FETAL MEDICINE FOUNDATION OF THE UNITED STATES OF AMERICA

November 2006

Volume 2 Issue 4

11 –13^{+6} Weeks Scan Project

Newsletter

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In this issue:

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- NT, Nasal Bone, and Tricuspid Accreditation, Software Information
- Annual audit information
- CD with nasal bone and tricuspid flow lectures
- Reprints of recent publications and free book

WELCOME to the November 2006 issue of the FMF/USA newsletter. I am pleased to be able to introduce Cathy Downing RT RDMS RVT who is now taking care of all annual reaccreditations. Cathy has, for over 10 years, worked alongside Dr. Jiri Sonek, FMF-USA Director and co-originator of first trimester nasal bone assessment as a Down syndrome screening tool. She is doing a wonderful job of helping people through the reaccreditation process and giving helpful hints for maintaining high-quality NT measurements year-round. Cathy welcomes your questions and comments and can be reached by mail or e-mail—all her details are found on the left side of page 1. Dr. Martin Walker, Director of Eastside Maternal Fetal Medicine in Seattle, has honored us with a wonderful article about twin-twin transfusion syndrome. As always, Q&A and upcoming courses and other news can be found on page 4.

LASER ABLATION THERAPY FOR TWIN-TWIN TRANSFUSION SYNDROME

Martin Walker, MD, Director, Fetal Therapy Program, Evergreen Hospital, Seattle, WA

Twin-twin transfusion syndrome is a complication exclusively of monochorionic twins. It is said to occur in approximately 15-20% of monochorionic twin pregnancies, although contemporary prospective population data is not available. It can be apparent on ultrasound as early as 11 weeks' gestation.[1] The peak incidence is between 16 and 20 weeks and it generally does not occur for the first time after 24 weeks.[2]

Despite the fact that fetoscopic laser occlusion of placental vessels had been proposed by De Lia as a treatment for severe twin-twin transfusion syndrome as early as 1990 [3], until recently the "standard therapy" included observation, pregnancy termination, early delivery and, most importantly, serial aggressive amnioreduction. However, since the publication of the Eurofetus trial in 2005 [4], therapy for twin-twin transfusion syndrome has taken a dramatic turn. This study has clearly shown that fetoscopic laser ablation therapy results in improved survival with a lower risk of brain injury in the survivors when compared to aggressive amnioreduction. Laser has now become the de facto standard of care for this condition.

Of prime importance in the management of all twins is the early determination of chorionicity. For this, the first trimester anatomical survey, including the nuchal translucency screen, is an ideal opportunity.

Adequate demonstration of either the lambda or the T sign and the thickness of the intertwin membrane make the diagnosis of chorionicity **(figure 1)**. This fact then becomes crucial in determining the potential complications that this twin pregnancy may suffer, as well as allowing an accurate diagnosis when complications of fluid imbalances or growth are subsequently encountered.

In addition to the determination of chorionicity, it has been demonstrated that monochorionic twins that subsequently develop twin-twin transfusion syndrome have a higher incidence of discordant nuchal thicknesses.[5] Occasionally, relative oligohydramnios in one sac can be demonstrated by "pointing" of the membrane toward the other twin. This crenellation of the intertwin membrane represents gradual collapse as fluid is withdrawn.

The diagnostic criteria for twin-twin transfusion syndrome are based upon the Quintero staging system[6] and are primarily of value in the second trimester. (cont. on page 2)

LASER ABLATION THERAPY FOR TWIN-TWIN TRANSFUSION SYNDROME (cont.)

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The primary diagnostic criterion that has to be met is monochorionic twins with the following amniotic fluid findings: a maximum vertical pocket of 8cm or greater around one twin and a concomitant oligohydramnios around the other twin with a maximum vertical pocket of 2 cm or less. The Eurofetus study group changed this criterion slightly to increase the maximum allowable pocket of fluid around the recipient twin to 10 cm after 20 weeks.

The presence of this amniotic fluid discrepancy alone in a monochorionic twin gestation is sufficient to make the diagnosis of twin-twin transfusion syndrome.

