Clinical Case Report

Intrauterine growth retardation in a 480 g neonate at birth

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Abstract

Background. There are few cases of live neonates with intrauterine growth retardation (IGR) <500 g with a satisfactory outcome, including apparent normal neurodevelopment.

Clinical case. We report the case of a female 480 g neonate diagnosed with severe IGR who was the product of a 30-year-old mother. This was the first gestation and delivery was at 31 gestation weeks. The neonate demonstrated severe oligoamnios and was delivered by Cesarean section. Apgar score was 7-7, oxygen was administered during the first 48 h of life, and parenteral nutrition and formula for premature infants was initiated. Serum cytomegalovirus IgG and IgM and cytomegalic urine inclusion were all negative. The infant accepted formula and was asymptomatic. She reached 500 g at 20 days of life. At 5 months old, her weight increased to 1700 g before hospital discharge. Patient was followed-up until 1 year of age. She weighed 2.8 kg and demonstrated a 6-month delay in psychomotor neurodevelopment. It is important to mention that she did not develop retinopathy of prematurity, periventricular leukomalacia or intracranial hemorrhage.

Conclusion. The patient presented here was born after 31 weeks gestation with a birth weight of 480 g. She showed severe IGR with neurodevelopmental delay; however, no retinopathy of prematurity, periventricular leukomalacia or intracranial hemorrhage was demonstrated.

Key words: severe intrauterine growth retardation, 480 g neonate.

Introduction

In the last two decades increased survival of infants with very low birth weight has been reported, reflecting the improvement in prenatal care, scientific and technological advances in neonatology, and a marked reduction in mortality after the introduction of prenatal steroids and exogenous surfactant. However, at a lower gestational age, the risks, morbidity and mortality are more elevated, with all the pathology that this implies (arteriosus ductus persistence, sepsis, intracranial hemorrhage, bronchopulmonary dysplasia, retinopathy of prematurity, necrotizing enterocolitis, periventricular leukomalacia, etc.), and possible sequelae such as re-hospitalizations in early life, slow growth, feeding problems, sight or hearing defects, motor and learning impairments or cerebral palsy. In developed countries that have the latest technology available, there has been a decrease in the limit of viability of infants in terms of weight and gestational age and, in most, they accept the limit of 25 weeks of gestation (>500 g) although there are isolated reports of infants who survived at lower gestational age and lower weight. Newborns (NB), who also are affected by intrauterine growth retardation (IUGR), have an additional risk factor for survival.
Clinical case presentation

