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Antepartum Pituitary Necrosis Occurring In Pregnancy with Uncontrolled Gestational Diabetes Mellitus: A Case Report

Antepartum pituitary necrosis is a rare medical condition that has only been reported in pregnant women with type I diabetes attributable to diabetes-related vasculopathy and hypercoagulability. We present for the first time a case of antepartum pituitary necrosis occurring in an uncontrolled gestational diabetes mellitus (GDM) patient. The patient was a 32-yr-old woman at 33 weeks and 2 days of gestation. She suffered from severe headache, blurred vision, dizziness, and vomiting. Her baby was delivered by Cesarean section. The brain magnetic resonance images revealed pituitary necrosis. This suggests that pituitary gland necrosis may also complicate GDM pregnancy when glucose levels are uncontrolled.

Key Words : *Antepartum; Pituitary Necrosis; Diabetes, Gestational; Uncontrolled Hyperglycemia; Headache*

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INTRODUCTION

Postpartum pituitary necrosis, or Sheehan's syndrome, is a relatively familiar condition to obstetricians and is known to be related to massive bleeding during or after delivery (1). The specific mechanism of pituitary necrosis is unclear, and it is generally accepted that hypotension incurs pituitary ischemia leading to necrosis (2). However, antepartum pituitary necrosis which is unrelated to massive intra or postpartum hemorrhage, is a very rare condition in pregnancy and has only been reported in patients with long standing type I diabetes mellitus (DM) (3). In this case report we present for the first time antepartum pituitary necrosis that complicated a pregnant patient with uncontrolled gestational diabetes mellitus (GDM).

CASE REPORT

A 32-yr-old multipara with GDM was referred at 33 weeks and 2 days of her second pregnancy from a private clinic to the emergency room of our institute and presented with severe headache, blurred vision, dizziness, and vomiting for 2 days. She had never been diagnosed with overt DM in her medical history. Her first pregnancy was uneventful and she delivered by cesarean section due to failure to progress.

The referral note indicated that all antenatal screening tests, including the initial serum glucose level performed in the first trimester to the present pregnancy, were within normal range. However, at 25 weeks and 5 days, she was diagnosed with GDM based on 1-hr 50-g glucose tolerance test, the result of which was 240 mg/dL. The test result for a 100-g glucose tolerance test was unavailable. Since then, she was instructed to control blood glucose level by diet modification only. Two days prior to admission, severe headache, blurred vision, dizziness, and vomiting suddenly developed, and she went to a private clinic where she was admitted for conservative care. She was informed that her blood glucose levels ranged from 140 to 200 mg/dL and that she had polyhydramnios. Due to persistent vomiting and poor intake for 2 days, she was transferred to our emergency room for further diagnosis and care.

On physical examination, the patient was acute-ill looking with alert mental status. Blood pressure was 120/85 mmHg; pulse rate, 95 bpm; body temperature, 36.8℃ and respiratory rate, 20 times/min. Dry skin and dry tongue were present but neck stiffness was absent. No sign of focal neurologic deficit was noted. Hematology lab results were normal and high sensitivity C-reactive protein (CRP) was increased to 15.1 mg/dL (0-3.0). Other than a slight decrease in serum sodium to 133 mM/L (normal, 135-145 mM/L), serum elec-

trolyte levels were normal. Kidney and liver function test results were within normal limits. Increased serum fasting glucose level of 164 mg/dL (normal, 70-110 mg/dL) was accompanied by HbA1c level of 7.7% suggesting poorly controlled diabetes. Random urine test results denoted increased specific gravity with ketone secretion and glucose and protein were absent. Arterial blood gas analysis showed a normal pH, however, the anion gap increased to 19 mM/L. Fetal sonogram showed a structurally normal fetus large for gestational age accompanied by polyhydramnios (amniotic fluid index=32.4 cm).

Due to her presenting symptoms, brain magnetic resonance (MR) imaging was scheduled to rule out intracranial pathology. However, tococardiogram performed prior to brain MR imaging demonstrated persistent severe variable decelerations (Fig. 1). Thus, emergency cesarean section was performed immediately. A female baby weighing 2,570 g was delivered at 1 min and 5 min with an APGAR score of 2 and 6, respectively. During surgery, maternal vital signs were stably maintained without massive bleeding. At postpartum, the uterus was firm without significant bleeding.

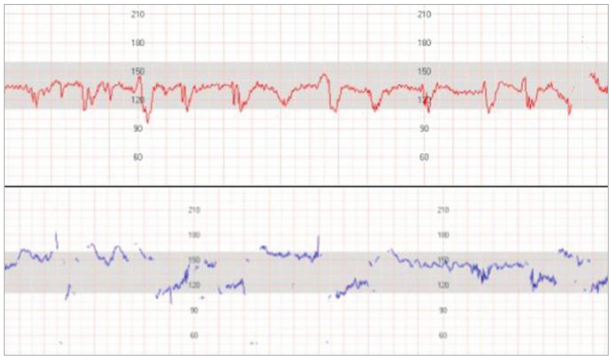

Fig. 1. Fetal tococardiogram demonstrating non-reassuring heart rate pattern on admission (top) and before emergency cesarean section (bottom). Multiple, repetitive mild to severe variable decelerations were revealed, suggesting fetal distress.

