



## Maternal -Fetal Therapy

Fetal anomalies complicate approximately 3-4% of all live births. With advances in prenatal imaging, many of these affected pregnancies can be detected prior to delivery. The majority of anomalies are best treated after delivery, with the benefit of prenatal diagnosis allowing the patient and physician to discuss the implications of the malformation and/or other findings, management options, and optimal time, place and mode of delivery. In certain conditions the fetal malformation or physiologic change is so severe that antenatal medical or surgical therapy is indicated to prevent fetal death or to decrease fetal morbidity. Before considering a patient as candidate for such an intervention there must be an accurate diagnosis to assure that the malformation is amenable to prenatal intervention, a clear understanding of the natural history of the disorder, and proven benefit to prenatal therapy compared with expectant management based on animal and human data. Any antenatal fetal therapy should be performed in a multidisciplinary center with strict protocols and approval by institutional and informed consent.

The following group of disorders is considered amenable, or potentially amenable, to antenatal intervention:

- Thoracic: lung mass or hydrothorax with hydrops
- Teratoma: sacrococcygeal or cervical teratoma with hydrops
- Myelomeningocele
- Fetal anemia/thrombocytopenia
- Fetal arrhythmia
- Complicated Monochorionic Twins
  - Twin-twin transfusion syndrome
  - Twin reversed arterial perfusion
  - Discordant malformation
- Urinary tract obstruction
- Congenital diaphragmatic hernia
- Aortic or pulmonary obstruction

Over the past four decades, there have been major advances in in utero surgical fetal therapy, moving the interventions from predominately open surgery with attempts at primary anatomic repair, to physiologic manipulation of the fetal disorder through minimally invasive procedures. These minimally invasive interventions generally utilize needles for delivery

of medications and blood products and placement of shunts into fetal body cavities. Miniaturized telescopes have been developed to allow direct visualization of the fetus and placenta for treatment of disorders such as twin-twin transfusion syndrome. However, even with these improvements, in utero fetal surgical therapy harbors significant risks to the expectant mother and fetus, including bleeding, infection, preterm premature membrane rupture, preterm delivery, direct injury to the fetus, and even fetal demise. In situations where open maternal-fetal surgery is required, these risks are even higher, with the possibility of traumatic uterine rupture, placental abruption, hemorrhage, and infection. Because open maternal-fetal therapy mandates a cesarean birth, patients must be counseled about the implications of cesarean on future pregnancies.

The role of the maternal-fetal medicine (MFM) subspecialist in maternal-fetal therapy can be divided into three main areas: prenatal diagnosis and counseling, fetal therapy, and coordination of care and delivery planning following therapy. MFM subspecialists are invaluable to diagnosing fetal anomalies and providing the initial counseling to expectant mothers and their family members. MFM subspecialists are able to perform a comprehensive assessment of the fetus via ultrasound, as well as to counsel the patient about possibility etiologies of disorder in question, the prognosis and risk/benefits of various management options, including in utero fetal therapy when available and appropriate. MFM subspecialists

can also perform prenatal diagnostic procedures, such as an amniocentesis, chorionic villus sampling (CVS) or umbilical cord blood sampling in order to provide the expectant mother with additional information about the fetal anomaly or condition that is essential in many cases to direct the ongoing care. MFM subspecialists will coordinate the multi-disciplinary team and direct the ongoing prenatal care mandated for these special pregnancies. If the condition has been deemed amenable to in utero therapy, MFM subspecialists may either perform the procedure, as is often the case with minimally invasive procedures, or act as co-surgeons with pediatric surgeons as is the case for fetal anomalies mandating open maternal-fetal surgery. Following the intervention, MFM subspecialists coordinate the post-intervention surveillance of the mother and fetus, as well as the delivery planning. MFM subspecialists are the primary providers who manage prenatally diagnosed fetal malformations with either maternal-fetal therapy or with expectant observation of the natural progression of the underlying condition, coordinating the ongoing care and delivery planning along with the neonatology teams and pediatric subspecialists.

**Key points:**

- Advances in maternal-fetal therapy have led to a transition from open fetal therapy to minimally invasive interventions for some conditions
- Maternal-fetal therapy still harbors significant risk to both

- the expectant mother and fetus.
- Ramifications of maternal-fetal therapy on both the current and future pregnancies must be discussed with the patient.
  - Maternal-fetal therapy should only be performed in multi-disciplinary tertiary care centers with strict protocols and approval by institutional and informed consent.
  - The role of the MFM subspecialist in fetal therapy can be divided into three main areas: Prenatal diagnosis and counseling, fetal therapy, and coordination of care and delivery planning following therapy.

The practice of medicine continues to evolve and individual circumstances will vary. This document reflects information available at the time of publication and is not intended to establish an exclusive standard of perinatal care. This publication is not expected to reflect the opinions of all members of the Society for Maternal-Fetal Medicine. For further information: [www.smfm.org](http://www.smfm.org)