Should this be the only criteria, this is considered stage I. Stage II is the presence of stage I criteria plus the absence of a visible bladder in the donor twin. Stage III includes the presence of critically abnormal Dopplers. While Dopplers may be abnormal in a variety of different fashions, critically abnormal Dopplers are considered to be either absent or reversed end-diastolic flow in the umbilical artery of the donor fetus or absent or reversed A-wave flow in the ductus venosus of the recipient fetus **(figure 2)**. Abnormalities of the middle cerebral artery, the Tei index, flow through the tricuspid or mitral valves and the umbilical vein, and other Dopplers have all been described in twin-twin transfusion syndrome but are not classically considered to be part of the staging system.

When the recipient fetus becomes hydropic, twin-twin transfusion syndrome is now stage IV, and stage V is when one fetus has already died.

Of note, size discrepancy is not a diagnostic criterion for twin-twin transfusion syndrome and frequently there is no significant size discrepancy between fetuses. This is especially apparent if the onset has been rapid.

Onset in the early second trimester heralds a poor outcome unless rapid treatment is instituted. Additional factors that suggest a poor outcome are significant maternal discomfort and a short cervical length.

Therapy for twin-twin transfusion syndrome revolves around the use of fetoscopic laser ablation. Fetoscopic laser ablation is the insertion of a small (2-3 mm) fetoscope into the recipient amniotic cavity and inspection of the placental surface. Vessels crossing the placental surface from the cord insertion of the donor to the vascular equator can be seen to anastomose with vessels from the recipient cord insertion. These anastomoses may be direct as in artery-to-artery or vein-to-vein anastomoses or intracotyledonary **(figure 3)**. It is true, however, that all anastomoses can be identified by inspection of the surface of the placenta or membranes.

Where an anastomosis is identified, ablation is accomplished using laser energy. Laser ablation is performed in a selective fashion to maximize viable cotyledonary tissue and blood flow to the fetuses. It should be noted that the vascular equator is not coincident with the membranous equator on the surface of the placenta although usually parallel to it. At the conclusion of the ablation procedure, anywhere from 1-15 anastomoses may have been identified and ablated. An amnioreduction is then usually performed.

In our center, and others, survival of one or more fetuses following fetoscopic laser ablation can be expected in over 90% of cases. Survival of two fetuses occurs between 60 and 70% of cases and survival of no fetuses in approximately 10% of cases **(figure 4)**. Survivors tend to be born prematurely, between 34 and 37 weeks. The incidence of significant brain injury in surviving fetuses is approximately 5-11%, reduced from 25-40% in survivors of amnioreduction therapy.[4,7]

The use of fetoscopic laser ablation therapy has been shown to improve outcome in stage III and IV twin-twin transfusion syndrome. Treatment of stage I and II remains controversial, however. Most centers that provide fetoscopic laser ablation services will perform laser ablation on stages I and II twin-twin transfusion syndrome, because fetal outcomes are at least as good as with amnioreduction and a single procedure is all that is required. In addition, the choice to proceed to an amnioreduction will often compromise the future performance of fetoscopy and laser ablation should the TTTS progress to stage III.

Following fetoscopic laser ablation therapy, the patients are carefully monitored throughout the remainder of their pregnancy, often with visits every week to two weeks to evaluate resolution of the twin-twin transfusion syndrome and improvement in Dopplers and growth. The TTTS should largely resolve within 2 weeks of the laser procedure. Delivery in our center is recommended no later than 37 weeks.

The development of new small fetoscopes and improved laser aiming devices will undoubtedly improve the technical success rate of fetoscopic laser ablation therapy over the years to come. As Professor N.Fisk noted in his editorial in the New England Journal of Medicine,[8] however, this therapy is far from perfect and further research in this area is required to attempt to better define those patients who are destined to develop twin-twin transfusion syndrome and the optimum timing of intervention to further reduce the incidence of survivor brain injury.

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(continued on page 3)

LASER ABLATION THERAPY FOR TWIN-TWIN TRANSFUSION SYNDROME (cont.)

