

TEXAS FETAL CENTER E-NEWSLETTER

Welcome to the e-Newsletter from 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.

Michael Bebbington, M.D., M.H.Sc., affiliates with the Texas Fetal Center

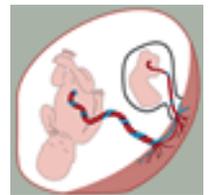
When I was a newly minted medical graduate from McMaster University in Canada, I would have laughed if anyone said that I would eventually practice as a fetal surgeon, let alone be a fetal surgeon in the state of Texas. Nothing would have been further from my mind. And yet, here I am now. You can never tell where the future will take you.



Continued on Page 3

Texas Fetal Center Joins North American Fetal Treatment Network (NAFTNet)

The Texas Fetal Center is proud to announce its acceptance as the newest member of the North American Fetal Treatment Network (NAFTNet). Founded in 2005, the network consists of 20 fetal centers located throughout North America. Its primary mission is to study the natural history of fetal diseases and to develop therapeutic prenatal interventions to improve outcomes.



Continued on Page 4

Education and Research

The Texas Fetal Center has appointed the first clinical trainee in the new Fetal Intervention Fellowship. The fellowship is one of only three in the United States and seeks to train the next generation of physicians in the emerging fields of maternal-fetal medicine and fetal intervention.

Read about what we're working on for the advancement of maternal-fetal medicine, including projects with Tufts Medical Center, Yale School of Medicine and the University of Utah.



Continued on Page 5

TEXAS FETAL CENTER E-NEWSLETTER

Newest Team Members

Two new world-renowned specialists have affiliated with the multidisciplinary team at the Texas Fetal Center. Michael Bebbington, M.D., joins as the director of prenatal diagnosis and fetal imaging, and David Sandberg, M.D., specializes in minimally invasive endoscopic approaches to hydrocephalus, brain tumors and arachnoid cysts, as well as surgical management of arteriovenous malformations of the brain, congenital spinal anomalies, spasticity and craniofacial anomalies.



Continued on Page 6

Patient Stories

Faith Hagler, the first patient to undergo in-utero repair of spina bifida in the state of Texas, celebrated her first birthday on July 4, 2012. For the Hagler family, Independence Day will always represent multiple reasons for celebration.

For more information about myelomeningocele repair, visit texasfetalcenter.org/spina-bifida.



Continued on Page 7

Upcoming Events

Texas Two-Step Conference Improving Maternal & Fetal Care

Jan. 11-12, 2013

The Westin Houston, Memorial City

SMFM Annual Meeting

The Pregnancy Meeting

Feb. 11-16, 2013

San Francisco

Continued on Page 9

TEXAS FETAL CENTER E-NEWSLETTER

New Opportunities

Continued from Page 1

When I was a newly minted medical graduate from McMaster University in Canada, I would have laughed if anyone said that I would eventually practice as a fetal surgeon, let alone be a fetal surgeon in the state of Texas. Nothing would have been further from my mind. And yet, here I am now. You can never tell where the future will take you.

At that time I anticipated completing my training and settling into practice somewhere in Ontario. A career in medicine is, however, an ever evolving journey. Mine has taken me through a residency in obstetrics and gynecology and then a fellowship in maternal-fetal medicine at the University of British Columbia (UBC). Adding a master's in epidemiology and biostatistics to your fellowship is commonplace now but was almost unheard of at the time. I thought my journey had ended when I joined the faculty of medicine at UBC in Vancouver in the Division of Maternal-Fetal Medicine. We were among the first hospitalist MFM groups in Canada for 12 years, I cared for pregnant patients, delivered babies, taught medical students, residents and fellows, did research and filled a number of administrative positions.

Vancouver is a fantastic city to live in with everything to offer the outdoor enthusiast and a culinary scene that rivals the best in the world. However, opportunity came knocking in the form of an offer to develop and run a new ultrasound department at the Albert Einstein College of Medicine in New York City. I knew that this was a chance to explore more aspects of medicine and live somewhere completely different. Ultrasound has always been one of my major interests and I've known from the start of my specialty training that I was more of a fetal-maternal medicine specialist than the other way around. I joined the faculty there and spent a number of splendid years working to develop a solid diagnostic ultrasound unit. I had the chance to work with some incredibly talented individuals that allowed me to continue to develop my skills. This was where my first interaction with fetal medicine and surgery took place.

