Winthrop-University Hospital is providing new hope for women with high-risk pregnancies through its specialized fetal therapy and surgery program. Created in 2008, the program incorporates a cooperative multidisciplinary effort to optimize both fetal and maternal welfare. Advanced therapeutic strategies for evaluation and treatment range from precautionary monitoring to advanced surgical options. This new frontier in medicine offers options to women with high-risk pregnancies and gives opportunities to those who might otherwise be incapable of carrying a fetus long enough to give birth.

“Our objective in establishing the fetal therapy and surgery program at Winthrop-University Hospital was to enable us to treat certain fetal conditions that, if left untreated, would prevent the fetus from developing safely and to also allow delivery at a more advanced gestational age,” says Martin Chavez, M.D., Chief of the Division of Maternal-Fetal Medicine and Director of the Fetal Therapy and Surgery Program. Dr. Chavez specializes in high-risk
pregnancies, ultrasound diagnoses, ultrasound-guided procedures, fetal therapy, treatment and surgery.

Winthrop-University Hospital is renowned throughout the region for its high-risk obstetrical program. The Division of Maternal-Fetal Medicine has a highly trained staff of experts, including board-certified perinatologists, perinatal nurses and perinatal sonographers that specialize in obstetrics. Advances in prenatal diagnosis, particularly in prenatal ultrasound, have led to a new understanding of the natural history and physiologic outcomes of certain congenital anomalies. These advances have also made it possible for Dr. Chavez and others at Winthrop-University Hospital to diagnose potentially serious conditions, including those that require immediate in-utero therapeutic/surgical intervention prior to delivery.

**Fetal Surgery**

Once the prenatal diagnosis is made, Dr. Chavez and a team of subspecialists develop and implement a customized treatment program. “Not every case warrants surgery, and there are nonsurgical approaches available to treat a fetus, including increased fetal surveillance, so we can diagnose fetal conditions and identify problems early. In addition, early delivery of a fetus is sometimes done if it is age appropriate, and the care that is needed can be better administered outside the uterus. Fetal surgery is a viable option to treat certain lethal and nonlethal congenital conditions that would jeopardize the survival of the fetus if left untreated in utero,” explains Dr. Chavez. A variety of treatment options are available to enable a fetus to survive and be safely delivered. The newborn can undergo further corrective surgery after birth, if necessary.

The recent advancements in endoscopic surgical technology have provided the opportunity to develop techniques adapted for prenatal fetal intervention. Equipped with state-of-the-art technology, Dr. Chavez performs the latest techniques in fetoscopic surgery. He explains, “Our fetal surgical procedures are done in utero through minimally invasive techniques with the help of direct visualization and ultrasound guidance. This approach is far less invasive than open techniques, which require the mother to undergo a cesarean section of sorts to expose the fetus for treatment. During an open procedure, the fetus is partially removed in order to expose the area that requires treatment.” Dr. Chavez says that in most cases the open method is not performed due to the potential for complications. “This type of surgery is very risky for both the mother and the fetus.” He adds, “Studies continue to show that some open methods are really not producing much benefit versus minimally invasive treatments or treatment after delivery.”

Fetoscopic surgery greatly reduces the likelihood of preterm labor compared to open surgery. During this technique, Dr. Chavez makes tiny incisions to enter a woman’s uterus. “There is no need to remove the fetus from the womb with the use of high-definition video equipment and miniaturized laparoscopic equipment, which provides a better view of the magnified surgical area,” he explains.

**Conditions Treated**

Along with a specially trained team of doctors, nurses and anesthesiologists, Dr. Chavez surgically treats a number of conditions in utero. These include, but are not limited to, fetal anemia, twin-to-twin transfusion syndrome and fetal/placental tumors. “Fetal blood transfusions enable our team to address anemia problems and treat the fetus in utero so that the patient’s
pregnancy can continue with much better outcomes,” says Dr. Chavez. An intrauterine blood transfusion is given to replace fetal red blood cells that are being destroyed by the mother’s immune system, infection, placental tumors or anatomical defects. The treatment is intended to keep the fetus healthy until it is mature enough to be delivered safely.

Blood transfusions can be administered through the fetal abdomen or, more commonly, by delivering the blood into the umbilical vein. Umbilical cord vessel transfusion permits better absorption of blood and provides a higher survival rate than a transfusion performed through the fetal abdomen. “Fetal umbilical cord transfusion is the preferred method for administering a blood transfusion to a fetus, because it allows for accurate measurements of fetal blood count and exact amounts of blood to be delivered.”

With the help of ultrasound guidance, Dr. Chavez temporarily paralyzes the fetus with medication administered through the umbilical cord or through an intramuscular injection in the fetal shoulder or the thigh. The fetus needs to be at least 16 weeks old to receive a blood transfusion.