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7. Banek CS, Hecher K, Hackeloer J, Bartmann P. Long-term neuro developmental outcome after intrauterine laser treatment for severe twin-twin transfusion syndrome. Am J Obstet Gynecol 2003;188:876-80.

8. Fisk NM, Galea P. Twin-twin transfusion – as good as it gets? N Engl J Med 2004;351:182-84

Figures

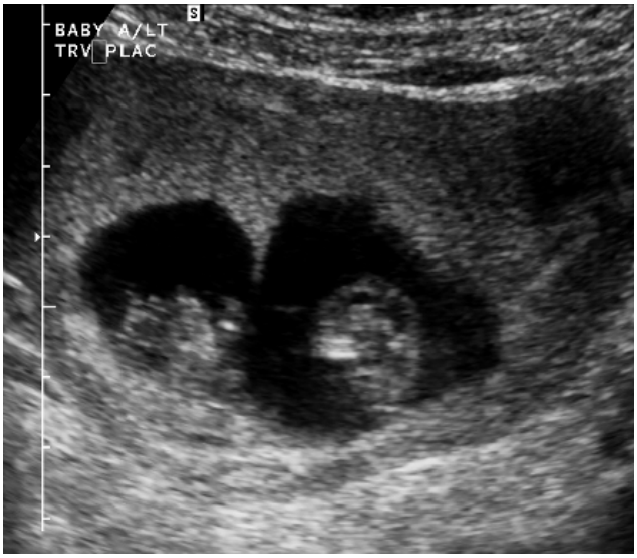

Figure 1. First trimester demonstration of dichorionicity.

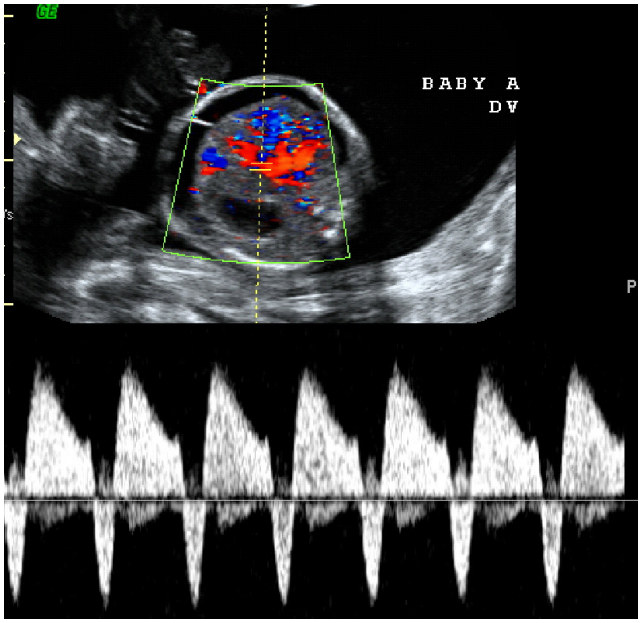

Figure 2. Reversed A-wave flow in the ductus venosus.

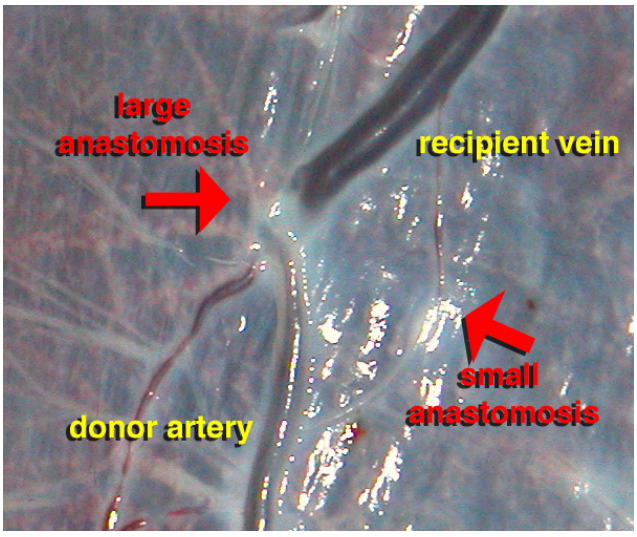

Figure 3. Placental anastomoses.

