

TEXAS FETAL CENTER NEWSLETTER

Summer 2013 • 4th Edition

*The Texas Fetal Center at Children's Memorial Hermann Hospital, in collaboration with
The University of Texas Health Science Center at Houston (UTHealth) Medical School.*

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Ways to Give to the Texas Fetal Center

To continue to provide the highest level of specialized care to both mothers and babies and support the groundbreaking work of the Texas Fetal Center, investments in capital needs and additional research are required.

For more information on how to support the Texas Fetal Center contact Randi Koenig, director of development at the Memorial Hermann Foundation, at 713.242.4643 or email Randi.Koenig@memorialhermann.org.

World-renowned Fetal Cardiologist, Helena Gardiner, M.D., Ph.D., joins the Texas Fetal Center



Helena Gardiner, M.D., Ph.D., world-renowned fetal cardiologist, joins the Texas Fetal Center at Children's Memorial Hermann Hospital as co-director of the Fetal Cardiology Program. She will serve as a professor in the department of Obstetrics, Gynecology and Reproductive Sciences and the division of Pediatric Cardiology at UTHealth Medical School.

Dr. Gardiner graduated from medical school in 1982 and went on to train in pediatrics and neonatal medicine in the United Kingdom and the Bahamas. She was awarded a Children's Research Fellowship in 1988 and an M.D. in 1992 from Bristol University for her thesis on the novel use of ultrasound to examine the neonatal hip. After training and accreditation in pediatric cardiology in the U.K., she was awarded a Medical Research Council (MRC) Visiting Scientist Fellowship at the University of Lund in Sweden, where she studied vascular programming of the fetal circulation. In 2002 she received a Ph.D. from Lund University.

Dr. Gardiner was appointed as senior lecturer at Imperial College London in 1997, working at the Royal Brompton and Queen Charlotte's and Chelsea Hospital in London, and was promoted to reader and director of perinatal cardiology in 2008, a position she held until relocating to Houston this year. Following her experience in London and growing the fetal cardiology service and research at The Center for Fetal Care at Queen Charlotte's & Chelsea Hospital, Dr. Gardiner is looking forward to growing the fetal cardiology program with her colleagues at the Texas Fetal Center.

She joins Gurur Biliciler-Denktaş, M.D., assistant professor of pediatric cardiology, as co-director of the Fetal Cardiology Program.

Research and Education Interests

While in the U.K., Dr. Gardiner established collaborative teams between fetal medicine and cardiology experts at Queen Charlotte's Hospital and Royal Brompton Hospital to undertake translational research in noninvasive and interventional fetal cardiovascular work. Through these collaborative efforts, the teams established collaborations with centers in Europe and the United States and received national and international recognition for their work on fetal vascular programming in monozygotic twins, fetal growth restriction and the use of percutaneous fetal valvuloplasty.

continued



Texas Fetal Center Team.

Her recent translational research interests include noninvasive outcomes, interventional fetal cardiovascular and neuro-developmental outcomes and novel aspects of imaging the fetal heart early in gestation, as well as the functional assessment and childhood outcomes following fetal surgery to open the aortic valve.

Dr. Gardiner has worked on several national and international educational and accreditation committees. As a council member and former secretary of The Fetal Working Group of the European Association of Pediatric Cardiology, she co-authored Recommendations from the European Association of Pediatric Cardiology for Training in Fetal Cardiology (2008) and has organized two multinational, multicenter research studies on congenital atrioventricular block (*Circulation*.2011;124:1919-26) and the current study on intrauterine treatment for fetal aortic stenosis.

Dr. Gardiner is an advisor to the National Health Service Fetal Anomaly Screening Programme (NHS FASP) to evaluate training standards and the optimal pathway for pregnant women with suspected fetal congenital heart disease.

Texas Tiny Tickers

Major congenital heart defects (CHD), those requiring surgery in the first year after delivery, affect 3.5 babies in every 1,000 pregnancies scanned each year. Detection of these babies before birth improves the management of pregnancies and allows safer delivery and better treatment and care of the babies after birth. In order to address the need for early detection of CHD, Dr. Gardiner founded the Tiny Tickers Program (tinytickers.org) in 1999 in the U.K., with the aim of improving screening of congenital heart defects before birth.

