Human placental lactogen (hPL) deficiency in a normal pregnancy

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Summary

A case of human placental lactogen (hPL) deficiency together with normal oestriol levels associated with a normal pregnancy in a woman in her second pregnancy is reported. The woman gave birth to a healthy male infant. The placenta was normal. Extremely low hPL levels may be compatible with the delivery of a healthy infant.

KEY WORDS: human placental lactogen, hPL, oestriol, pregnancy.

Introduction

In recent years measurements of serum concentrations of human placental lactogen (hPL) together with circulating levels of oestriol have been widely employed for the serial and accurate endocrine monitoring of pregnancy in order to evaluate and to assess intrauterine fetal well-being (Spellacy et al., 1971; Letchworth and Chard, 1972; Lindberg and Nilsson, 1973; Spellacy, Buhu and Birk, 1975). It is generally accepted that pregnancies with very low hPL levels are associated with maternal vascular problems, fetal delay of growth, and also with increased perinatal morbidity and mortality (Spellacy et al., 1975; Lebech and Borggaard, 1974; Moshirpur et al., 1981). Recently pregnancies have been described where very low levels or practically complete deficiency of hPL are associated with a normal gestation and the birth of normal babies, mostly male (Bock, Gaede and Trolle, 1976; Bradford and Hargreaves, 1978; Gaede, Trolle and Pedersen, 1978; Nielsen, Pedersen and Kampmann, 1979; Moshirpur et al., 1981; Di Renzo, Anceschi and Volpe, 1982); at least one normal female baby has also been delivered (Borody and Carlton, 1981). We report here a further case of hPL deficiency associated with normal oestriol levels in an otherwise normal pregnancy concluded with the delivery of a healthy male baby.

Case report

A 31-year-old woman, in her second pregnancy, had had an uncomplicated delivery of a healthy 3,500 g male baby 8 years before. The uterine size and the periodic ultrasound measurements were compatible with gestational age. However, after the first hPL determination at the 34th week gestation, which revealed an extremely low level of the hormone (0.9 µg/ml), she was admitted to our hospital. The patient remained normotensive and all routine urine and blood analysis continued to be normal. In the following weeks almost daily hPL concentrations ranged between 0.8 and 1.4 µg/ml (in our laboratory normal limits for the last 2 months of pregnancy range between 5.85 ± 1.3 and 7.1 ± 1.4 µg/ml). Total oestriol measurements, assayed on the same sera, gave values between 151 and 236 ng/ml (normal range for the corresponding pregnancy period is 42–284 ng/ml). Biparietal diameters also suggested normal fetal growth. The fetal heart rate became abnormal in the 39th week, with alternating periods of bradycardia and tachycardia. A caesarian section was performed with the delivery of a healthy male 3,060 g infant, 51 cm tall, with a cranial circumference of 34 cm, with Apgar scores of 10 at 1 and 5 min. The placenta weighed 605 g with a diameter of 19 cm and looked normal; the umbilical cord was 28 cm long. The infant and the mother were discharged from the hospital on the 7th post-partum day both in a satisfactory condition.

Materials and methods

Serum hPL levels were determined by Radioimmunoassay Liso-phase hPL Kit (Lepetit SpA, Diagnostic Products, Milano). This method allows a
detection of minimum hPL concentration of 0.1 
µg/ml, employing 0.1 ml of unknown serum sample, 
with a between-assay coefficient of variation of about 3.5%. After 30 weeks of gestation, values of at least 4 
µg/ml are accepted as normal. The total serum 
oestriol levels were measured by Clinical Assays 
Travenol GammaDab Radioimmunoassay kit (Cam-
bridge, Massachusetts), which has a calculated sensi-
tivity of 10 ng/ml employing 10 µl of unknown serum 
sample, with a between-assay coefficient of variation 
of about 8%.

All serum hPL and oestriol determinations were 
performed on patient’s blood samples withdrawn at 
8.00 a.m. in the fasting state and after a night’s rest in 
bed.

Discussion

As in previously reported cases, our patient had 
extremely low hPL values together with total oestriol 
levels within normal limits, but pregnancy was 
normal and ended with delivery of a healthy male 
baby. It has been suggested that hPL deficiency may 
be sex-limited, as in sulphatase deficiency (Bock et 
al., 1976). In our patient, as in that of Moshirpur et al.
(1981), Borody and Carlton (1981) and Di Renzo et 
al. (1982), the pregnancy with hPL deficiency was the 
second.

Although the importance of the measurement of a 
substance such as hPL produced in high quantities by 
the syncytiotrophoblasts of the placenta (Moshirpur 
et al., 1981) is well established for the monitoring of 
placental function in problematic and in clinically 
normal pregnancies (Spellacy et al., 1971; Letch-
worth and Chard, 1972; Lindberg and Nilsson, 1973, 
Spellacy et al., 1975) our case further indicates that 
extremely low levels of hPL may be compatible with 
a normal pregnancy and the delivery of a normal 
baby. However, in the same period we monitored 
another pregnancy in a primigravida woman also 
with extremely low hPL levels and normal oestriol 
concentrations which ended with the premature 
spontaneous delivery of a female infant who died 
after four days for respiratory distress.

It has been postulated that such low hPL levels 
may be consequent to a failure of placental synthesis 
(Nielsen et al., 1979; Borody and Carlton, 1981), or to 
a more rapid destruction rate (Borody and Carlton, 
1981); finally the presence of another molecule with 
hPL-like activity but with different immunological 
characteristics cannot be excluded (Nielsen et al., 
1979). The real cause of this very unusual condition 
remains to be elucidated.

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