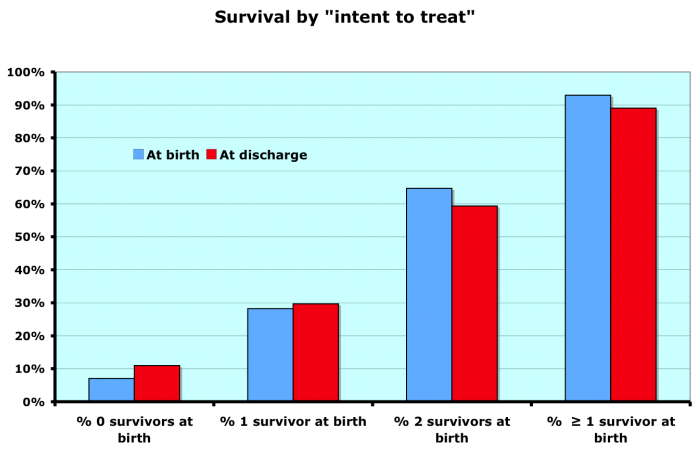

Figure 4. Survival.

Upcoming Fetal Medicine Foundation United States Courses

Face-to-Face Courses

**Saturday, December 2nd, 2006 in San Francisco, CA (8.0 CMEs possible)

**Saturday, January 6th, 2007 in Atlanta, GA (8.0 CMEs possible)

**Saturday, February 24th, 2007 in Cincinnati, OH (8.0 CMEs possible)

** Saturday March 3, 2007 in Tampa, FL (8.0 CMEs possible)

**Contact Melissa Machtolff (MMachtolff@genecare.com) or Carrie Spradley (CSpradley @genecare.com)

Website: www.genecare.com/35/id/Conferences 1-800-277-4363

Online course:

***Online FMF/USA Course: http://www.mfmedicine.com/CourseList.aspx

FMF USA 11-13+6 Week Scan Theory and Practical NT/NB/TF Internet Course

(complete theory course covering nuchal translucency, nasal bone, and tricuspid flow theory, techniques and accreditation/ ongoing quality assurance processes) (4.0 CMEs)

FMF USA Nasal Bone and Tricuspid Flow Theory and Practical Internet Course

(new short course just covering nasal bone and tricuspid flow theory, techniques and accreditation / ongoing quality assurance processes—see box below this for explanation) (4.0 CMEs applied for)

E-mail: NaomiHG@fetalmedicine.com or John.Lai@mfmedicine.com

Got NT? Want nasal bone/ tricuspid flow certificates?*

No problem… check out this site:

http://www.mfmedicine.com/CourseList.aspx

Choose this course title:

FMF USA Nasal Bone and Tricuspid Flow Theory and Practical Internet Course

Contact: John.Lai@mfmedicine.com or NaomiHG@fetalmedicine.com

***Current FMF NT accreditation is a prerequisite for nasal bone and/or tricuspid flow accreditation - however, for our colleagues who earned NT accreditation through the NTQR program, the theory course component is satisfied and you need only submit NT images to prove mastery of the technique to qualify for FMF NT accreditation— For nasal bone or tricuspid flow please see FAQ below.**

Frequently asked questions:

Question: I attended a theory course that did not offer information about nasal bone and tricuspid flow accreditations. Is there a short course that deals just with these protocols?

Answer: Yes. We offer a newly-created short online course (see box above this for contact details) which offers lectures on theory and execution of nasal bone and tricuspid flow assessments, as well as accreditation and quality assurance process information. You can take this new course to apply for these accreditations. The protocols are also available on our website (www.fetalmedicine.com/usa).

Question: When we will hear about the new CPT code for nuchal translucency?

Answer: As soon as the code is released, we will post the news on our website www.fetalmedicine.com/usa