The Tiny Tickers Program aims to improve the overall detection, diagnosis and care for babies with major heart defects, before birth and in the first year of life. For more than 14 years, the Program has educated physicians and sonographers and improved professional standards used to train, screen, diagnose and care for babies with CHD, in addition to raising community awareness of the impact of undetected congenital heart disease and the associated risks with delayed diagnosis.

With the arrival of Dr. Gardiner, the Texas Fetal Center plans to establish an active training program in Houston and the surrounding communities in order to improve the confidence of sonographers in the detection of congenital heart defects. Through education, research and community awareness, more babies with heart conditions can be diagnosed during the prenatal period, allowing physicians and families the advantage of early treatment and intervention options in order to give these babies the chance of a better start in life.

Caring for Congenital Heart Defects: A Multidisciplinary Approach

The Children's Heart Institute, a collaboration between Children's Memorial Hermann Hospital and UTHealth Medical School, is a leader in the diagnosis and treatment of congenital heart defects (CHD) and is one of only two pediatric cardiology facilities in Southeast Texas.

Through a coordinated and collaborative care approach at the Texas Fetal Center, patients are provided with the most advanced technology in order to accurately provide a prenatal diagnosis. Once a diagnosis is made, the fetal care team works together with subspecialists, including pediatric cardiologists, pediatric cardiovascular surgeons and the neonatology team, to create a personalized delivery plan as well as a neonatal treatment plan including the most advanced surgical and nonsurgical treatment options for babies diagnosed with heart defects.

Pediatric Cardiovascular Surgery



William Douglas, M.D., joined the pediatric cardiovascular surgery team in 2007 as chief of the division of Pediatric Cardiovascular Surgery. Dr. Douglas is active in the research and development of new medical devices for pediatric cardiac surgery, including the adjustable systemic-pulmonary artery shunt that is used to provide precise pulmonary systemic blood flow following single-ventricle reconstructive surgery. Every year, Dr. Douglas participates in mission trips to Central and South America to perform heart surgery for impoverished children in developing countries.



In 2011, Michael Hines, M.D., professor in the division of Pediatric Cardiovascular Surgery, relocated to Houston from North Carolina to join the Children's Heart Institute. His clinical practice includes the repair of CHD in infants, children and adults. He has a special interest in minimally invasive approaches including video-assisted thoracoscopic surgery (VATS) ligation of the patent ductus arteriosus. He is the only surgeon in the Southwest United States to offer this procedure, often on an out-patient basis. Dr. Hines remains active in extracorporeal membrane oxygenation (ECMO) practice and education, serving over a decade on the steering committee of the Extracorporeal Life Support Organization, including three years as its chairperson. He remains an internationally recognized expert in ECMO support and now directs the program at Children's Memorial Hermann Hospital and the rapidly growing adult program.



Pediatric Cardiology

Gurur Biliciler-Denktaş, M.D., serves as the co-director of the Fetal Cardiology Program at the Texas Fetal Center, in conjunction with her role as assistant professor in the division of Pediatric Cardiology at UTHealth Medical School. Dr. Biliciler-Denktaş completed her residency training in pediatrics at Mayo Clinic College of Medicine and went on to complete pediatric cardiology and echocardiography fellowships at the same institution. She also completed additional fellowship training in pediatric cardiology at the University of Miami. Her clinical and research interests include fetal echocardiography, pediatric echocardiography and adult congenital heart disease.

Texas Fetal Center: Research And Education

Ongoing Research Projects

- Ramesha Papanna, M.D., a visiting fellow from Yale School of Medicine, is completing a swine project at the UTHealth Medical School to study various methods for sealing iatrogenic defects at fetoscopy. Results to date using a decellularized amniotic membrane patch look favorable. Further work is planned in collaboration with Russell Stewart, Ph.D., from the University of Utah to investigate the role of underwater glue in securing the patch.
- Kenneth Moise Jr., M.D., is collaborating with Kuojen Tsao, M.D., UTHealth department of Pediatric Surgery, Stephen Fletcher, D.O., and David Sandberg, M.D., UTHealth department of Pediatric Neurosurgery, and Russell Stewart, Ph.D., of the University of Utah, to study the use of underwater glue to patch fetal myelomeningocele (MMC). Recently, successful creation of the MMC has been accomplished in the animal model.
- Pedro Argoti, M.D., a first-year fetal intervention fellow at UTHealth Medical School, is working in collaboration with Judith Smith, Pharm.D., to study the maternal pharmacokinetics of a remifentanyl infusion in pregnant women undergoing fetal intervention procedures.
- Dr. Argoti is also prospectively studying the ultrasound measurement of thigh volume in fetuses with myelomeningocele to determine if ambulation can be predicted later in the life of these children.