There aren't many people who do what we do. I first met both Drs. Tony Johnson and Ken Moise at meetings of the International Fetal Medicine and Surgery Society (IFMSS) when they were both at the University of North Carolina. We continued to meet after I joined the Center for Fetal Diagnosis and Treatment (CFDT) at the Children's Hospital of Philadelphia (CHOP), affiliated with the University of Pennsylvania, where I became involved in fetal surgery full time. I had another amazing career experience there. Laser therapy for twin-twin transfusion really became established in the wake of the Eurofetus trial. I was also able to participate in the MOMS trial since CHOP was one of the three study centers. I watched the Center grow by leaps and bounds during my time there. One of my fondest memories will always be the annual family reunions. Every June, all of the families that have been part of the CFDT are invited back for a day of games and fun. I have watched children that we treated while they were still in utero, grow up and develop into incredible individuals, and I have experienced the gratitude of the families that we helped. Truly the best part of any job.

My journey wasn't over yet. The confluence of change in fetal therapy in Houston, which took place last fall, resulted in the creation of the Texas Fetal Center at Children's Memorial Hermann Hospital. Out of change always comes opportunity. The division of Maternal-Fetal Medicine needed a new director of prenatal diagnosis and fetal imaging, the Texas Fetal Center needed another experienced fetal surgeon to allow the program to expand and I was ready for a new challenge. So, I've become a Texan. For me it is the next evolution of my medical career. I get the pleasure of working with two leaders in the fetal medicine community and in a supportive atmosphere that continues to say "we can do that" even when faced with unique challenges! The potential for growth, development and new discoveries is limitless here and I look forward to continuing my quest to do the best for the next generation that will come into this world.



Michael Bebbington, M.D.

Director of Prenatal Diagnosis and Fetal Imaging, Texas Fetal Center
Children's Memorial Hermann Hospital

Professor, Department of Obstetrics, Gynecology and
Reproductive Sciences
The University of Texas Health Science Center at Houston (UTHealth)
Medical School

Endoscopic Management of Hydrocephalus in Patients with Spina Bifida

Continued from Page 1

New endoscopic treatment options for hydrocephalus associated with spina bifida are now being performed at Children's Memorial Hermann Hospital by David Sandberg, M.D., chief of pediatric neurosurgery at The University of Texas Health Science Center at Houston (UTHealth) Medical School. This method of treatment has the potential to dramatically minimize complications and improve outcomes in spina bifida patients.

Approximately 80 percent of patients with myelomeningoceles require treatment for hydrocephalus. The most common treatment offered, ventriculoperitoneal shunting, is effective but is associated with numerous complications. Many patients with shunts require multiple surgeries throughout their childhood for shunt malfunctions and/or infections. Dependency on shunts can create a life-threatening situation when the shunt fails, which occurs 40 percent of the time within the first year of placement and approximately 4 percent every year thereafter for the rest of the patient's life. Some children have up to 50 shunt-revision surgeries throughout their childhood with considerable associated morbidity.

In an effort to avoid shunting and its complications, endoscopic third ventriculostomy (ETV) with choroid plexus cauterization may be offered. This procedure has a published success rate of over 70 percent in children with hydrocephalus associated with myelomeningocele and a much lower complication rate than shunting (Wang BC, Child's Nervous System 27 (10): 1589-94, 2011). In this procedure, an endoscope is inserted into the lateral ventricle of the brain and then guided into the third ventricle. A hole is made in the floor of the third ventricle which allows fluid to bypass a blockage caused by abnormal brain anatomy in these patients. Next, production of cerebrospinal fluid (CSF) can be minimized by coagulation of the choroid plexus, the substance in the brain which produces CSF. ETV and choroid plexus cauterization are performed simultaneously through a very small incision which is placed behind the hairline. Patients can often be discharged from the hospital as soon as two days after surgery. Most importantly, patients can be discharged without a shunt. In children who already have a shunt, endoscopic surgeries can be considered when the shunt fails in order to avoid future surgeries for shunt failure.

