Doppler studies in post-term pregnancies

Based on Doppler in Obstetrics: by K Nicolaides, G Rizzo, K Hecher

IMPLICATIONS

The prevalence of post-term pregnancy (those exceeding 294 days or 42 weeks of gestation) is about 10% when dating is based on the first day of the last menstrual period, but this is only about 5% when dating is by an early ultrasound scan. Post-term pregnancy is associated with increased risk of both intrauterine and postnatal death (Figure 1). In a registry in London involving 171,527 births, the rate of perinatal and infant increased from 0.7 per 1000 ongoing pregnancies at 37 weeks to 5.8 per 1000 pregnancies at 43 weeks.

![Figure 1: Intrauterine death (black), neonatal death and post-neonatal death (red) per 1000 ongoing pregnancies at each gestation.](image)

There are no morphological features that could indicate an aging process of the term or post-term placenta. In contrast, the amniotic fluid volume decreases from about 37 weeks, and, during the post-dates period, it is estimated that there is a decrease in amniotic fluid volume of about 33% per
week. This decrease in amniotic fluid volume, combined with the increased incidence of meconium staining of the amniotic fluid in post-term pregnancies, results in an increased risk of meconium aspiration syndrome. The risk of perinatal death is mainly in the small, postmature, growth-restricted fetus, and the main aim of antenatal monitoring is to identify the onset of uteroplacental insufficiency and the development of fetal hypoxia. Post-term pregnancies are associated with the development of oligohydramnios, which may be the consequence of decreased fetal renal perfusion due to impaired fetal cardiac function. The alternative hypothesis for the reduction in renal perfusion and urinary output is redistribution in the fetal circulation, as in fetal growth restriction.

**DOPPLER STUDIES**

Several studies have examined the potential value of Doppler assessment in the prediction of adverse outcome (usually defined as fetal distress in labor) in post-term pregnancies.

- Impedance to flow in the uterine arteries is normal even in those associated with fetal compromise and abnormal neonatal outcome.\(^3,4\) This suggests that the pathophysiology of placental insufficiency in post-term pregnancies differs from that observed in cases of fetal growth restriction at earlier gestational ages. Fetal compromise in prolonged pregnancy appears to be a fetoplacental than a uteroplacental problem.

- Studies examining impedance to flow in the umbilical arteries in post-term pregnancies with adverse outcome reported contradictory results; in some studies impedance was increased and in others it was normal.\(^3-7\)

- Some studies reported that post-term pregnancies which subsequently developed fetal distress in labor and adverse outcome were associated with antepartum evidence of increased impedance in the umbilical artery and decreased impedance in the fetal middle cerebral artery.\(^7-9\)

- In post-term pregnancies with adverse outcome, there is decreased blood flow velocity in fetal aortic and pulmonic outflow tracts and across the mitral valve.\(^10,11\) It was suggested that, in prolonged pregnancies, cardiac function deteriorates in fetuses that subsequently develop an abnormal fetal heart rate pattern.

**REFERENCES**