In Print and Publication

Lee H, Bebbington M, Crombleholme TM. The North American Fetal Therapy Network Registry data on outcomes of radiofrequency ablation for twin-reversed arterial perfusion sequence. *Fetal Diagn Ther* (Epub 4/9/2013).

Argoti PS, Bebbington M, Johnson A, Moise KJ Jr. Sonographic capture of acute exsanguination in a case of developing monochorionic co-twin demise. *Ultrasound Obstet Gynecol* (Epub 4/10/2013).

Moise KJ Jr, Bebbington MW, Johnson A, Walker M, Johnson M. The benefit of laser therapy for severe twin-twin transfusion: which meta-analysis do you pick? *Am J Obstet Gynecol* (Epub 3/21/2013).

Papanna R, Mann LK, Moise KY, Johnson A, Moise KJ Jr.. Prevention of iatrogenic preterm premature rupture of membranes using absorbable gelatin sponge after fetoscopic laser surgery for twin-twin transfusion syndrome. *Ultrasound Obstet Gynecol*. (Epub 4/18/2013).

Skupski DW, Luks FI, Papanna R, Walker M, Bebbington M, Ryan G, O'Shaughnessy R, Moldenhauer J, Bahtiyar O; North American Fetal Therapy Network (NAFTNet). Laser ablation of placental anastomoses in twin-to-twin transfusion syndrome: preoperative predictors of death by recursive partitioning. *Prenat Diagn*. 2013;33:279-83.

Papanna R, Bebbington M, Moise KJ Jr. Novel findings of an iatrogenic fetal membrane defect after previous fetoscopy for twin-twin transfusion. *Ultrasound Obstet Gynecol* (Epub 1/17/2013).

Argoti PS, Bebbington M, Adler M, Johnson A, Moise KJ Jr. Serial intrauterine transfusions for a hydropic fetus with severe anemia and thrombocytopenia caused by parvovirus: Lessons learned. *Am J Perinatol* (in press).

Texas Fetal Center: Research And Education

Hui L, Wick HC, Moise KJ Jr, Johnson A, Luks F, Haeri S, Johnson KL, Bianchi DW. Global gene expression analysis of amniotic fluid cell-free RNA from recipient twins with twin-twin transfusion syndrome. *Prenat Diagn* (in press).

Fetal Therapy: Scientific Basis and Critical Appraisal of Clinical Benefits. eds. Kilby MD, Oepkes D, Johnson A. Cambridge University Press; New York, NY, 2013.

Moise KJ. The rationale for fetal therapy. IN: Fetal Therapy: Scientific Basis and Critical Appraisal of Clinical Benefits. eds. Kilby MD, Oepkes D, Johnson A. Cambridge University Press; New York, NY, 2013.

Papanna R, Moise KJ. Twin-to-twin transfusion syndrome: management of stage I disease. IN: Fetal Therapy: Scientific Basis and Critical Appraisal of Clinical Benefits. eds. Kilby MD, Oepkes D, Johnson A. Cambridge University Press; New York, NY, 2013.

Ruano R, Johnson A, Kilby MD. Fetal urinary obstruction: fetal cystoscopy. IN: Fetal Therapy: Scientific Basis and Critical Appraisal of Clinical Benefits. eds. Kilby MD, Oepkes D, Johnson A. Cambridge University Press; New York, NY, 2013.

Presentations

Several members of the Texas Fetal Center presented at the 32nd Annual Meeting of the International Fetal Medicine and Surgery Society (IFMSS) held in May 2013 in Jerusalem, Israel.