About 9 hr after surgery, brain MR imaging was performed because her symptoms persisted. The scan revealed an enlarged anterior pituitary gland with no area of enhancement in the center of the pituitary gland after contrast administration, suggesting pituitary necrosis (Fig. 2). The Synacthen test result was normal and other pituitary hormones were within normal range (adrenocorticotrophic hormone [ACTH] 16.1 pg/mL [10-60], growth hormone [GH] 0.8 ng/mL [0-9.5], prolactin 24.3 ng/mL [0-15], thyroid-stimulating hormone [TSH] 0.75 μIU/mL [0.35-5.50], free thyroxine [FT4] 0.99 ng/dL [0.89-1.76], luteinizing hormone [LH] 0.78 mIU/mL, and follicle-stimulating hormone [FSH] 0.31 mIU/mL) on pituitary function investigation.

Postoperatively, elevated blood sugar was controlled with regular insulin for 2 days, and her initial presenting symptoms resolved over few days. She was discharged without medication after a week of uneventful postoperative recovery.

At 2 months follow up, although serum glucose level and pituitary function test results were unremarkable, follow-up brain MR imaging depicted progressive shrinkage of the pituitary gland; she failed to lactate and was amenorrheic (Fig. 3). She is under continuous surveillance without treatment.

DISCUSSION

The pituitary gland, especially the anterior lobe normally, enlarges and the blood supply requirement increases during pregnancy (4). When diabetic vasculopathy and hypercoagulability superimposes the aforementioned physiologic change, the pituitary gland becomes more prone to ischemia and necrosis (5). This is the suggested pathophysiological explanation of pituitary necrosis that occurs in diabetic pregnancy.

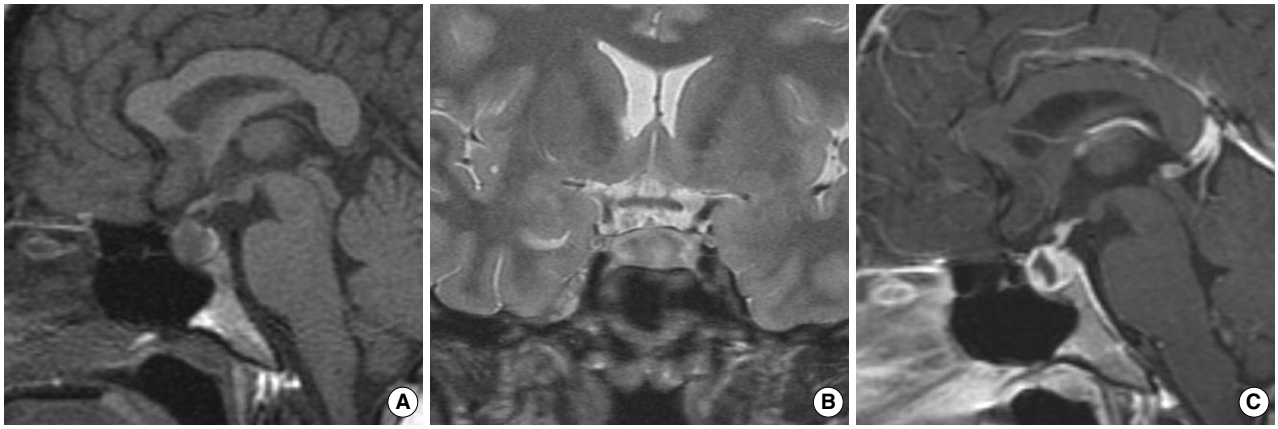

Fig. 2. (A) Unenhanced midline sagittal T1-weighted MR image shows low signal intensity of the enlarged anterior pituitary gland. (B) Unenhanced coronal T2-weighted MR image demonstrates heterogeneous signal intensity of the enlarged anterior pituitary gland. (C) Gadolinium-enhanced sagittal T1-weighted MR image shows the nonenhanced portion in the center of the gland, consistent with pituitary necrosis.