Twin-to-twin transfusion syndrome occurs in identical twins that share the same placenta. Cases can range from mild to severe and can occur at any point during a woman’s pregnancy. It’s estimated that the syndrome occurs in 10% to 15% of identical twin pregnancies. The disorder is often suspected when a pregnant woman carrying twins finds her abdomen rapidly enlarging. The syndrome can also be detected during an ultrasound of the pregnancy.

In twin-to-twin transfusion syndrome, the twins share not only the same placenta, but also some of the same circulation. This enables the transfusion of blood from the donor twin to the recipient twin. The syndrome causes the donor twin to become small and anemic and the recipient twin to become large and overloaded with blood. Because the recipient twin has more blood, he or she also urinates more and has more amniotic fluid. Unfortunately, the donor twin has less amniotic fluid — sometimes so little that the fetus appears on an ultrasound to be stuck in place on the wall of the uterus. This is referred to as the “stuck twin” phenomenon.

To treat the disorder, Dr. Chavez uses fetoscopic laser photocoagulation, which separates the circulation of the fetuses and stops the twin-to-twin transfusion. Dr. Chavez meticulously places a fetoscope into the woman’s uterus through a 2-3 millimeter incision in the skin. He uses laser energy to seal the anastomotic blood vessels on the surface of the placenta, which restores balance to the placental circulation so that equal blood volumes flow to both fetuses. The procedure is performed in the operating room using either a spinal epidural or local anesthesia. After the procedure, the mother returns to the care of her own obstetrician for the remainder of her pregnancy and delivery. Repeatedly draining the excess amniotic fluid from the recipient twin by amniocentesis is another method that can be used, but not as effectively as laser treatment.

Dr. Chavez also treats chylothorax, a condition that occurs when fluid builds up around a fetus’s heart and lungs. The condition can pose a number of complications for the fetus, since it impinges on the normal function of the heart. “Chylothorax is a rare condition that can occur spontaneously during a woman’s pregnancy,” says Dr. Chavez. “Because it can be life threatening, it must be closely monitored and properly treated.” Dr. Chavez inserts a pleuro-amniotic shunt between the chest and the amniotic cavity to drain the excess fluid from the fetus’s chest while still in the
womb. “I believe the benefits of this procedure far outweigh any risks,” says Dr. Chavez.

The pleuro-amniotic shunt, only available at select hospitals nationwide, is performed under local anesthesia and involves positioning a flexible tube between the fetal pleural cavity and the amniotic fluid surrounding the fetus. “The procedure yields immediate results, and the level of fluid around the fetus’s lungs decreases over a matter of hours,” notes Dr. Chavez. The shunt acts as a drain to prevent additional fluid buildup and is removed shortly after the baby is born.

Sometimes, a fetus will develop certain types of tumors. To address these growths, Dr. Chavez uses radiofrequency ablation or a laser to seal off the blood supply to the tumor. This maneuver hinders the tumors from growing larger, so the fetus can survive until it can be delivered. The tumors can be safely removed after birth. Sometimes, a fetus can develop tumors on the lower portion of the back that become so large and vascular that the fetus becomes anemic. “We treat these tumors by administering blood to the fetus, or we can use a diode laser to seal off the vessels to decrease surface blood flow to the tumor.”

Winthrop-University Hospital offers a full range of inpatient and outpatient services, including comprehensive obstetric and gynecological services. Winthrop-University Hospital is a New York State Regional Perinatal Center, a prestigious designation that recognizes the hospital’s ability to deliver the highest level of obstetrical and perinatal care.

Off to a Great Start
“Our desire is to catch fetal abnormalities as early as possible. Unfortunately, I don’t see patients unless they have a problem, and by that time, the disease process has also started. Nevertheless, we are committed to doing everything possible to intervene, so these vulnerable fetuses have the best chance at life,” says Dr. Chavez.

Among the champions of the fetal surgery program at Winthrop-University Hospital are Anthony M. Vintzileos, M.D., Chairman of the Department of Obstetrics and Gynecology, and Mr. John F. Collins, Winthrop-University Hospital’s President and CEO. Dr. Vintzileos, a member of the Board of Governors of the American Institute of Ultrasound in Medicine, is widely respected for his contributions to the field of maternal-fetal medicine, including more than 300 peer-reviewed articles and book chapters on topics related to maternal-fetal medicine, fetal behavior and obstetrical ultrasonography.

Although the fetal therapy and surgery program at Winthrop-University Hospital is still relatively new, Dr. Chavez says he’s very excited about the work that’s being done. Since 2008, he has performed a number of intricate fetal surgical procedures. “It’s enormously gratifying to be able to help women deliver healthy babies. It’s also heartwarming when you get invited to birthday parties to celebrate these miracle babies,” he says. “We believe it’s very important to stay in touch with these families because their feedback is invaluable in helping us counsel other patients.”

Partnering With Other Physicians
Historically, women who required specialized maternal-fetal services had to travel out of state for this type of care, but now, they have convenient access on Long Island. Only 25 to 30 facilities throughout the nation — and only two in New York state — offer similar programs.

“At Winthrop, we are very interested in partnering with