- Papanna R, Block-Abraham D, Buhimschi I, Bebbington MW, Garcia EI, Khalek N, Harman CR, Moise KJ Jr., Baschat A, Johnson A. Predictors of preterm delivery after fetoscopic laser surgery for twin-twin transfusion syndrome.
- Papanna R, Mann LK, Moise KJ Jr., Kyriakides T, Zhao G, Argoti P, Buhimschi CS, Buhimschi IA. Amniochorion apoptosis and autophagy: novel insights into the mechanisms of PPRM after fetoscopic laser surgery for twin-twin transfusion syndrome.
- Papanna R, Mann LK, Johnson A, Moise K, Moise KJ Jr. Chorioamnion plugging with absorbable gelatin sponge to prevent iatrogenic preterm premature rupture of membranes after fetoscopic laser surgery for twin-twin transfusion syndrome.
- Papanna R, Mann LK, Tseng SCG, Swindle M, Stewart RJ, Argoti P, Garcia E, Kyriakides T, Johnson A, Tatevian N, Buhimschi IA, Moise KJ Jr. Cryopreserved human amniotic membrane (hAM) to promote healing of iatrogenic fetal membrane defect in a swine model.
- Argoti P, Papanna R, Bebbington MW, Khalek N, Baschat A, Johnson A, Moise KJ Jr. Outcomes of laser photocoagulation for fetofetal transfusion syndrome in dichorionic-triamniotic triplet gestations as compared to monochorionic-diamniotic twins.

Invitations

- Michael Bebbington, M.D., has been invited to write the accompanying editorial for the July issue of *Ultrasound Obstetrics and Gynecology*.
- Kenneth Moise Jr., M.D., has been invited to be the guest editor for an upcoming special edition on fetal intervention to be published in the *American Journal of Perinatology*.

Texas Fetal Center Patient Story – In Their Own Words

Hypoplastic Left Heart Syndrome: Mason's Story

Written by Mason Brown's mother, Erinn Brown



When our daughter was about 2 1/2 years old, my husband, Kevin, and I began discussing having another child. We wanted our daughter Macie to have a sibling, and we wanted them close in age. It was not long after that I found out I was pregnant for the second time.

This pregnancy, just as my first, was relatively easy. When Macie was born, Hurricane Ike was in the Gulf of Mexico and quickly approaching Galveston, Texas. We had a rushed discharge and were sent home to “hunker down” and ride out our first hurricane. It was a chaotic time for our family so I prayed that our next delivery would be smooth and simple; however, that wasn't the case this time.

At my 22-week ultrasound, the baby's positioning made it difficult to get a clear image of the baby's organs; however, we could clearly see that we were expecting a boy. Kevin and I were elated! Weeks later, at my 34-week ultrasound, my physician requested another ultrasound be performed so that better images of all organs could be taken. During the ultrasound, our technician was quiet and focused and I had an instant feeling that something was very wrong. When my OB came in the room, I could immediately tell I was right; her demeanor had changed. She told me that she wanted me to go to the Texas Fetal Center and see Jerrie Refuerzo, M.D., maternal-fetal medicine specialist affiliated with Children's Memorial Hermann Hospital, because there was excess fluid around our son Mason's heart and we would need a fetal echocardiogram (ECHO) to be sure.

With tears running down my face, I called Kevin to update him of the news. He was my rock and said we shouldn't worry until we knew what we were dealing with. I then placed a phone call to the Texas Fetal Center and spoke with a woman whom I now call my guardian angel, Coral, a clinical coordinator at the Texas Fetal Center. It was two days before Thanksgiving and I desperately wanted answers but felt it was a long shot because of the holiday. Coral called me back first thing the next morning and said she had scheduled a fetal ECHO for that afternoon and an informal meeting with a pediatric cardiologist. She told me where to park, where to meet her, and guided me to all of my first appointments.

After the ECHO was completed, I met with a pediatric cardiologist affiliated with Children's Memorial Hermann Hospital. She told me that a large part of Mason's heart was underdeveloped; he had hypoplastic left heart syndrome (HLHS) and would need surgery soon after birth. I was worried that I would lose my baby but she assured me that there were procedures that could save my little guy. The pediatric cardiovascular (CV) surgeon was not available to meet until after Thanksgiving but fortunately the CV surgery nurse coordinator, Becky, was available. I met with Becky who patiently explained Mason's heart anatomy to me. She helped me better understand what HLHS was and reassured me that Mason was in good hands.

