

*Diagnostic Work Up and Pre-operative Management at CHOP*

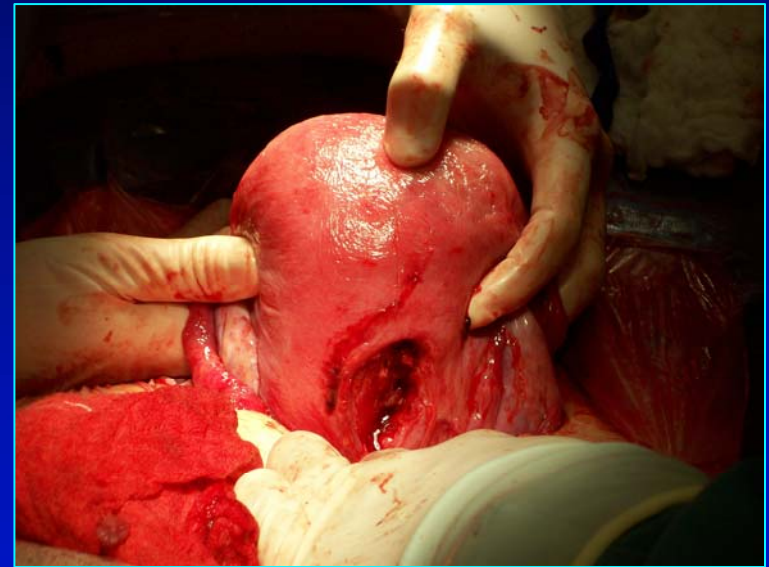
# Fetal Risks Associated with OFS

- Surgical injury
- Prematurity
- Drug effects
- Fetal/neonatal death



# Maternal Risks Associated with OFS

- Bleeding
- Infection
  - Wound
  - Intraamniotic
- Preterm premature rupture of membranes
- Preterm labor/delivery
- Anesthesia complications
  - General
  - Regional
- Medication side effects
  - Tocolysis



- Prolonged hospitalization
- Pulmonary edema
- Impaired fertility
- Repeat cesarean delivery
- Uterine rupture
- Death

# MMC Repair Trial



## INCLUSION CRITERIA

- Myelomeningocele at level T1 through S1 with hindbrain herniation
- Maternal age  $\geq 18$  years
- Gestational age at randomization 19<sup>0</sup> to 25<sup>6</sup> wks' gestation (determined by clinical info and 1st ultrasound)
- Normal karyotype. Results by FISH accepted if patient  $\geq 24$  wks' gestation

# MMC Repair Trial

## EXCLUSION CRITERIA



- **Non-resident of U.S.**
- Multifetal pregnancy
- Insulin-dependent pregestational diabetes
- Fetal anomaly unrelated to MMC
- Kyphosis in fetus  $\geq 30^\circ$
- History of incompetent cervix
- Placenta previa
- Other mat med condition
- Short cervix  $< 20$  mm by u/s
- Obesity (BMI  $\geq 35$ )
- Previous spontaneous singleton delivery  $< 37$  wks
- Maternal-fetal Rh isoimmunization
- Maternal HIV or Hepatitis-B status +; Known Hep-C +
- No support person
- Uterine anomaly
- Fails psychosocial
- Inability to comply w/travel & follow-up

# Initial Patient Evaluation and Counseling

- Multidisciplinary team approach (2 days)
- Imaging: Ultrasound, MRI and echocardiography
- detailed maternal history and physical exam
- psychosocial assessment (social worker/psychologist)
- maternal-fetal medicine consultation
- pediatric neurosurgery consultation
- neonatology consultation
- anesthesia evaluation
- fetal surgical consultation
  - family decision making (“reflective period”)
- pre-operative team meeting if elect fetal surgery

# Prenatal Evaluation of Neural Tube Defects:

- establish lesion level, Chiari 2 hindbrain herniation and ventriculomegaly
- rule out associated brain abnormalities (MRI and Ultrasound)
- heterotopia, ACC, absent CSP, IVH, PVL, microcephaly
- rule out other structural or phenotypic anomalies
- rule out associated genetic etiologies - amniocentesis:

karyotype and microarray

AF-AFP



# Pregnancy Management Options

1. Termination of the pregnancy
2. Postnatal neurosurgical closure
3. Fetal neurosurgical closure

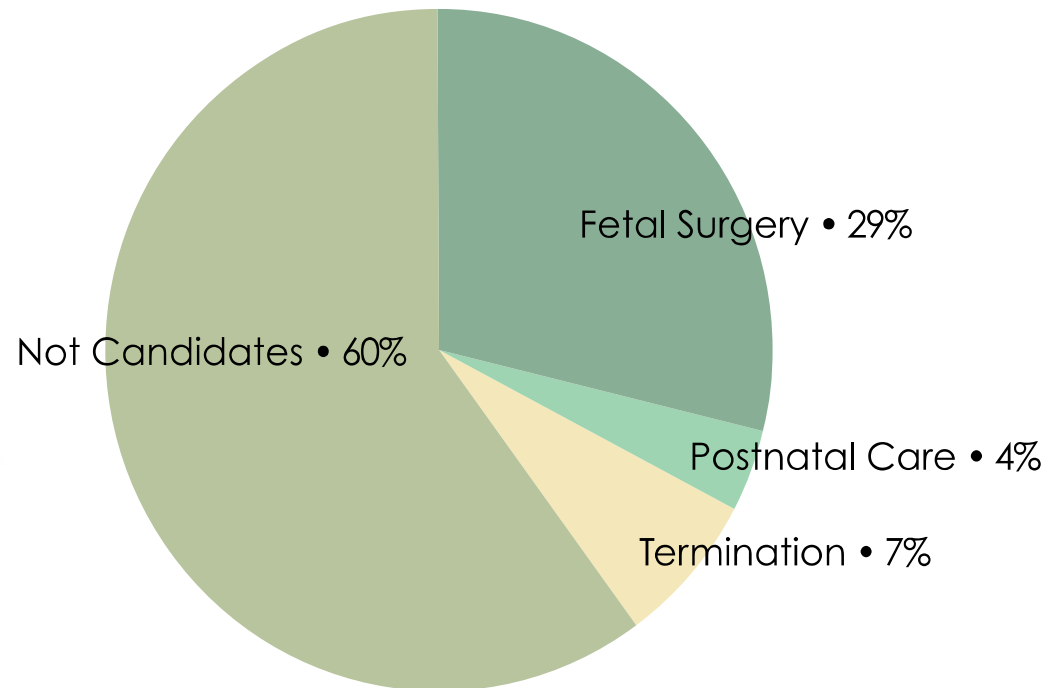


# Disposition after Pre-operative Evaluation And Counseling at CHOP (Post MOMS)

## Of the 348 Candidates Evaluated\*

Fetal Surgery Candidates	139
Fetal Surgery	101
Postnatal Care	13
Termination	25
Not Candidates (Due to Exclusion Criteria)	209

\* Out of 587 Referrals, CHOP conducted 348 MMC on-site evaluations.



# Disposition of all patients referred to CHOP (Post MOMS)

	Total (n = 587)	%
On-site evaluations	348	59.3
Disposition of fMMC repair candidates	139	23.7
Open fetal surgery	101	17.2
Postnatal care	13	2.2
Termination of pregnancy	25	4.3
Exclusions for noncandidates	209	35.6
BMI >35	12	2.0
Additional anomalies on imaging	66	11.2
Genetic diagnosis in fetus	8	1.4
Gestational age >26 weeks	5	0.9
Preexisting maternal medical condition	65	11.1
Multiple pregnancy	10	1.7
No hindbrain herniation on MRI	43	7.3
Disposition of referral-only patients	239	40.7
Declined appointment	67	11.4
Information call only	57	9.7
Insurance issues	1	0.2
International patient	22	3.7
Not a candidate based on basic information	77	13.1
Opted for termination of pregnancy	15	2.6

# Summary

- Comprehensive prenatal evaluation and counseling for fetal MMC is critical to optimize outcomes
- Requires MMC focused multidisciplinary expertise that can only be learned by experience
- Only 1:4 referred pts and 1:3 evaluated pts were surgical candidates by our criteria

# ***The Center for Fetal Diagnosis and Treatment The Children's Hospital of Philadelphia***



## ***Fetal Surgery***

**N. Scott Adzick, MD**

**Holly L. Hedrick, MD**

**William H. Peranteau, MD**

## ***Obstetrics & MFM***

**Mark P. Johnson, MD**

**Julie S. Moldenhauer, MD**

**Nahla Khalek, MD**

**Juan Martinez-Poyer**

***[www.fetalsurgery.chop.edu](http://www.fetalsurgery.chop.edu)***