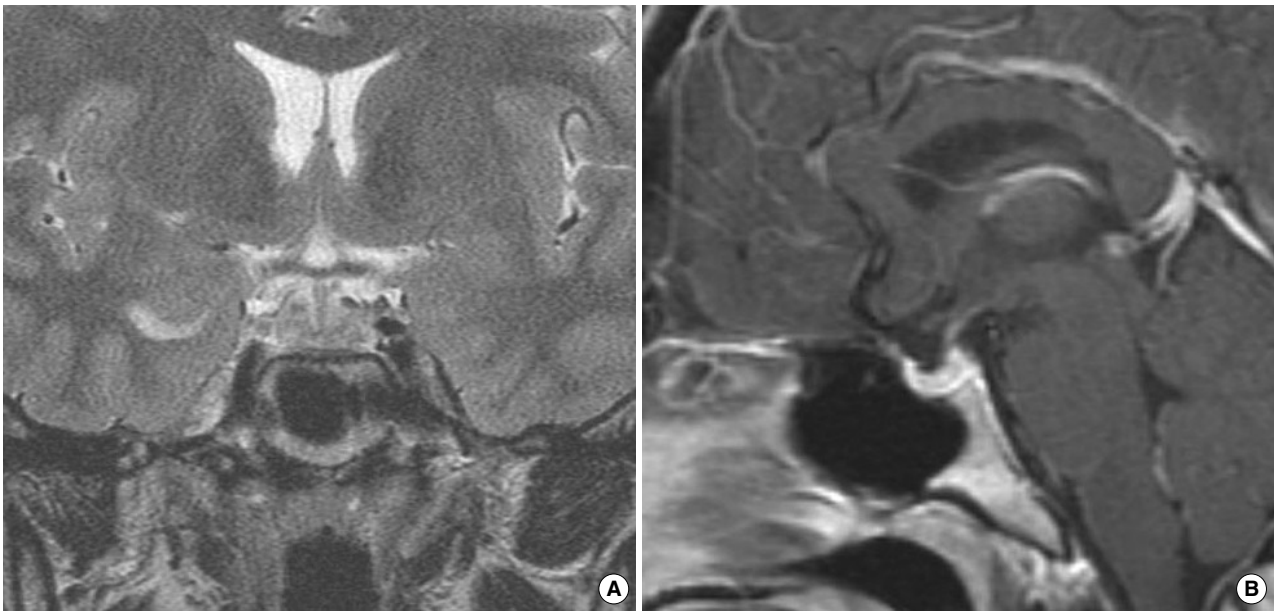

Fig. 3. Follow-up MR imaging at 2 months postpartum. (A) Coronal T2-weighted and (B) gadolinium-enhanced sagittal T1-weighted MR images show significant pituitary gland shrinkage.

To date, reports of antepartum pituitary necrosis associated with DM are rare. Based on the 8 cases described so far (4, 6-10), all pregnant patients associated with this condition had preexisting insulin-dependent DM duration that ranged from 1 to 25 yr. Most frequently, antepartum pituitary necrosis occurred in the third trimester, where common symptoms and signs to incur suspicion of pituitary necrosis were intractable headache and the Houssay phenomenon (frequent episodes of hypoglycemia caused by GH or ACTH deficiency, resulting in a sudden decrease in insulin requirement) (7).

Our case is distinguished from previous cases in that the patient had uncontrolled GDM, not pre-existing insulin-dependent DM. Nonetheless, gestational age at diagnosis and presenting symptoms were similar to previous DM cases. The Houssay phenomenon was not observed in the present case, and this may be ascribed to the normal ACTH and GH levels.

Based on the present observation, we speculated that the mechanism of pituitary necrosis complicating type I DM might equally apply to GDM. Schillinger et al. reported that inflammation indicated by elevated CRP together with hyperglycemia indicated by increased HbA1c was associated with increased risk for microvascular lesions in the brain and stroke (11). Similarly, previous studies demonstrated an increase in cerebrovascular ischemia when CRP elevation and insulin resistance coexisted (11-13). Our patient also had increased serum CRP level and uncontrolled hyperglycemia indicated by elevated HbA1c, polyhydramnios, and macrosomia, and furthermore had GDM, which is known to be caused by insulin intolerance. Thus, coexistence of these risk factors may have increased the risk and caused microvasculopathy and necrosis to occur in the pituitary gland in this patient.

Some may argue that pituitary necrosis observed in the present case may not have existed due to intrapartum hemorrhage but rather developed at postpartum by a combination of vascular disease and abnormalities in coagulation. However, we would like to refute this by highlighting the fact that the central nervous system-related symptoms such as headache and vomiting that developed a few days prior to delivery and the time interval between surgery and MR imaging was only about 9 hr. We did not encounter heavy bleeding or hypotension during surgery or postpartum, and the patient did not require transfusion because postpartum hemoglobin level was 10.4 g/dL.

In the present case, pituitary function on serum hormone levels was not compromised initially or at 2-month follow up. Nonetheless, postpartum lactation failure and amenorrhea together with a shrunken pituitary gland detected on follow-up MR imaging strongly suggest pending hypopituitarism.

The clinical feature of the present case demonstrated that pituitary gland necrosis may be complicated with not only type I DM but also GDM pregnancy when glucose levels are uncontrolled. This should alert obstetricians to include antepartum pituitary necrosis in the differential diagnosis in uncontrolled GDM patients presenting with intractable headache, blurred vision, and vomiting.

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