Over the Thanksgiving holiday, Kevin and I shared this news with family and close friends. There were a lot of tears and an incredible amount of fear of what was to come. Kevin and I were both scouring the internet seeking answers and more information about HLHS. I distinctly remember finding a mother's blog detailing the loss of her child to HLHS and how it tore her marriage apart. With that I decided Kevin and I had to come together. We openly discussed our marriage, our relationship with God, the possibility of losing Mason, and the impact this could have on our 3-year-old daughter. We made the decision that we would get through this together, relying on our faith and our family.

The following week, Kevin and I met with William Douglas, M.D., pediatric cardiovascular surgeon; Becky, pediatric CV nurse coordinator; Coral, Texas Fetal Center patient care coordinator, and yet one more guardian angel, Karen Moise, R.N., lead clinical nurse coordinator at the Texas Fetal Center. We were provided with so much information about Mason's condition, the surgeries he would face, and the struggles he and our family would face together. It was hard to take in, but we are still so thankful that these wonderful and skillful people took the time to sit down with us and answer every question we had. It was on this day, sitting around that table, that our family grew to include a few new special faces.

Over the course of a few days, we toured the NICU and the labor and delivery unit. On the day Mason arrived, we felt very comfortable at the hospital, which would be our new home for the next month or so. Mason was born on January 4, 2012, via cesarean section.



Mason Brown with sister Macie.

I visited my little guy later that evening in the NICU. The team had already run many tests and did his first of many ECHOs in order to prepare him for surgery. At 6 days old, Mason had his first open heart surgery, the Norwood procedure. Mason's recovery was spent in the Pediatric Intensive Care Unit followed by the Children's Special Care Unit, and after almost three weeks in the hospital, we were finally able to bring Mason home. He did well at home and when he was almost 6 months old, Mason had his second open heart surgery, the Glenn procedure. This time he only spent about a week in the hospital and has been home and doing AWESOME ever since!

We have been incredibly blessed since Mason joined our family. Having a child with a heart condition forced Kevin and me to see things very differently. We hug our daughter a little tighter and delight in how easy she is to care for. We cherish every moment, every milestone and every smile Mason gives us, and thank God to have him in our lives. One of the biggest lessons we've learned is not to sweat the small stuff. Life is full of unexpected and scary things but you just have to roll with it and make the most of every experience.

“A large part of Mason’s heart was underdeveloped. I was worried I would lose my baby, but they assured me there were procedures that could save my little guy.”

Events



The speakers at the Multifetal Pregnancy event.

Multifetal Pregnancy: A Multidisciplinary Update educational conference

The Multifetal Pregnancy: A Multidisciplinary Update continuing educational event was held on Saturday, May 11 at The Brown Foundation Institute of Molecular Medicine for the Prevention of Human Diseases (IMM) in the Texas Medical Center. The event was co-directed by Anthony Johnson, D.O., co-director of the Texas Fetal Center and professor in the department of Obstetrics, Gynecology and Reproductive Sciences at the UTHealth Medical School, and Alfredo Gei, M.D., maternal-fetal medicine specialist and associate professor, department of Obstetrics, Gynecology and Reproductive Sciences at the same institution.

The Multifetal Pregnancy CME event provided prenatal healthcare providers with the current guidelines and best practices for the management of multiple gestations as well as the detection and treatment of disorders unique to monochorionic pregnancies.

For more information and to view presentations from this conference or to view archived presentations from previous conferences, visit childrens.memorialhermann.org/cme.



International leaders in the treatment of TTTS gathered in Houston for a collaborative educational workshop.

Twin-Twin Transfusion Syndrome Workshop

The Texas Fetal Center hosted the Twin-Twin Transfusion Syndrome Workshop in mid-June under the direction of Kenneth Moise Jr., M.D., co-director of the Texas Fetal Center. Physicians and nurse representatives from leading fetal centers in North America who are actively involved in the treatment of complicated multifetal pregnancies attended the one-day event. Through the educational workshop, the group's objective was to share the pros and cons of various surgical innovations currently used in the treatment of complex monochorionic twin gestations.

The Texas Fetal Center receives \$1 million donation from Keith and Alice Mosing

In mid-May, Keith and Alice Mosing hosted a reception at their home to formally announce their \$1 million donation to the Texas Fetal Center. Kenneth Moise Jr., M.D., and Susan Distefano, chief executive officer at Children's Memorial Hermann Hospital, provided more than 70 attendees with an overview of the Texas Fetal Center along with descriptions of the Center's current research and educational initiatives as well as the Center's vision for the future.

