible difference between growth curves for singleton and twin gestations in the second trimester, standards as established by Hadlock (1991) for singletons are used to assign the growth percentile.
2. Persistent absent or reversed flow in the umbilical artery of the growth-restricted twin.
3. Finally, the diagnosis of twin-twin transfusion syndrome (TTTS) must be excluded. TTTS is diagnosed by assessing the discordance of amniotic fluid volume on either side of the dividing fetal membranes; the maximum vertical pocket (MVP) of amniotic fluid volume must be greater than or equal to 8.0 centimeters in the recipient's sac, and less than or equal to 2.0 centimeters in the donor's sac to secure the diagnosis of TTTS.

Management Options & Outcomes

The treatment options along with expected pregnancy outcomes are listed below:

1. **Expectant Management:** Prior to the development of the laser therapy outlined below, the treatment of this condition has been traditionally one of expectant management. This entails at least weekly ultrasound assessments of fetal wellbeing, amniotic fluid volume assessment, and Doppler studies of the umbilical artery, as well as sonograms to assess fetal growth about every three weeks. After 24 weeks' gestation, parents traditionally discuss with their physicians whether there is a need for increased fetal surveillance, such as fetal heart rate monitoring, and if a course of steroids is required for fetal maturation therapy. Early delivery may be decided if fetal status is deemed nonreassuring based on fetal heart rate monitoring or ultrasound parameters. The challenge that this condition presents to parents and physicians alike is in regards to the timing of delivery. On the one hand, delay of delivery will reduce the complications associated with premature birth. On the other hand, prolongation of the pregnancy in this setting, particularly if findings suggestive of a nonreassuring fetal status are present, may result in the demise of one twin in the womb. This may occur in up to 40% of monochorionic twins with SIUGR. As described above, the death of one twin while in the womb may result in the concomitant demise of the other twin in as high as 40% of cases. If the other twin does survive, there is up to a 30% risk of subsequent neurologic handicap. The demise of a twin results in these adverse effects on the other twin because of the blood vessels on the surface of the placenta that connect the circulatory systems of the babies – essentially linking the livelihoods of each baby to one another.
2. **Laser Therapy:** This surgical approach utilizes an operative fetoscope to deliver laser energy that then seals off the offending blood vessels on the surface of the common placenta. Because the vascular connections between the two fetuses are sealed, no further blood exchange between the fetuses takes place. It has been theorized that elimination of the vascular communications may decrease or prevent harm to the surviving twin in the case of the demise of one twin. The magnitude of this potential benefit is unknown.

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Candidacy for Treatment

To qualify for treatment, generally the following conditions must be met.

Inclusion Criteria

1. Gestational age 16-26 weeks.
2. Sonographic evidence of monochorionicity (shared placenta).
3. Diagnosis of IUGR present in one twin (fetal weight at or below the 10th percentile for gestational age -Hadlock et al 1991).
4. Absent or reverse-end diastolic flow in the umbilical artery in the SIUGR twin.

General Exclusion Criteria

1. Presence of twin-twin transfusion syndrome defined as a maximum vertical pocket (MVP) of ≤ 2 cm in one sac and MVP of ≥ 8 cm in the other sac.
2. Presence of major congenital anomalies (anencephaly, acardia, spina bifida) or intracranial findings in either twin: IVH, porencephalic cysts, ventriculomegaly or other findings suggestive of brain damage.
3. Unbalanced chromosomal complement.
4. Ruptured or detached membranes.
5. Placental Abruption.
6. Chorioamnionitis (infection in the uterus).
7. Triplets

Details of Surgical Procedure

Most surgeries are performed under local anesthesia with some intravenous sedation. A small incision (3 millimeters or about 1/10th of an inch) will be made and a trocar (small metal tube) will be inserted into the amniotic sac of the normally grown twin. Amniotic fluid may be sent for genetic and microbiology studies. An endoscope (medical telescope) will be passed into the uterus. The blood vessels, which are visible on the surface of the placenta, will be analyzed, and all communicating vessels will be sealed off with laser energy. A second trocar may have to be inserted to complete the surgery, particularly if the placenta is anterior. You will be given antibiotics before and after surgery.

Postoperative Care

Typically, you will remain in the hospital for 1 to 2 days after surgery. You will then be sent home to the care of your primary obstetrician and perinatologist. Follow-up ultrasounds will be scheduled every week for the first month to detect possible intrauterine fetal demise, and monthly thereafter. Delivery will be decided based on obstetrical indications (however it is the recommendation of Fetal Hope to have weekly monitoring via ultrasound, NST's, or other appropriate means.).

Additional Resources

For more information on SIUGR, please visit www.fetalhope.org.