Current Status of Fetal Therapy

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Overview

• Fetal Treatment Center
• Maternal outcome
• Diseases amenable to fetal surgery

• Fetus.ucsfmedicalcenter.org
Why have a Fetal Treatment Center?

- Best for patient care
  - Majority do not have fetal surgery/intervention
  - Best diagnosis
  - Multidisciplinary
- Collegial
- Research
- Advances field

The Team

- Coordinator
- MFM
- Neonatologists
- Radiologists
- Cardiologists
- Pediatric Surgeons
- Geneticists
- Social Workers
- Anesthesiologists
- Administrative Staff

Boundaries

- Transparency
  - Cases presented at FTC meeting
  - Report data in peer-reviewed journal
- Fetal oversight committee
- IRB approval
- Trials

Counseling

- Multidisciplinary
  - MFM, Geneticists, Neonatologists, Ped Surg, Ped Subspecialists, Social Worker
- Discuss ALL options
- Non-directive counseling
- Fetal risks/benefits
- Maternal risks
Morbidity

- No deaths related to fetal surgery
- Short-term morbidity significant esp for open cases
- Long-term morbidity
  - Uterine rupture
  - Thigh-burn from RFA

Maternal Retrospective Review

Maternal Outcome
187 fetal surgery 1989-2003
no deaths, no long-term disability
87 open 69 endoscopic 31 percutaneous
less morbidity with endoscopic procedures
icustay, hospital stay, transfusion
more chorion amnion separation in endo group

golembeck et al. 2006 march am j obstet gynecol

Fertility: Part I

- 70 cases, 45 respondents
- 35 attempted to get pregnant
  - 32 successfully pregnant
  - 31 with live births(all by c/s)
  - remaining 3
    - two with strong infertility history
    - 1 attempted for 3 months

farrell et al. fetal diagn therap 1999 May
Fertility: Part II
• 98/244 responded (40%)
  – 52 attempted to get pregnant
    • 48 pregnant
      – 44 at least one livebirth
      – 3 spontaneous abortions
      – 1 ectopic
    • 59 total livebirths
      – 11% uterine rupture/dehiscence
      – 17% preterm labor
  – 88% would have made same decision

Vu et al. APSA

CHOP Experience
• 83 women with fetal surgery 1996-2002
• 55 returns (66%)
  – 62% pregnancy subsequent pregnancies
  – uterine dehiscence/rupture 12/6%
  – 3% hysterectomy
  – 9% transfusion

johnson am j obstet gynecol 2004 Oct
What Diseases?

- Only diseases with high morbidity or mortality
- Proven benefit for fetus
  - RFA for TRAP
  - Fetoscopic laser for TTTS
  - Fetal shunt for hydrothorax
  - Open fetal surgery for hydrops due to mass
  - EXIT procedure
- Experimental
  - TO for CDH
  - Fetal repair of MMC
  - Urinary tract obstruction
  - Cardiac valvuloplasty

Proven Fetal Benefit
TRAP Sequence

- High mortality with large acardiac twin
- RFA to stop flow into acardiac
- UCSF results
  - Mo/Di twins
    - 92% survival
    - 35.6 weeks

Quintero Staging

- Stage I: DVP’s >8, <2
- Stage II: no bladder in donor
- Stage III: Echo/umbilical vessel abnormalities
- Stage IV: Hydrops
**Treatment Options**

- Amnioreduction
- Fetoscopic Laser
- Eurofetus trial
  - Prospective randomized trial
  - AR vs Laser
  - Stopped after 142 patients
  - Survival at least one twin
    - Laser 76%
    - AR 56%

  Senat et al NEJM 2004

**UCSF Experience**

- A-A connections
  - Outcome better
  - Consider AR
- Interventional treatment
  - At least 1 survivor 85%
  - 2 survivors 55%

**Solid Tumors**

- Grethel j pediatr surgery 2007
  - 15 year experience
  - No hydrops 95% survival
  - Hydrops no intervention --> 100% mortality
  - Fetal surgery 50% survival
- Tsao j pediatric surgery mar 2003
  - 3 patients with CCAM/hydrops survived with maternal steroids

**Treatment : Hydrops**

- Macrocystic (dominant cyst) --> Shunt
  - * 7/10 survival, mean GA 33 wks
- Microcystic --> Open Fetal Surgery

*Wilson et al. Fetal Dups Ther 2004*
Minimally Invasive Options?

• Interstitial Laser
• Radiofrequency Ablation
• Alcohol Injection

Steroids and CCAM

• Hydrops + CCAM \(\Rightarrow\) Death
• 3 cases hydrops with survival
  – Case 1: 24 wks, pleural effusion, ascites, scalp edema
  – Case 2: 26 wks, ascites, pericardial effusion, scalp edema, placentomegaly
  – Case 3: 21 wks, ascites, skin/scalp edema, placentomegaly
  – All delivered 39+ wks
• Common factors
  – Right sided
  – Microcystic
  – Maternal steroids betamethasone 12 mg IM x 2 doses


Steroids and CCAM

• Limit Treatment to “High-Risk” Microcystic CCAM
• Prospective randomized controlled trial
• NAFTNet centered
• Consider cooperative study with Eurofetus
NIH Trial

- Fetal TO vs Standard postnatal care
- Severe Isolated CDH
  - LHR < 1.4
  - Liver herniated
- Trial stopped after 24 patients
  - Survival 75%
  - No difference between groups
- ??????

Harrison et al. NEJM 2003
Percutaneous TO/Reversal

- Pt 1. Successful occlusion, chorioamnionitis
- Pt. 2
  - Successful occlusion/reversal
  - Delivered at 34 weeks
  - No sustained oxygen requirements
- Pt. 3
  - Successful occlusion/reversal
  - Delivered at 34 weeks
  - ECMO

Management Of Myelomeningocele Study

http://www.spinabifidamoms.com
Summary

• Critical to have multidisciplinary effort
• Best for patient care
• Maternal considerations primary
• Small number of patients have fetal interventions
  – Few fetal surgery have “proven” benefit
  – Many other interventions are experimental
• Trials important for establishing role of truly novel therapy

“What do surgeons know anyway?”

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