MULTIFETAL PREGNANCY REDUCTION

Rationale

- The authors estimated that by limiting multifetal gestations to twins:

Prevention of 58 percent of early triplet mortality

Prevention of 70 percent of early quadruplet mortality

Increased risk of long-term neurodevelopmental morbidity

the prevalence of cerebral palsy :

1.6 to 2.3 per 1000 surviving infants in singletons

7 to 12 per 1000 surviving infants in twins

28 to 45 per 1000 surviving infants in triplets

Multifetal pregnancy AND pregnancy complications

- Preeclampsia
- gestational diabetes
- postpartum hemorrhage

- The economic and psychological impacts of multiple birth on families

Reduction of high order multifetal pregnancy

- MPR should be considered for any pregnancy with three or more fetuses, as there is good evidence that it improves pregnancy outcome for survivors

Reduction of twin pregnancy

- This is more controversial in the absence of a medical or obstetrical indication

FOREXAMPLE :

Maternal cardiac disease

History of preterm singleton delivery

Cervical insufficiency with history of pregnancy loss

Preprocedure considerations

1. It is important to be familiar with local laws
2. MPR is usually performed between 10 and 13 weeks of gestation for several reasons:

Why 10 and 13 weeks of gestation???

- ✓ Technical issues (eg, the fetuses have to be large enough for adequate visualization by transabdominal ultrasound).
- ✓ Most spontaneous fetal losses will have occurred by 10 weeks
- ✓ CVS
- ✓ Identification of some fetal abnormalities
- ✓ In those patients not opting for CVS, nuchal translucency screening should be performed between 10+5 to 13+5 weeks.
- ✓ Early reduction allows parents to undergo the procedure while the pregnancy is relatively private

3.Immediately prior to any invasive procedures, an ultrasound examination is performed to establish :

- ✓ the relationship of the gestational sacs to each other
- ✓ to determine which of the fetuses are most accessible to needle insertion
- ✓ to survey the fetal anatomy for structural
- ✓ anomalies to markers of aneuploidy(increased nuchal translucency or absent nasal bone)

- The traditional technique of injection of potassium cholaride assumes multichorionic placentation

Chorionic villus sampling

- CVS can be performed on one or more of the fetuses prior to MPR
- In general, CVS is performed on the fetuses that are not intended to be reduced.
- The obvious advantage of performing CVS before MPR is to ensure that the chromosomally normal fetuses are not reduced.
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Women with multifetal gestations are at increased risk of carrying aneuploid fetuses

(1) many of these women are of advanced maternal age

(2) the risk of aneuploidy is cumulative (risk multiplied by the number of fetuses)

(3) reproductive endocrine techniques may affect embryonic genes and chromosomes

- Given both a normal FISH and normal ultrasound (including nuchal translucency), the residual risk of abnormal karyotype has been calculated to be about 1/400 to 1/500
- Performing CVS before MPR does not increase the post-procedural pregnancy loss rate above that of MPR alone, and may decrease losses

- a diagram of the relative positions of the gestational sacs and placentas, must be carefully recorded so that if an abnormal karyotype is identified, it can be correctly matched to the affected fetus.
- Attention should also be paid to the relative fullness of the maternal bladder, as filling and emptying the bladder can change the appearance of the sacs/placentas.
- Nevertheless, diagnostic error due to incorrect matching of results and fetus has been reported in up to 1.5 percent of cases

Technique for MPR

- In a multichorionic pregnancy, the fetus(es) reduced are those that are most easily accessible, usually those closest to the anterior uterine wall and/or the fundus.
- The fetus above the cervix is avoided whenever possible because of a hypothetical increased risk for infection or uterine irritability if that fetus were reduced.

- The most common technique uses a transabdominal (TA) approach. A transcervical (TC) or a transvaginal (TV) approach can be used, but have been associated with increased post-procedural pregnancy loss rates when compared with the TA approach; therefore, these approaches are usually reserved for situations in which the TA approach is not technically feasible

- The procedure is performed by injection of approximately 2 to 3 mL of potassium chloride (concentration 2 mEq KCl/mL) into the fetal thorax using a 22 gauge spinal needle under ultrasound guidance.
- Asystole is usually seen within one minute of injection of potassium chloride, and total procedural time is typically less than five minutes.
- Additional fetuses can be reduced with the same needle puncture or, more commonly, with a separate needle stick.