Accepted into North American Fetal Treatment Network (NAFTNet)



The Texas Fetal Center is proud to announce its acceptance as the newest member of the North American Fetal Treatment Network (NAFTNet). Founded in 2002, the network consists of 20 fetal centers located throughout North America. Its primary mission is to study the natural history of fetal diseases and to develop therapeutic prenatal interventions to improve outcomes.

Two of the current co-directors of the Texas Fetal Center, Anthony Johnson, D.O., and Kenneth Moise, M.D., were founding members of the network and assisted in the development of its charter.

In addition, Dr. Johnson was instrumental in securing funding from the National Institutes of Health to support NAFTNet's biannual research meeting. Dr. Johnson will serve as the primary NAFTNet representative for the Texas Fetal Center; KuoJen Tsao, M.D., will serve as the alternate representative.



TEXAS FETAL CENTER E-NEWSLETTER

Educational Opportunities

Continued from Page 1

On July 1, Pedro Argoti, M.D., was appointed as the first clinical trainee in the newly approved Fetal Intervention Fellowship at the Texas Fetal Center. The fellowship is one of only three in the United States and seeks to train the next generation of physicians in the emerging fields of fetal medicine and fetal intervention. The fellowship is approved by the state of Texas and the Graduate Medical Education office of The University of Texas Health Science Center at Houston (UTHealth) Medical School. During the course of the two-year training period, the fellow will undertake a research thesis in fetal medicine. Dr. Argoti will also be trained in such fetal procedures as intrauterine transfusion, fetal shunt placement, laser therapy for twin-twin transfusion and open repair of fetal spina bifida.

Ongoing Research Projects

The Center has joined with the Mother Infant Research Institute of Tufts Medical Center to study genomic analysis in amniotic fluid to better understand the pathophysiology of twin-twin transfusion. Using modern microarray technology, six genes expressed by the fetal brain, two water-transported genes, and the vascular endothelial growth factor gene were found to be up-regulated. The findings were presented as a poster presentation at the 32nd Annual Meeting of the Society for Maternal-Fetal Medicine and as a platform presentation at the 59th Annual Meeting of the Society of Gynecologic Investigation. The lead investigator, Lisa Hui, M.B.B.S., received the prestigious President's Presenter Award at the latter meeting.

Preterm premature rupture of the membranes (PPROM) remains the Achilles heel of invasive fetal therapy. The Center has collaborated with investigators at Yale School of Medicine to study the histological findings and biochemical factors that may contribute to the non-healing nature of the fetal membranes. Unique changes in the fetal membranes distant to the fetoscopic entry site have been discovered. The findings have been submitted as an abstract to the upcoming Annual Meeting of the Society for Maternal-Fetal Medicine. The Center is also working with bioengineers at the University of Utah to study the use of a membrane patch in combination with a unique underwater biologic glue in a swine model for PPRM. This study is being undertaken with investigators at Texas A&M School of Veterinary Medicine.

For more information about our ongoing research projects, email us at texasfetalcenter@memorialhermann.org

TEXAS FETAL CENTER E-NEWSLETTER

New Additions to the Texas Fetal Center's Multidisciplinary Team

Continued from Page 2



Michael W. Bebbington, M.D., M.H.Sc., world-renowned maternal-fetal medicine (MFM) specialist, joined the team at the Texas Fetal Center at Children's Memorial Hermann Hospital and the division of Maternal-Fetal Medicine in the department of Obstetrics, Gynecology and Reproductive Sciences at The University of Texas Health Science Center at Houston (UTHealth) Medical School. Dr. Bebbington serves as the director of prenatal diagnosis and fetal imaging at the Center.

Dr. Bebbington specializes in maternal-fetal medicine, with expertise in fetal therapy, identification and management of fetal diseases and complex monochorionic pregnancies. He also has an extensive background in open fetal repair surgery, and serves as one of the participating MFM specialists in the MOMS trial.

