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Letter to the Editor

Transfer of insulin lispro across the human placenta

Abstract

Our in vitro perfusion study confirms the result of the Boskovic et al., that insulin lispo is not crossing the human placental membranes at low concentrations. In our study maternal steady state concentration reached 48 ± 0.7 μU in the maternal artery and 28 ± 1 μU in the maternal vein, while in the fetal site insulin lispo was not detected. However, the concentration of insulin lispo in placental tissue was 1836 ± 220 μU.

Keywords: Insulin lispro; Human placenta; Perfusion

We read with interest the Boskovic et al., study, concerning transfer of insulin lispro across the human placenta [1].

Their results show that at concentration of 100 μU/ml, level that mimics the peak levels typically measured after admission of 13 U of insulin lispro to healthy volunteers, no detectable transfer of insulin lispro was observed.

Insulin lispro improves the dosing convenience for patients with diabetes and provides a more natural control of blood glucose concentrations.

The new insulin has been tested in pregnant diabetic women, showing fewer hypoglycemic episodes with similar levels of metabolic control as regular insulin. Anti-insulin antibody levels were similar to regular insulin, and fetal or neonatal abnormalities were not observed. Moreover, no insulin lispro was found in the umbilical cord blood of infants of women, received insulin lispro during labor and delivery [2].

The use of insulin lispro in Type 1 diabetes during pregnancy results in outcomes comparable to other large studies of diabetic pregnancy [3].

We have also performed an in vitro study regarding the transfer rate of the short-acting insulin analogue insulin lispo in human perfused placental cotyledon.

Our study was performed in isolated placental cotyledons from four normal human placentas dually perfused, using the Shneider method [4]. Closed circulations were used to evaluate steady state transplacental gradient formation. Insulin lispo was added to the maternal medium at concentration of 100 μU/l. Insulin levels were measured by RIA. Antipyrine (0.5 mg/ml) was used as reference substance and measured by HPC. In order to determine the accumulation of insulin lispo in placental tissue, the levels of insulin lispro were examined in homogenate of perfused placental cotyledone.

In our study maternal steady state concentration reached 48 ± 0.7 μU in the maternal artery and 28 ± 1 μU in the maternal vein, while in the fetal site insulin lispo was not detected. However, the concentration of insulin lispo in placental tissue was 1836 ± 220 μU.

Our in vitro perfusion study confirms the result of the Boskovic et al., that insulin lispo is not crossing the human placental membranes at low concentrations.

Moreover, we have shown that high concentrations of insulin lispro are accumulated by placental tissue. The exact role of such insulin consumption in human placenta needs further investigation.

It seems that insulin lispro is a useful new agent in the treatment of diabetes mellitus.

References

[1] Boskovic R, Feig DS, Derewlany L, Knie B, Portnoi G, Koren G. Transfer of insulin lispro across the human placenta: in vitro perfusion studies. Diabetes Care 2003;26(5):1390–4.
[2] Jovanovic L, Ilic S, Pettitt DJ, Hugo K, Gutierrez M, Bowsher RR, et al. Metabolic and immunologic effects of insulin lispro in gestational diabetes. Diabetes Care 1999;22(9):1422–7.
[3] Masson EA, Patmore JE, Brash PD, Baxter M, Caldwell G, Gallen IW, et al. Pregnancy outcome in Type 1 diabetes mellitus treated with insulin lispro (Humalog). Diabet Med 2003;20(1): 46–50.
[4] Schneider H, Huch A. Dual in vitro perfusion of an isolated lobe of human placenta: method and instrumentation. In: Schneider H, Dancis J, editors. In vitro perfusion of human placental tissue. Basel: Karger; 1985. p. 40–7.

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