

# A Case Series of Diabetes Mellitus in Pregnancy

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**Abstract:** *The adverse effects caused by diabetes mellitus in pregnancy can vary widely on maternal and fetal outcomes. This case series that we found in our hospital within 1 - month period need to explain that diabetes mellitus in pregnancy may be a predisposing factor for preterm labor and intrauterine fetal death (IUFD). We report 2 cases of pregnant women aged 24 years with gestational age 28 weeks 2 days and another case aged 39 years with gestational age of 33 weeks 3 days diagnosed with diabetes mellitus. Those 2 cases showed poor fetal outcomes, including preterm delivery and IUFD.*

**Keywords:** Diabetes mellitus, preterm labor, IUFD

## 1. Introduction

Diabetes Mellitus (DM) in pregnancy is a problem that is still often encountered in the world and developing countries because of its detrimental effects on maternal and infant health, the International Diabetes Federation (IDF) noted that the incidence of DM in pregnancy occurred in 16.2% of total of all pregnancies in the world<sup>1</sup>, while in Indonesia it occurs in 1.9% – 3.6% of the total pregnancies.<sup>2</sup>

The adverse effects caused by DM on the health of pregnant women and babies can vary widely, if it occurs before the conception or the first trimester (Pre - Gestational DM) it is proven to increase the incidence of congenital abnormalities, spontaneous abortion, premature labor, and stillbirths, while if it occurs in the second trimester of pregnancy (gestational DM) has been shown to be associated with an increased incidence of macrosomia, neurodevelopmental delay, and pre - perinatal mortality. Furtherly, PGDM and GDM may cause a long term effect such as metabolic syndrome.<sup>3</sup>

Early detection of PGDM and GDM followed by tight blood sugar control will reduce the negative effects that can be caused on the health of mothers and babies.

## 2. Case 1

A 24 - year - old woman, G3P0020, 28 weeks 2 days, based on last menstrual period, came to the emergency department of Wangaya Regional Public Hospital with chief complaints of leaking fluid since 7 hours before admission and accompanied by intermittent abdominal pain. Prior obstetric history, the patient experienced two consecutive abortions in 2016 (5 weeks of gestational age) and 2017 (12 weeks of gestational age). Patient had antenatal care for the first pregnancy in midwife and for the second pregnancy in obstetrics - gynecology specialist. During those years, patient had never been diagnosed with diabetes mellitus and no other abnormality or disease was identified.

In 2019, the patient was admitted to hospital due to sudden dyspnoea. According to physical and lab examination, patient was diagnosed with diabetic ketoacidosis. Patient had high blood glucose and was diagnosed with type 1 diabetes mellitus. Since then, patient received insulin to maintain her blood glucose. During pregnancy, patient used Apidra 3x10

IU and Lantus 1x10 IU and routinely checked blood glucose levels.

In addition, in 2019, the patient was also diagnosed with hyperthyroidism and had been undergoing treatment until she recovered. On 18/9/2021, examination of FT4 and TSH values were found to be within normal limits (FT4=0.9; TSH=0.8) and thyroid ultrasound examination did not reveal thyroid enlargement or nodules. On physical examination, the general condition was good, compositis, a blood pressure of 110/70 mmHg, pulse rate of 84 beats per minute, respiration rate at 20 breaths per minute, temperature 36.7°C. Uterine fundus was ½ mid - processus xyphoideus, the baby's back was on the left side of the mother, the presenting part was the head and converged. Fetal heart rate was 150 bpm and there was no regular uterine contraction. Inspection of the vulva and vagina revealed amniotic fluid coming out of the external cervical orifice and a positive litmus paper test. Based on vaginal touche, cervical dilatation was 1 cm, 25% effacement, clear membranes, palpable head, no small part or umbilical cord palpable.

Based on transabdominal ultrasound, a single live intrauterine fetus was found, fetal movement (+), fetal heart beat (+), with a BPD of 6.7 cm; HC 25 cm; AC 23.67 cm; FL 5.06 cm; SDP 7.1 cm; EFW 1103 g, 27 weeks gestation, cephalic presentation, grade II placenta in anterior corpus fundus. Lab examination, found Hb 10.6 g/dL Hct 31.2% (mild anemia), leukocytes 8760/uL; platelets 244, 000/uL; blood glucose 260 mg/dL. Urinalysis examination revealed glucose 3+, protein (-), leukocyte esterase 500 leu/uL, bacteria (+).

Patient diagnosed with G3P0020, 28 weeks 2 days, preterm premature rupture of membrane, Type II DM, urinary tract infections.

Management of the patient for conservative therapy was conducted with Ringer Lactate 500 ml with 28 drops per minute, dexamethasone IM 12 mg every 24 hours for 2 days, amoxicillin 500 mg every 8 hours, Aprida 3x6 IU, Lantus 1x8 IU, Nifedipine 20 mg PO. After 3 days of treatment, the patient failed conservative therapy and examination revealed a complete opening, front posterior fontanelle, Hodge - III, uterine contraction was 4 - 5x/10 minutes/40 seconds. The patient was led for vaginal delivery. Baby was born with a

weight of 1410 grams, body length 45 cm, Apgar Score 3 - 4 - 5 - 6. Infants was admitted to NICU with verylow birth weight, respiratory distress syndrome, and moderate asphyxia.

### 3. Case 2

A 39 - year - old woman, G2P1001, 33 weeks and 3 days, based on last menstrual period, came to the emergency department of Wangaya Regional Public Hospital with complaints of not feeling fetal movement since 3 hours before admission. Fetal movement had decreased since 2 days before admission. There was no intermittent abdominal pain and any vaginal discharges.