We present the case of a female newborn infant. The newborn was the first child (first pregnancy) of a 30-year-old mother. The pregnancy was determined to be at 31 weeks of gestation according to the last menstrual period (LMP) and initial ultrasound. IUGR and severe oligohydramnios developed. Anticytomegalovirus antibodies (+) of 0.548 were reported (gray area). The infant was born by cesarean section, which was indicated due to lack of intraterine growth manifested by IUGR, and with abnormalities of placental-fetal circulation observed in the umbilical Doppler flow. The infant weighed 480 g at birth, length 30 cm, head circumference 21 cm and Apgar scores of 7-7. The growth was defined according to that reported by Kamoji: a weight of 500 g corresponds to the 10th percentile at 24 weeks of gestation although according to LMP it was 31 weeks, confirming severe IUGR (Figures 1A and 1B). Initial resuscitation steps were implemented and the infant was managed wearing a cephalic helmet and with inspired oxygen fraction of 80% for 2 days, considering retention of pulmonary fluid. Maternal nutrition was initiated through oral administration. Furthermore, the NB also presented an umbilical hernia of 3 cm in diameter, treated conservatively. Studies looking for intrauterine infection were negative for toxoplasma, rubella, HIV and herpes. IgG and IgM antibodies for cytomegalovirus and cytomegalic inclusion bodies in urine were also negative. The NB did not develop retinopathy of prematurity (ROP), periventricular leukomalacia (PLM) or intracranial bleeding. She was given two complete antibiotic schemes with imipenem and vancomycin and a second scheme with fluconazole and cefepime for a suspected sepsis, which was unconfirmed. She received parenteral nutrition from the time she was admitted to the hospital and showed a good response along with some weight gain. At 20 days old she weighed 500 g. Her urine output was normal and her vital signs were stable. She showed good activity, reactivity and color, and from the time she was admitted she showed spontaneous respiration, no apnea or other neurological signs. She received transfused plasma, red blood cells and concentrated platelets due to a platelet count of 39,000. Caloric intake was supplemented with formula for premature infants of 138 calories/kg/day on average. The hospital weight records showed a progressive weight gain and at 62 days of life her weight was 1 kg (Figure 2). She continued with good gastric tolerance and had no neurological or gastrointestinal complications. The formula was increased until the infant reached 165 days of age, achieved a weight of 1.7 kg and was discharged from the hospital asymptomatic and in good general condition. A cranial CAT scan with a normal result was performed prior to discharge at 5 months of age (Figure 3), suggesting that rehabilitation be continued. Among the tests that were carried out, the following initial results were reported for biometric hematology (BH): hemoglobin 15.9 g/dL, platelets of 220,000, white blood count 19,000, and differential with 91% lymphocytes and 6.7% neutrophils.
Low initial blood glucose was corrected, peak serum creatinine was 0.9 mg/dL, electrolytes and liver function tests were normal, and blood group was O Rh+. Final BH reported a white blood count of 6700, hemoglobin of 13.7 g/dL, platelets of 185,000, 21% neutrophils, 68% lymphocytes, and the final quantification of IgG and IgM antibodies against cytomegalovirus were negative, as well as others against intrauterine infections (toxoplasma, rubella, herpes). Thyroid hormone profile reported a TSH level of 2.0 μIU/mL, and a free T4 level of 1.1 ng/mL. The eye fundus, cardiovascular area, transfontanel ultrasound and CAT were carried out and followed-up until the child reached 1 year of chronological age and all were normal. By the age of 1 year, her weight was 2.8 kg, length 52 cm, and head circumference 31 cm. Her psychomotor development is consistent with a delay of about 6 months based on the Denver II. At this age, her growth is below the second standard deviation for both weight and height and head circumference according to Babson and Marks.16,17 This patient, with poor normal growth and head circumference, all well below the second standard deviation, is not expected to have comparable development or comparable to the standards for newborns or normal infants. At this time, she has a developmental delay of about 6 months according to her chronological age and her neurological level must be evaluated in the long-term to define her true prognosis, which is uncertain.

Discussion
The birth of a newborn weighing <500 g represents a major dilemma because these children are considered to be unstable, regardless of gestational age. It is true that survival of these infants is rare, but there are reports of some cases where their survival is achieved.18-21 It must be considered that, although the CAT scan and eye fundus were negative for PLM or ROP for this

Development of a neonate weighing 480 g at birth.

Figure 2. Weight gain curve in the first 100 days of life.

Figure 3. Simple cranial CAT scan showing no neurological damage.
patient, she remains at high risk for developing some type of neurological disability. It is probable that many of these infants who survive have significant neurological damage. The patient was very hypotrophic as a result of placental dysfunction whose cause was undetermined. Growth of this patient was halted in utero, but not the maturity, thereby avoiding neonatal intensive care and treatment with ventilators. She also did not show serious complications such as intraventricular hemorrhage, enterocolitis, sepsis, ROP, or PLM. She was discharged in good "practical" general condition. For this reason, it is reasonable to establish an initial assessment of gestational age at birth and to also establish prognosis. Possible causes of severe IUGR such as placental insufficiency, premature rupture of membranes, antiphospholipid syndrome, toxemia during pregnancy, and type 2 diabetes mellitus with vascular disease were ruled out. TORCH complex antibodies were negative. The most likely cause was IUGR secondary to placental insufficiency. There was no histological study of the placenta, only a report that showed a small size.

Termination of the pregnancy presented an ethical dilemma because the growth curve came to a halt in the last four measurements, although the pregnancy was not interrupted until we found a reversal in the Doppler flow of the umbilical artery. Caesarean section was indicated after induction of prenatal steroids for pulmonary maturity. This was a difficult decision despite the poor prognosis and limited life opportunities for the child (the mother was aware of the prognosis and future obstetric risks). With maternal consent, the pregnancy was interrupted, being aware of the poor prognosis and the presence of severe IUGR, which was demonstrated. In this case, the obstetric decision to interrupt a pregnancy at an early gestational age due to significant intrauterine growth failure and impairment of placental-fetal circulation confirmed on Doppler umbilical flow was justified. Due to the estimated fetal weight, this patient had a poor prognosis.

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References