

## 13. FETAL TREATMENT: PRINCIPLES

*Francois I. Luks, M.D.*

### INTRODUCTION

Fetal treatment is:

- Pregnancy management
  - Alteration in mode of delivery (C-section vs. vaginal delivery)
  - Alteration in time of delivery
  - Alteration in place of delivery (community hospital vs. tertiary center)
  - Non-invasive fetal treatment (without entering the gravid uterus)
- Minimally invasive fetal treatment (percutaneous needle techniques, endoscopic surgery)
- Open fetal surgery (very few indications)

Most prenatally diagnosed conditions are best treated *after* birth.

### RATIONALE FOR FETAL TREATMENT

- Reserved for (small) number of fetal anomalies seen to deteriorate throughout gestation
- Only if even earliest postnatal intervention too late, and following conditions are met:

1. ***The condition has to be diagnosable before birth.***

Many defects cannot (yet) be diagnosed with current technology (imaging, molecular)

2. ***Differential diagnosis has to be accurate.***

Some conditions have similar ultrasound appearance but different etiology. Examples: hydrocephalus from isolated aqueductal stenosis (potential for drainage) or chromosomal anomaly (irreparable); oligohydramnios from untreatable Potter syndrome (renal agenesis) or low urinary tract obstruction (which can be drained)

3. ***The natural history of the condition should be known.***

Often difficult – how to be certain of irreversible damage if left untreated?

Example: posterior urethral valves → oligohydramnios → impaired chest expansion → pulmonary hypoplasia → neonatal death

Even if pathophysiology is predictable in general, possible variations in severity: importance of prognostic factors. Example: lung-head ratio (LHR) to predict severity of diaphragmatic hernia, staging of twin-to-twin transfusion syndrome

4. ***There is no effective postnatal treatment.***

Most conditions are best treated after birth. Examples: abdominal wall defects (gastroschisis, omphalocele), esophageal atresia, cleft lip/cleft palate, intestinal atresia, club foot, most fetal tumors

5. ***The condition should be lethal if left untreated.***

Fetal intervention (surgery) is highly invasive/dangerous to mother and fetus. Fetal surgery not justified for 'less severe' conditions. Examples: cleft lip/cleft palate (despite promise of scarless healing), open neural tube defect (spina bifida)

6. ***In utero treatment must be feasible.***

Treatment must also be expected to be effective. Examples: in utero open heart surgery (not (yet) feasible), spina bifida (in utero closure not shown to be effective in reversing damage from open neural tube)

7. ***Fetal intervention should only be performed at specialized institutions with access to a multidisciplinary team of experts, and with pressure-free informed consent from appropriately counseled parents.***

## TYPES OF FETAL INTERVENTION

### - Non-invasive intervention

- "Pregnancy management:" alterations in time, place or mode of delivery
- Indirect treatment of the fetus through non-invasive means: ex. Transplacental therapy

### - Invasive intervention

- Requires entering the gravid uterus – needle, incision
- Most aggressive form of fetal treatment
- Significant risks: infection (wound, chorioamnionitis), bleeding (uterus, fetus), tear/rupture of amniotic or chorionic membrane, premature labor, chronic amniotic leak (and oligohydramnios)
- Significant risk of fetal death
- Needle techniques vs. endoscopic fetal surgery vs. open fetal surgery
- Perinatal intervention: EXIT procedure (see chapter 16)