He received his medical degree from McMaster University in Ontario, Canada, and a master's in health science from the University of British Columbia in Vancouver. He went on to complete his residency training at McMaster University and completed fellowships in maternal-fetal medicine at the University of British Columbia and the Albert Einstein College of Medicine in New York. Prior to coming to Houston, Dr. Bebbington was an associate professor of clinical surgery at the Perelman School of Medicine at the University of Pennsylvania and an attending physician at Children's Hospital of Philadelphia (CHOP) in the Center for Fetal Diagnosis and Treatment, where he also served as the director of fellowship training.

To refer a patient to Dr. Bebbington, call 832.325.7288 or toll-free at 1.888.818.4818.



David Sandberg, M.D., F.A.C.S., F.A.A.P., has joined the medical staff of Children's Memorial Hermann Hospital and Mischer Neuroscience Institute at Memorial Hermann-Texas Medical Center. He will also serve as the chief of pediatric neurosurgery at The University of Texas Health Science Center at Houston (UTHealth) Medical School. Dr. Sandberg specializes in minimally invasive endoscopic approaches to hydrocephalus, brain tumors, and arachnoid cysts, as well as surgical management of arteriovenous malformations of the brain (AVMs), congenital spinal anomalies, spasticity and craniofacial anomalies.

Dr. Sandberg received his medical degree from the Johns Hopkins University School of Medicine. He then completed neurosurgery training at the Weill Medical College of Cornell University/New York Presbyterian Hospital. During residency, he was awarded the Resident Traveling Fellowship in Pediatric Neurosurgery by the American Association of Neurological Surgeons (AANS) and Congress of Neurological Surgeons (CNS), and he completed this fellowship at the Hospital for Sick Children in Toronto. After residency, he completed pediatric neurosurgery fellowship training at the Children's Hospital Los Angeles. Before joining the UTHealth Medical School, Dr. Sandberg served as associate professor of clinical neurological surgery and pediatrics at the University Of Miami Miller School Of Medicine.

To refer a patient to Dr. Sandberg, call 832.325.7234.

TEXAS FETAL CENTER E-NEWSLETTER

Texas Fetal Center Patient Stories

Continued from Page 2



Baby Faith Turns 1

Faith Hagler, the first patient to undergo in-utero repair of spina bifida in the state of Texas since the completion of the Management of Myelomeningocele Study, celebrated her first birthday on July 4, 2012. For the Hagler family, Independence Day will always represent a day for celebration.

Last spring, Colette and Ivan Hagler were referred to the perinatal specialists at the Texas Fetal Center at Children's Memorial Hermann Hospital after their baby, Faith, was prenatally diagnosed with spina bifida. The first-time parents traveled from Dallas to Houston to meet with the entire multidisciplinary team over a span of two days. Following numerous hours of consultation, ultrasound and screening, Faith and Colette were believed to be excellent candidates for fetal surgery.

The Hagler family carefully weighed the benefits of surgery with the risks to mother and fetus, and ultimately made the decision to move forward with the operation. Approximately eight weeks later, on July 4, 2011, baby Faith Hagler made her debut into the world. Today, she is a happy and healthy little girl who does most everything a 14-month-old does, including moving around and crawling independently.

The Texas Fetal Center is considered an experienced center in open fetal surgery for spina bifida repair and is dedicated to providing families with the highest quality and compassionate care. The Center regularly evaluates and treats patients who meet surgical criteria, with an emphasis on educating families about the neurological condition and providing them with resources and information about living life with a child with spina bifida.

For more information about myelomeningocele repair, visit texasfetalcenter.org/spina-bifida. An educational video presenting the risks and benefits of in-utero repair of spina bifida can also be found on the site. The video is available in both English and Spanish.

Millie and Matt Killpack: A Second Child with Spina Bifida

At 20 weeks pregnant with their fourth child, Millie and Matt Killpack learned that their daughter Maggie had spina bifida. Unfortunately, this was not the first spina bifida diagnosis for the family. Their 4-year-old son Davy had also been diagnosed during Millie's pregnancy in 2008.

