

Intracranial hemorrhage and hematuria in a neonate associated with heavy maternal smoking

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Maternal smoking during pregnancy is associated with greater rates of premature deliveries, low birth weight, perinatal morbidity and mortality, and impaired intellectual development. It also causes a three-fold greater risk for intracranial hemorrhage in neonates. To our knowledge no neonatal case with intracranial hemorrhage and hematuria related to heavy maternal smoking has been published to date. In this case report we present a neonate with intracranial hemorrhage and hematuria, which were associated with heavy maternal smoking, to emphasize the importance of heavy maternal smoking as a causal factor in neonatal bleeding.

Key words: hemorrhage, hematuria, intracranial bleeding, maternal smoking, neonate.

Maternal smoking during pregnancy is associated with greater rates of premature deliveries, low birth weight, impaired intellectual development, and perinatal mortality¹⁻⁴. Also, maternal smoking during pregnancy causes a three-fold greater risk for intracranial hemorrhage in preterm newborns than in similar neonates of nonsmoking mothers⁵. In this case report, we present a neonate with intracranial hemorrhage and hematuria, which were associated with heavy maternal smoking, to emphasize the importance of heavy maternal smoking as a causal factor in neonatal bleeding.

Case Report

A 16-day-old, 2100 g male patient was referred to our hospital because of hematuria for 14 days. He was delivered at 37 weeks' gestation to a 32-year-old woman after an uncomplicated pregnancy. His mother did not receive any medicine during pregnancy. An elective cesarean section was performed because of maternal hip dysplasia. Apgar scores were in normal limits after birth. His mother had smoked >20 cigarettes per day during pregnancy. An inherited bleeding disorder was not present in his family. The physical examination on admission was unremarkable except low birth weight (<3rd percentile). Laboratory investigations revealed

normal complete blood cell count with differential, serum chemistry values, and renal and liver function tests. Results of coagulation studies including bleeding time, prothrombin time, activated partial thromboplastin time, fibrinogen concentration, von Willebrand factor antigen, factor XIII level, and platelet function tests were within normal limits according to his age. Urinalysis showed low-grade microscopic hematuria without proteinuria. Urinary calcium-to-creatinine ratio and uric acid levels were in normal ranges. Results of urine culture and serologic studies for intrauterine infections were negative. Abdominal ultrasound was normal. On the second day of hospitalization, clonic seizures occurred. Cranial ultrasound revealed previously occurred subacute intracerebral hemorrhage, localized at the left caudate nucleus, germinal matrix, and thalamic region, without any other abnormalities. His repeated coagulation tests were in normal limits. Treatment with Phenobarbital was started. During follow-up hematuria disappeared, seizures did not occur again, and intracranial hemorrhage features diminished in control cranial ultrasounds.

Discussion

In our patient the occurrence of hematuria and intracranial hemorrhage without any predisposing

factors points toward heavy maternal smoking as a possible cause. Cigarette smoking during pregnancy causes circulatory abnormalities of the fetoplacental unit⁶⁻⁹ and increases the risk of intracranial hemorrhage in neonates related to chronic fetal hypoxia arising from decreased uteroplacental perfusion and increased levels of carboxyhemoglobin in fetal blood^{5,10}. The vasoconstrictive effect of nicotine in human umbilical arteries was also established in a study of Milart et al.¹¹. The arteries of heavy smoker pregnant women showed significantly lower contractions in comparison with nonsmokers. In a study of Clark et al.¹², the maternal use of nicotine produced significant changes in fetal mean arterial pressure, heart rate and umbilical blood flow at concentrations that had similar effects on maternal hemodynamics; it decreased fetal heart rate and umbilical blood flow, but increased the umbilical vascular resistance. Since low blood flow may be an important risk factor for severe germinal matrix and intraventricular hemorrhage in newborns¹³, the neonates whose mothers smoked during pregnancy are under great risk for intracranial bleeding.

In addition to the direct hemodynamic effects, components of cigarette smoke have been shown to damage the vascular endothelium¹⁴, which may lead to hematuria as in our case. Recently, vascular retinal abnormalities in neonates of mothers who smoked during pregnancy were demonstrated clearly¹⁵, supporting the hypothesis of a generalized vascular disorder in those neonates. In adult patients, an association between cigarette smoking and the occurrence of intracranial hemorrhage and hematuria has also been shown in different studies¹⁶⁻²¹.

The negative family history and no abnormality in blood coagulation tests ruled out the presence of an inherited bleeding disorder in our case. As in our case, it has been reported that smoking during pregnancy does not disturb the components of coagulation in neonates²². To our knowledge no other neonatal case with intracranial hemorrhage and hematuria related to heavy maternal smoking has been published to date. Our case confirms that heavy maternal smoking is an important risk factor for neonatal bleeding without any defect in the coagulation profile. A careful follow-up, both in the antenatal and postnatal period, and early intervention and diagnosis in those neonates may decrease the maternal smoking related morbidity and mortality.

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