Fetal Lung Maturity Testing- Amniocentesis

Background:
In term and near term gestations, amniocentesis is used as an assessment of fetal lung maturity. Although only one factor in the final pre-delivery development of the term newborn, fetal lung maturation is both a surrogate marker for maturity and a major determinant of neonatal admissions and newborn morbidity in the child delivered without sufficient development of pulmonary function to normally support post delivery life.

Testing:
Although various tests have been used and proposed for fetal lung maturity testing, the choice of the particular test used is often influenced by availability and logistic issues that are present at a given practice site. At The University Hospital, the primary test used for initial evaluation is the amniotic fluid lamellar body count (LBC). In most cases of a transitional result (LBC >10,000 < 50,000/μL), L/S should be ordered. A mature L/S indicates that the fetus is at low risk for developing RDS.

Indications for Testing:
1. For patients where delivery may be indicated prior to accepted historical pregnancy dating presumption of fetal lung maturity (ACOG) if fetal lung maturity is documented by amniocentesis.

Contraindications:
1. Contraindication to amniocentesis
2. Early gestational age- Amniocentesis lung maturity testing positive predictive value is poor in confirmed gestational age pregnancy in which pre-test probability of lung maturation is very low. Amniocentesis fetal lung maturity testing is, therefore, not generally of value in pregnancies of < 32 weeks.
3. Any patient in whom delivery is medically or obstetrically indicated as best compromise of minimalization of maternal and fetal risk irrespective of gestational age or lung maturation.

Reflex Testing:
LBC test results are generally available within 1-2 hours of sampling. L/S should be ordered for patients with LBC results in a transitional range (10,000<50,000/μL). PG should be ordered for diabetic patients with an inconclusive LBC. The reflex testing process for fetal lung maturity testing:

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LBC Testing
  Amniocentesis for lung maturity

LBC <10,000/μL  LBC 10,000<50,000/μL  LBC ≥ 50,000/μL
  Immature       Transitional        Mature

  L/S (PG if poorly controlled diabetic)

  Delay delivery Immature Mature Deliver
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Testing Limitations and Special Issues:

1. Ruptured Membranes - Vaginal pool samples may be less reliable than amniotic fluid samples obtained from amniocentesis. LBC testing should not be used if the specimen is a vaginal pool sample. Phosphitidol glycerol (PG) is valid with a vaginal pool sample).
2. Blood/Meconium - Blood or meconium contamination may make fetal lung maturity testing unreliable. Blood falsely elevates LBC count. LBC and PG are not affected by meconium. L/S is affected by meconium.
3. Diabetic mothers – LBC is the preferred test for lung maturity. When the LBC is in the transitional level, both LS and PG are acceptable options as a second test for diabetes patients who require maturity evaluation and who have reasonable glycemic control. For patients with poor glycemic control and a transitional level LBC, PG should be tested. When the level of control of a diabetic patient is in question, choice of lung maturity test will be made in consultation with a Maternal-Fetal Medicine specialist.

Presumed Maturity Several Days After Initial Immature Results:

1. LBC testing does not change in a linear fashion. Therefore, it is not reliably possible to presume fetal lung maturity after an initially transitional or negative LBC analysis.

2. Presumed maturation will only be used in our practice with the following stipulations:
   - Decision for delivery without retesting is a faculty decision
   - Rationale and plan are discussed with the patient, with the alternative of repeated amniocentesis discussed in detail
   - Delivery without retesting is not an option in a pregnancy of less than 37 0/7 weeks’ gestation
   - Decision not to repeat amniocentesis but to instead deliver requires faculty documentation in the patient’s chart