

CASE REPORT

A Case of Neonate Hypoglycemia

Tao Lu, Gangfeng Li

Department of Clinical Laboratory Center, Shaoxing People's Hospital, Shaoxing, P.R. China

SUMMARY

Background: There has been no unified definition for neonatal hypoglycemia. Generally, neonatal hypoglycemia is diagnosed when the whole blood glucose concentration is below 2.2 mmol/L. The reasons are numerous. This case report presents an instance of a newborn with extremely low blood glucose levels immediately after birth from a diabetic mother, referred to as the "Infants of Diabetic Mothers", providing a practical case reference for early monitoring and timely intervention for Infants of Diabetic Mothers (IDMs).

Methods: The glucose concentrations in whole blood and serum were measured using a fingerstick glucometer and a fully automatic biochemical analyzer, respectively. The levels of insulin and C-peptide were detected using a fully automatic chemiluminescence method. The glycated hemoglobin was measured using a glycated hemoglobin analyzer.

Results: The mother's blood glucose value before delivery was 8.28 mmol/L. After delivery, the fingerstick blood glucose and serum glucose concentrations of the newborn were 2.6 mmol/L and 0.11 mmol/L, respectively. The levels of insulin and C-peptide were 805.55 pmol/L and 2,312.64 pmol/L, respectively. The value of glycated hemoglobin was 7.5%. Intravenous nutrition with a 100 mL of 10% glucose at an infusion rate of 12.7 mL/d was maintained. Then, 10% glucose was given to the neonate at an infusion rate of 7.7 mL/minute for 30 minutes. Eventually, the blood glucose levels were raised to 5.2 mmol/L.

Conclusions: Diabetes has a profound impact on both the mother and the newborn. Close monitoring and timely intervention are necessary to reduce neonatal complications and promote long-term healthy growth and development.

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Correspondence:

Gangfeng Li
Department of Clinical Laboratory Center
Shaoxing People's Hospital
Shaoxing 312000
P.R. China
Phone: +86 13819587582
Email: 13819587582@163.com

KEYWORDS

diabetes, neonate, insulin

INTRODUCTION

The incidence of diabetes is increasing year by year, particularly gestational diabetes mellitus (GDM), and should be taken seriously [1]. Both GDM and pre-gestational diabetes mellitus (PGDM) have a significant impact on the growth and development of pregnant women and fetuses [2,3]. This article introduces a case of a newborn from a mother with diabetes, who presented with extremely low blood glucose level, providing a reference for clinical diagnosis and treatment.

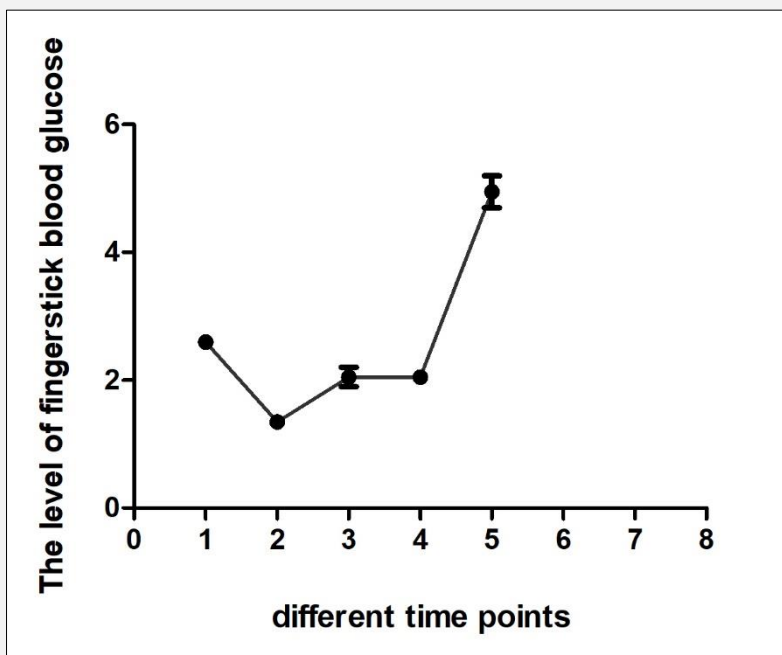


Figure 1. The level of fingerstick blood glucose at different time points.

The notes for different time points are as follows: 1. Immediately after birth. 2. After intravenous infusion of 100 mL of 10% glucose at a rate of 10 mL/hour. 3. One hour after intravenous infusion of 7.7 mL of 10% glucose at a rate of 1 mL/minute. 4. After intravenous infusion of 100 mL of 10% glucose at a rate of 12.7 mL/hour. 5. Half an hour after intravenous infusion of 7.7 mL of 10% glucose at a rate of 1 mL/minute.

CASE PRESENTATION

The diabetic mother was diagnosed with diabetic nephropathy and thyroid tumors. The glucose values in the whole blood and serum of newborn were 2.6 mmol/L and 0.11 mmol/L, respectively. To clarify the insulin situation, a fully automatic chemiluminescence instrument was used for detecting the levels of insulin and C-peptide. The levels of insulin and C-peptide were 805.55 pmol/L and 2,312.64 pmol/L, respectively. The value of glycated hemoglobin was 7.5%, significantly higher than the normal range, which indicated that the newborn had already been affected by the mother's higher blood glucose in utero. After glucose was injected into the vein with an appropriate amount, the level of infant fingerstick blood glucose was detected at different time points and gradually returned to normal levels (Figure 1).

DISCUSSION

The definition of neonatal hypoglycemia is vague, and typical clinical manifestations were lacking [4,5]. It is widely believed that newborns with a blood glucose val-

ue below 2.2 mmol/L, regardless of whether they exhibit symptoms such as reduced responsiveness, pallor, difficulty feeding, hypothermia, lethargy, irritability, or even coma, can be diagnosed with neonatal hypoglycemia [6]. There are many causes of neonatal hypoglycemia, such as hypoglycemic treatment during pregnancy, prematurity, asphyxia, diabetic mothers, and hyperinsulinemia [7,8]. In this case, the parturient herself had underlying diseases such as diabetic nephropathy and thyroid tumor. Newborns with a diabetic mother may exhibit symptoms such as rapid breathing, congenital malformations, and hypoglycemia, which are part of the "Infants of Diabetic Mothers" (IDM). In this case, the newborn exhibited symptoms such as slight weakness in spirit and shortness of breath after birth, and the blood glucose value was very low. The main cause of neonatal hypoglycemia is that insulin could not penetrate to the placenta. The newborn should secrete higher insulin to adapt to the higher blood glucose environment in the mother's body. After the fetus is separated from the mother, the higher insulin in the newborn does not decrease immediately, leading to the occurrence of hypoglycemia. In this case, the newborn had an extremely low blood glucose with a higher insulin at the same time. After glucose was injected into the vein at an ap-

appropriate amount, it returned to be normal.

This case suggests that, in order to diagnose the IDM promptly, it is necessary to closely monitor the blood glucose levels and take different clinical intervention measures according to the severity of clinical symptoms and the degree of blood glucose concentration, which can effectively prevent and reduce the harm of hypoglycemia to newborns.

Declaration of Interest:

All authors declare that they have no competing interests.

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