At the time of Davy's diagnosis, the NIH-sponsored Management of Myelomeningocele (MOMS) trial was still in the experimental stage. During the trial, only three centers were performing the fetal surgery to compare the effects of in-utero repair with standard postnatal repair of spina bifida defects. Unable to relocate from Utah to one of the study center sites, the family ultimately decided to wait until Davy was born to have his spinal defect closed.

This time around, the Killpack's knew the study had been closed, which meant that their daughter had additional treatment options available. After receiving confirmation of baby Maggie's diagnosis from a local maternal-fetal medicine specialist, the couple was referred to the Texas Fetal Center at Children's Memorial Hermann Hospital. They immediately made arrangements to fly to Houston to meet with the multidisciplinary team for consultations, comprehensive evaluation and counseling to determine if both Millie and Maggie were candidates for fetal surgery, which they were.

Surgery was scheduled for the following week, when Millie would be 24 weeks pregnant. "My goal is to be part of the 20 percent of patients who do not have complications [after fetal surgery], and make it to 37 weeks at the time of her birth," said Millie, who returned to Utah and spent the following 12 weeks on modified bed rest. On July 17, 2012, baby Maggie was born.

Footnote: Since the first in-utero repair of myelomeningocele was performed on baby Faith in May 2011, more than 30 patients with fetal spina bifida have been evaluated at the Texas Fetal Center. The team has performed six successful cases of in-utero repair, with three of the pregnancies remaining undelivered.

TEXAS FETAL CENTER E-NEWSLETTER

Texas Fetal Center Patient Stories

Continued from Page 2



Twin-Twin Transfusion Syndrome in Triplets

Julie Davis was pregnant for the first time in the fall of 2011. At her nine-week ultrasound she learned that she was pregnant with twins, only to find out three weeks later that she was actually carrying triplets. Two of the fetuses were “identical,” also known as monochorionic (MC), because they share one placenta. Multifetal pregnancies come with a wide range of anxieties not typically experienced in singleton pregnancies. In multifetal pregnancies the patient’s anxiety is compounded by the increased fetal and maternal risks, including congenital anomalies, reduced fetal growth and prematurity, preeclampsia, gestational diabetes, extended hospitalization, placental abruption and postpartum hemorrhage. These risks increase exponentially when comparing twins to triplets.

Recognizing the increased risks associated with Julie’s pregnancy, ultrasounds were performed every two weeks. At 17 weeks the MC twins developed signs of twin-twin transfusion syndrome (TTTS) with discordance in the amniotic fluid volumes (donor twin with reduced volumes and recipient twin with increased volumes) and abnormal blood flow to the recipient twin indicating early heart failure. Julie subsequently underwent fetoscopic laser photocoagulation at 18 weeks of gestation. The resolution of the TTTS was successful, but there were additional complications including preeclampsia and premature rupture of the membranes at 32 weeks, resulting in preterm labor. A cesarean section was performed shortly after the membranes ruptured, resulting in the delivery of three healthy yet premature neonates: Vera, the donor, weighed 3 pounds, 3 ounces; Lindy, the recipient, weighed 3 pounds 8 ounces; and Genevieve, the “singleton,” weighed 4 pounds 2 ounces at birth. After uncomplicated stays in the neonatal intensive care unit at Children’s Memorial Hermann Hospital, Genevieve, named after the UT sonographer who performed all of Julie’s ultrasounds throughout the pregnancy, was discharged six weeks after delivery. Vera and Lindy joined the rest of the family at home the following week.

Recent reports have found that triplets occur in one out of every 645 live births, with over 80 percent of these pregnancies being the result of assisted reproduction. Spontaneous triplets will be seen in one out of every 6,000 to 8,000 pregnancies. Triplet pregnancies, like twins, are at risk for a group of complications that may develop when two or more of the fetuses have an MC placenta. Vascular anastomoses are present in virtually all MC placentas. These intertwining communications may lead to the development of TTTS, twin reverse arterial perfusion sequence (TRAP) or selective fetal growth restriction. In TTTS, the perinatal mortality approaches 90 percent when the disorder develops prior to 24 weeks. Treatment with fetoscopic-directed laser photocoagulation has been shown to essentially reverse the outcome with overall survival rates of 70 to 75 percent. The experience in triplet pregnancy is limited; however, preliminary data would suggest that comparable outcomes should be expected in affected triplet pregnancies when interventions are performed by an experienced operator.

