Assessment of fetal lung maturity

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INTRODUCTION

The pulmonary system is among the last of the fetal organ systems to mature, both functionally and structurally. Fetal sex appears to play a role in this process; respiratory problems near term are slightly more common among male compared with female fetuses [1-3].

Because the immature pulmonary system may not oxygenate the preterm neonate adequately, preterm birth can lead to significant neonatal morbidity or mortality. Laboratory tests can be performed on amniotic fluid before iatrogenic preterm birth to provide an indirect assessment of the likelihood of lung maturity (direct tests of fetal lung function are not possible), and can be a factor in planning the time of induction or cesarean birth. Although once commonly performed, fetal lung maturity testing is no longer available in many countries.

This topic will discuss tests for assessment of fetal lung maturity. Clinical manifestations, diagnosis, treatment, sequelae, and prevention of neonatal pulmonary immaturity are reviewed separately. (See "Respiratory distress syndrome (RDS) in the newborn: Clinical features and diagnosis" and "Respiratory distress syndrome (RDS) in preterm infants: Management".)

WHEN IS FETAL LUNG MATURITY TESTING PERFORMED?

In most clinical settings, testing for fetal lung maturity is not performed because (1) delaying delivery because of lung immaturity would place the pregnant patient or fetus at significant risk, or (2) the fetus would benefit from delaying delivery, even if lung maturity is documented, and delaying delivery does not place the pregnant patient at significant

risk, or (3) a course of antenatal corticosteroids can be given, which will benefit the fetus with immature lungs and has no proven harms [4]. (See "Antenatal corticosteroid therapy for reduction of neonatal respiratory morbidity and mortality from preterm delivery".)

These assessments may be ambiguous, so information about lung maturity sometimes may be helpful in the balance [5]. The information may also be helpful in estimating the level of newborn care that will be required. Thus, a test for fetal lung maturity may be performed before semielective but medically indicated births <39 weeks when this information significantly impacts assessment of the balance between the maternal-fetal risks of continuing the pregnancy versus the maternal-fetal risks of preterm birth, but this is an infrequent occurrence. In the United States, testing for fetal lung maturity is now rarely performed, and there is no clinical scenario where it is required.