Guests also heard from two former Texas Fetal Center patient families, including the Center's first patient for the in-utero repair of spina bifida, Colette Hagler, who attended with her husband Ivan and 2-year-old daughter, Faith. Former patient Julie Davis also attended the event with her triplet daughters, Genevieve, Vera and Lindy, who were diagnosed with twin-twin transfusion syndrome (TTTS) and underwent fetoscopic laser photocoagulation to resolve the TTTS in the monochorionic twin pair.

The Texas Fetal Center team is incredibly grateful for the Mosing family gift, which will benefit the Center's continued growth and overall goal of providing the highest level of specialized care to both mothers and babies.

For more information on how to support the Texas Fetal Center contact Randi Koenig, director of development, at the Memorial Hermann Foundation, at 713.242.4643 or email Randi.Koenig@memorialhermann.org.

If you would like to receive communication about future education events, email texasfetalcenter@memorialhermann.org.

Fascinating Fetal Finds

A 33-year-old G3P2 was referred to the Texas Fetal Center at 21 weeks and one day gestation with a placental mass diagnosed at 19 weeks and five days on her second trimester ultrasound. In addition to the mass there was an increased cardiothoracic ratio (CTR) but no additional abnormalities were seen. The mother was evaluated at the Center and showed a viable fetus with biometry that was appropriate for the gestational age. The fetus had an estimated fetal weight (EFW) of 377 grams and the amniotic fluid volume was normal. A large mass was seen on the surface of the placenta immediately adjacent to the placental cord insertion site. The mass measured a volume of 140 cc.

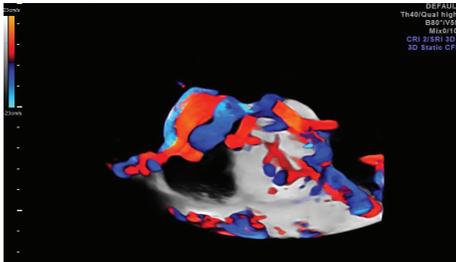


Image 1

There appeared to be an artery/vein pair arising from the cord insertion site that provided multiple feeding vessels to the tumor (image 1). The fetal anatomic survey did not show any anomalies. The CTR measured 0.7 and the combined cardiac output measured 1,100 cc/kg/min. No evidence of hydrops was seen.

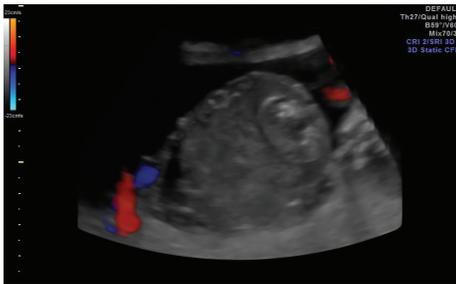


Image 2

A diagnosis of placental chorioangioma was confirmed. After detailed discussion about management options, the patient elected to undergo an attempt to ablate the feeding vessels. On fetoscopic evaluation, it was possible to visualize the feeding vessels discrete from the remaining umbilical cord vessels. The patient underwent a combination of simultaneous laser ablation and bipolar coagulation of the vessels, and flow to the mass was completely obliterated (image 2).

The immediate postoperative course was uncomplicated and the pregnancy is ongoing.

