

Severe Intrauterine Growth Restriction In A Term Newborn: A Case Report Associated With Maternal Smoking

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Abstract

We report a case of a term neonate with severe intrauterine growth restriction (IUGR) born to a mother with a significant tobacco-smoking history. Despite regular prenatal care, the fetus showed progressive growth failure and abnormal Doppler findings. The neonate required specialized neonatal intensive care. This case underscores the role of maternal smoking as a modifiable risk factor for severe IUGR, discusses pathophysiology, perinatal management, and long-term outcomes.

INTRODUCTION

Intrauterine growth restriction (IUGR) refers to poor growth of a fetus in the uterus, resulting in weight below expected norms for gestational age. Severe IUGR is associated with considerable perinatal morbidity and mortality, including hypoglycaemia, hypothermia, respiratory distress, and long-term neurodevelopmental impairment. Maternal smoking during pregnancy is a well-established risk factor for IUGR and affects both fetal growth and vascular function in the placenta and fetus. PubMed⁴

CASE REPORT

Maternal History:

A 29-year-old gravida 2, para 1 mother presented for routine antenatal care. Her pregnancy was otherwise uncomplicated. She reported smoking 8-10 cigarettes per day since age 20, including during pregnancy. She had no hypertension, diabetes, or other medical illnesses. She attended regular antenatal visits; ultrasounds at 20 and 28 weeks were within normal parameters.

Prenatal Investigations:

At 32 weeks' gestation, an ultrasound revealed estimated fetal weight (EFW) at the 5th percentile. Doppler assessment showed elevated umbilical artery resistance (high umbilical artery pulsatility index), reduced middle cerebral artery (MCA) Doppler flow, and cerebral-umbilical (C/U) ratio decreased, suggestive of "brain sparing" pattern. There was oligohydramnios (amniotic fluid index ~ 5 cm). Maternal cotinine assay was not performed. Nutritional status was adequate; maternal hemoglobin was 11.2 g/dL.

Delivery:

At 37 + 2 weeks, because of worsening Dopplers (umbilical artery end-diastolic flow nearly absent, declining fetal movements), the decision was taken for delivery via cesarean section.

Neonatal Findings:

The infant was born with Apgar scores 6 and 8 at 1 and 5 minutes respectively. Birth weight was 1800 g (well below the 3rd percentile for this gestational age), length and head circumference were also proportionally reduced. On examination, there was symmetrical IUGR, with thin extremities, loose skin, abundant vernix. Respiratory distress developed within the first hour; chest radiograph consistent with mild respiratory distress syndrome. Blood sugar at 2 hours was 35 mg/dL; treated with intravenous dextrose. Thermoregulatory measures were instituted. There was mild hyperbilirubinaemia needing phototherapy. The neonate was managed in NICU: supportive care, feeding via orogastric tube initially, gradual attainment of full enteral feeds.

Investigations: Complete blood count, infection screen negative. Cord blood gases showed mild acidosis. Echocardiography normal. Follow-up Dopplers postnatally were not indicated. There was no congenital anomaly on clinical or ultrasound evaluation.

Hospital Course:

The baby required respiratory support with CPAP for 24 hours, then supplemental oxygen for another day. Feeding was advanced gradually. Glycemic control stable after first 24 hours. The infant was discharged on day 14 weighing 2000 g, with advice for close follow-up for growth and development.

DISCUSSION

Pathophysiology:

Maternal smoking has multifactorial effects: nicotine, carbon monoxide, and other toxins lead to vasoconstriction of uteroplacental vessels, reduced oxygen-carrying capacity, oxidative stress and altered placental structure. These contribute to decreased nutrient and oxygen delivery and thus restrict fetal growth. Studies have shown dose-response relationships between number of cigarettes smoked and the likelihood of IUGR. PubMed²

Doppler findings & timing:

In this case, the development of abnormal umbilical artery and MCA Dopplers indicate uteroplacental insufficiency and fetal adaptation (“brain sparing”). Studies (e.g., smoking vs non-smoking mothers) show increased umbilical artery resistance in smoking pregnancies complicated by IUGR. PubMed¹

Also, early vs late onset IUGR differ in severity, proportionality, and outcomes. PubMed¹

Clinical management:

Timely recognition via ultrasound and Dopplers, maternal counselling to stop smoking, close surveillance, and appropriately timed delivery are key. Neonatal care must address the complications: thermoregulation, feeding difficulties, hypoglycemia, respiratory support, monitoring for long-term outcomes.

Prognosis & Long-term outcomes:

Severe IUGR is associated with risk of neurodevelopmental delay, metabolic syndrome in later life, growth catch-up failure. Long-term follow up is required. Interventions that minimize insult (such as maternal smoking cessation even mid-pregnancy) are beneficial. PubMed¹

Significance of Modifiable Risk Factor:

Smoking as an etiological agent is preventable. Public health measures, antenatal counselling, possibly biochemical verification, and smoking cessation programs could reduce incidence. Studies show that maternal smoking IS independently associated with IUGR, with odds ratios rising significantly with amount smoked.

PubMed²

CONCLUSION

This case highlights the severe growth restriction possible in a term neonate born to a mother who smoked throughout pregnancy, even in absence of other comorbidities. Early detection, maternal smoking cessation, Doppler surveillance, and coordinated obstetric-neonatal care are essential to reduce adverse outcomes. For clinicians and public health policymakers, reinforcing the risks of smoking during pregnancy must be a priority.

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