The internationally recognized team of surgeons affiliated with the Texas Fetal Center at Children’s Memorial Hermann Hospital and UTHealth Medical School, has collectively performed more than 700 laser ablations, making them the most experienced fetoscopic intervention team in the central United States.



TEXAS FETAL CENTER E-NEWSLETTER

Texas Fetal Center Events

Continued from Page 2

Texas Fetal Center Hosts First CME Conference Updates in Diagnosis, Treatment and Care for Complex Fetal Conditions

Advances in diagnostic imaging and treatment for selective fetal conditions have changed the field of fetal medicine from one of detection to one of active intervention. The experts at the Texas Fetal Center held their first continuing medical education (CME) and continuing nursing education (CNE) event on April 28, 2012, at Barton Creek Resort & Spa in Austin, Texas. Maternal-fetal medicine specialists, pediatric surgeons, sonographers and OB nurses from across the state traveled to the Texas Hill Country to learn more about the new technologies, current treatment modules and the clinical criteria for candidates of fetal intervention.

The event's guest speakers included James Huhta, M.D., professor of pediatrics at the University of Florida at Gainesville and medical director of perinatal services at All Children's Hospital in St. Petersburg, Fla., who presented on cardiac anomalies in fetal patients. Jan Deprest, M.D., professor in the department of Obstetrics and Gynecology and director of the fetal therapy program at University Hospitals Gasthuisberg in Belgium, was also a guest presenter and described the clinical criteria for tracheal occlusion for fetuses with diaphragm hernia.

Colleagues of the Texas Fetal Center and faculty members of the department of Pediatric Surgery at The University of Texas Health Science Center at Houston (UTHealth) Medical School, also spoke on topics including the follow-up care for a cardiac patient through adulthood and pregnancy, presented by Gurur Biliciler-Denktaş, M.D., assistant professor in the division of Pediatric Cardiology. William Douglas, M.D., associate professor in the division of Pediatric Cardiovascular surgery, spoke about surgical treatment options of single ventricle cardiac lesions.

Other topics discussed included Rh disease and neonatal alloimmune thrombocytopenia purpura, presented by Kenneth Moise Jr., M.D., co-director of the Texas Fetal Center and professor in the departments of Obstetrics, Gynecology and Reproductive Sciences and Pediatric Surgery; clinical criteria and current applications of the EXIT procedure by KuoJen Tsao, M.D., co-director of the Texas Fetal Center and associate professor in the departments of Pediatric Surgery and Obstetrics, Gynecology and Reproductive Sciences; management of complicated monozygotic twins by Anthony Johnson, D.O., co-director of the Texas Fetal Center and professor in the departments of Obstetrics, Gynecology and Reproductive Sciences and Pediatric Surgery; and maternal and fetal inclusion criteria for in-utero repair of spina bifida by Michael Bebbington, M.D., director of prenatal diagnosis and fetal imaging at the Texas Fetal Center and professor in the division of Maternal-Fetal Medicine.

To review the presentations, visit texasfetalcenter.org/CME. If you would like to receive information about future continuing medical education events, email texasfetalcenter@memorialhermann.org.

Upcoming Events:

Children's Memorial Hermann Hospital's Texas Two-Step Conference: Improving Maternal & Fetal Care

January 11-12, 2013

The Westin Houston, Memorial City

The two-day educational and interactive conference will provide physicians, nurses, and other prenatal healthcare providers with the knowledge and understanding of the state-of-the-art advances in detecting, evaluating and treating high-risk pregnancies and selective fetal anomalies. For more information about the event, visit childrens.memorialhermann.org/cme.

Society for Maternal Fetal Medicine: The Pregnancy Meeting

February 11-16, 2013

San Francisco

Management of Multiples CME Event

Spring, 2013

Houston

Hosted by UTHealth Medical School