About Chorioangioma

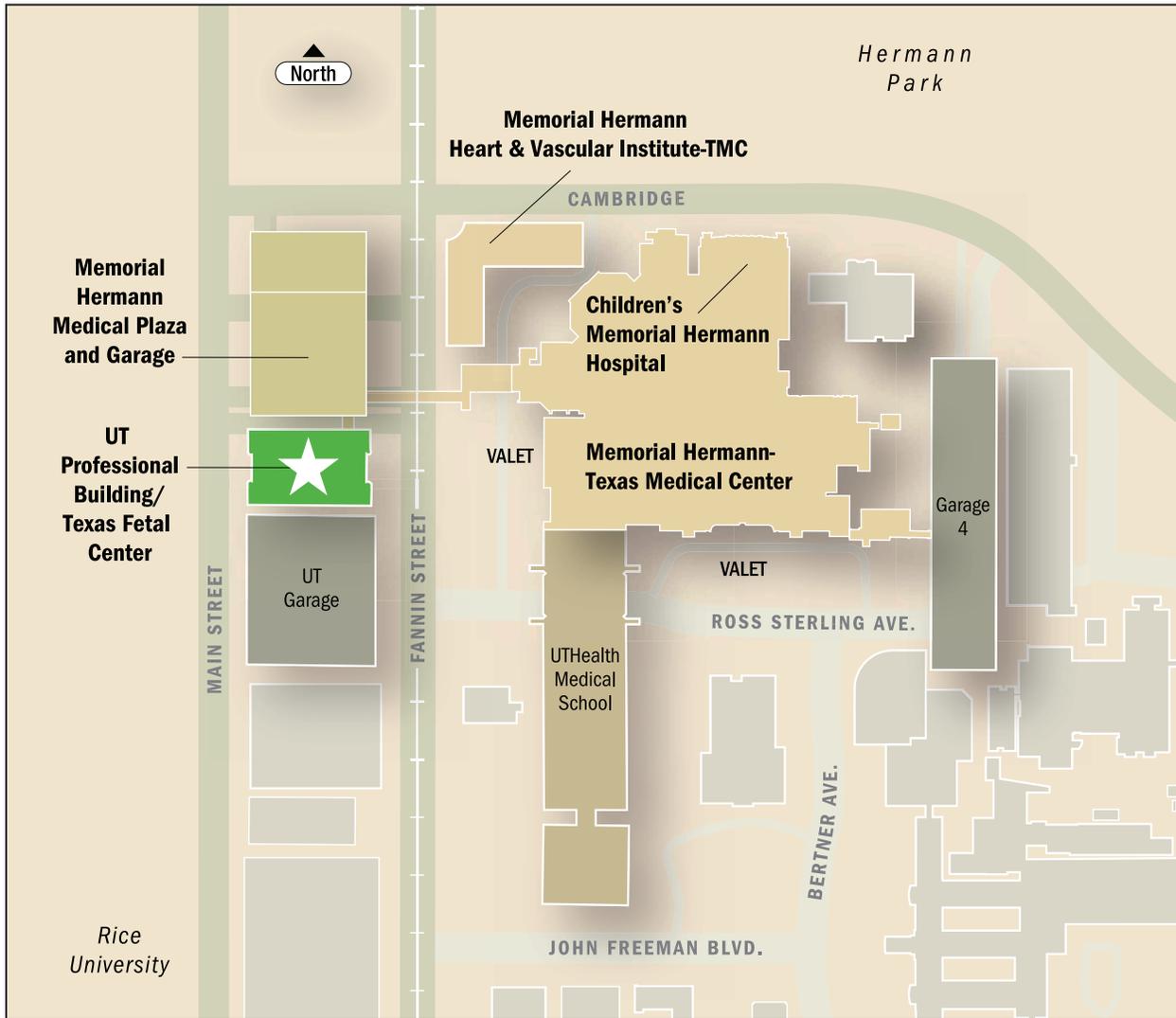
Chorioangioma is the most common placental tumor. Most are incidental findings on routine ultrasound and are small and of little clinical consequence. Large chorioangiomas measuring more than 5 cm in diameter are much less common and are often located near the site of the placental cord insertion. This is what limits options for therapeutic interventions.

Chorioangiomas have significant potential for both maternal and fetal complications. These include polyhydramnios, preterm labor, fetal anemia, cardiomegaly, intrauterine growth restriction (IUGR), hydrops and fetal demise. The presence of low resistance arterial-venous shunting within the mass can increase the demands on the fetal heart since blood flows preferentially along the path of low resistance. As the tumor grows it takes a greater portion of the cardiac output. The fetus increases its cardiac output to compensate while trying to maintain adequate perfusion of the rest of the fetus. Eventually the heart can no longer compensate. Cardiac failure develops and hydrops ensues. Therapeutic options are often limited and the prognosis, in the absence of treatment, is dismal.

Prenatal evaluation includes the size and location of the mass to determine if a prenatal intervention is possible. The cardiovascular impact of the tumor also needs to be carefully evaluated to determine if and when an intervention is performed. The team at the Texas Fetal Center is experienced in the evaluation and management of chorioangiomas and a variety of complex and unusual anomalies in pregnancy.

For more information about chorioangiomas or to schedule a consult, call 832.325.7288 or toll-free at 1.888.818.4816.

Contacts



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