- Antibiotics have not been given
- The patient is asked to wait in the waiting area, and an ultrasound is performed one hour after the procedure to again confirm asystole in the reduced fetus(es) and cardiac activity in the nonreduced fetus(es).

Postprocedure considerations

Repeat ultrasound examination to confirm fetal well-being is usually performed one to two weeks after the procedure.

monthly ultrasounds for fetal growth in the third trimester.

Pregnancy outcome

- Pregnancy outcome is improved when higher order multifetal gestations are reduced.

- Operator experience —

Improve total pregnancy loss and prematurity rates

Psychological outcome

- Although many in the MPR group expressed sadness and guilt one year after birth of the remaining fetuses, the majority overcame the pain associated with the reduction at two years. Furthermore, when compared with mothers of nonreduced triplets, mothers who had undergone MPR had less anxiety and depression and a more satisfactory relationship with their children

LEGAL CONSIDERATIONS

- Since MPR is not really a "termination of pregnancy," but a procedure developed to "increase the prospects of pregnancy continuation," ***we do not consider it a type of abortion(UP TO DATE)***
- However, since laws may vary from state to state, it is important to know the law in the state in which the MPR is performed, and be aware of any special legal considerations.

SELECTIVE TERMINATION

- Selective termination (ST) refers to a procedure in which one or more anomalous fetus(es) in a multifetal pregnancy are terminated

- Fetuses with major anomalies
- Offered for lethal anomalies
- May optimize the outcome of the normal fetus
- To reverse preeclampsia when occurring in the setting of a hydropic fetus

Preprocedure considerations

- precise fetal mapping and placental positioning
- Accurate determination of chorionicity

Dichorionic fetuses

- POTASSIUM CHLORIDE is injected into the thorax (ideally intracardiac) of the affected fetus under ultrasound guidance until asystole is confirmed

Pregnancy outcome after selective termination

Pregnancy outcome after selective termination

- In two large series, the median gestational age at delivery after ST, for continuing pregnancies, was 35.7 and 37.1 weeks

- Performing earlier ST in pregnancy:

Decreased fetal loss and decreased rates of prematurity.

- performing ST between 10 to 23.7 weeks, each increase of one week of gestational age at time of ST was associated with a 2.69 week decrease in GA at delivery

Third trimester termination

- ST in the third trimester is legal in some states within the United States and in several countries.
- **One series describes 36 dichorionic pregnancies that underwent ST at greater than or equal to 24 weeks:**

✓ The mean gestational age at delivery was 36.9 weeks; 13.8 percent of patients delivered before 34 weeks.

✓ This study established late ST in twin pregnancies as a safe procedure with reasonable perinatal outcome.

Monochorionic fetuses

- Potential approaches for ST in monochorionic twins :

Endoscopic procedures (fetoscopy), and ultrasound guided needle techniques.

The most common method: Radiofrequency ablation

- A systematic review of studies of umbilical cord occlusion for selective feticide in monochorionic twins included 345 cases performed at 14 and 35 weeks of gestation between 2000 and 2008

- Survival of the cotwin was higher if the procedure was performed after 18 weeks of gestation (89 versus 69 percent).
- Survival after **radio frequency ablation**, bipolar cord coagulation, laser cord coagulation, and cord ligation was 86, 82, 72, and 70 percent, respectively.
- The majority of cotwin deaths occurred within two weeks of the procedure.
- The overall rate of neonatal death was 4 percent.

- 3 % of procedures failed:

Technical difficulties

complications, such as bleeding

- 22 %Premature rupture of membranes
- 33 % preterm delivery (≤34 weeks)
- 7 % of survivors experienced neonatal morbidity related to neurologic lesions or secondary to prematurity

How to reduce the rate of preterm birth and pregnancy loss

- Performance of the procedure to ≥19 weeks
- Use of thinner instruments
- Minimizing operating time

LABORATORY CHANGES POSTPROCEDURE

- The maternal serum alpha-fetoprotein concentration is typically elevated **for several weeks** after any fetal reduction procedure and is not necessarily indicative of fetal defects .
- The elevation is probably caused by release of tissue or serum from the dead fetus(es); therefore ***karyotype*** are not indicated based upon elevated MSAFP levels alone.

- detailed ultrasonography should be performed to screen for fetal structural defects.
- Information on the effects of MPR on midtrimester maternal serum levels hCG and uE3 are limited, contradictory, and difficult to interpret