Prior obstetric history, the patient gave birth to a full - term baby by spontaneous vaginal deliverywith birth weight of 2500 grams in 2004. A history of injectable contraceptives every 3 months for 2 years and birth control pills for 13 years. The patient has had syphilis since 5 months ago and history of syphilis treatment was unclear.

The patient was diagnosed with diabetes mellitus at 9 weeks 1 day of gestation at Siliragung Public Health Center. Before pregnancy this patient claimed that she didn't have diabetes because before pregnancy she already checked her blood sugar level at primary health care that came to her house in Java, her random blood sugar at that time was 185. The primary health worker told her to check her blood sugar regularly every month but she didn't do that because she already moved to Bali. Currently she was getting insulin Aprida 3x8 IU and Lantus 1x10 IU.

On physical examination, the general condition was good, composmentis, blood pressure of 120/80 mmHg, pulse rate of 84 beats per minute, respiration rate at 20 breaths per minute, temperature 36.8°C. Uterine fundus was ½mid - processus xyphoideus (25 cm), the baby's back was on the left side of the mother, the presentation was head and diverged. No uterine contraction and fetal heart beat detected.

Based on vaginal touche, cervical dilatation was 1 cm, 25% effacement, intact membranes, palpable head, no small part or umbilical cord was palpable.

Based on transabdominal ultrasound, a single intrauterine fetus was found dead, fetal movement (-), fetal heart beat (-), with a BPD of 7.55 cm; HC 28.07 cm; AC 28.03 cm; FL 6.52 cm; EFW 1956 grams, 33 weeks gestation, cephalic presentation, grade II placenta in anterior corpus fundus, spalding sign (+).

Lab examination revealed a hemoglobin of 13 g/dL; leukocytes 12870/uL; hematocrit 36.4%; platelets 438000 /uL; blood glucose 197 mg/dL; 2 - hours post prandial blood glucose 249 mg/dL; HbA1c 8.2%; The Sars - Cov - 2 swab was negative. Urinalysis examination found glucose 3+, protein (-), leukocyte esterase 500 leu/uL, bacteria (+).

The patient was diagnosed with intrauterine fetal death at 33 weeks gestation, syphilis infection, gestational diabetes mellitus, urinary tract infection.

Management of the patient for termination of pregnancy was conducted with misoprostol 25 mcg every 6 hours, oxytocin drip, ondansetron every 8 hours, amoxicillin 500 mg every 8 hours, Ringer Lactate 500 ml 20 drops per minute. The patient was monitored for her vital signs and progress of labor. The patient gave birth to a baby who had died in utero with a weight of 2700 grams, body length 46 cm, maceration grade II, negative congenital abnormalities. The placenta was born complete, there was no post - partum bleeding, the mother's vital condition was stable.

### 4. Discussion

The first case, 24 years old woman with a diagnosis of G3P0020, gestational age 28 weeks 2 days, preterm premature rupture of membrane, Type II DM. The patient was a woman with a history of two consecutive abortions in 2016 and 2017. In the anamnesis, she complained of leaking fluid since 7 hours before admission with a gestational age of 28 weeks 2 days based on last menstrual period. From the anamnesis, it can be established that the patient has preterm premature rupture of the membranes. Premature Rupture of Membranes (PROM) is the rupture of the membranes before labor begins. Meanwhile, Preterm Premature Rupture of Membrane (PPROM) is the rupture of the membranes before 37 weeks of gestation.<sup>4</sup>

Diabetes Mellitus in pregnancy has been shown to increase the risk of premature birth and premature rupture of membranes.<sup>5, 6</sup> GDM patients are 1.87 times more likely to experience PPROM.<sup>6</sup>

Recent reports suggest that PPROM is thought to be associated with the presence of sterile inflammation of the amniotic membranes. This sterile inflammation is thought to be responsible for the association between GDM and PPROM. Diabetes can stimulate the production of Advanced Glycation End - products (AGEs), ligands of RAGE, receptors involved in this pathway.<sup>6</sup>

In Case I, a baby was born with a weight of 1410 grams, Apgar Score 3 - 4 - 5, admittedto NICU with very low birth weight, respiratory distress syndrome, and asphyxia. Simeonova and associates said that baby born from a mother with diabetes mellitus were more at risk of experiencing neonatal respiratory distress, NICU admission, and lower first minute Apgar score.<sup>7</sup> High morbidity in infants could be caused by preterm delivery.

The second case, 39 years old woman with gestational diabetes was diagnosed with intrauterine fetal death. The patient was Gravida 1 Para 0. Gestational age 33 weeks 3 days from last menstrual period. In the anamnesis, it was found that the patient felt reduced fetal movement since 2 days before admission. On physical examination, there was no uterine contraction and fetal heart beat. On vaginal touche, cervical dilatation was 1 cm, 25% effacement. Based on transabdominal ultrasound examination, a single intrauterine fetus was found dead, fetal movement (-), fetal heart beat (-). From the history, physical and ultrasound examination, the diagnosis of fetal death in the uterus was established. According to WHO and The American College

of Obstetricians and Gynecologists, fetal death (intrauterine Fetal Death) is a fetus that dies in the uterus weighing 350 grams or more or the death of a fetus in the uterus at 20 weeks of gestation or more.<sup>8,9</sup>

History and physical examination have limitations in establishing the diagnosis of IUFD.<sup>10</sup> To diagnose IUFD from anamnesis, symptoms of decreased infant movement are usually revealed.<sup>11</sup> On physical examination, there was no fetal heart rate. IUFD must be confirmed by ultrasonography (USG) that shows no cardiac activity.<sup>10</sup>

Fetal death can be caused by several factors, including maternal, fetal or pathological factors. One of the maternal factors that can cause fetal death is diabetes mellitus.<sup>11</sup> Pregnant women with diabetes mellitus have five times greater risk of experiencing fetal death in the uterus.<sup>12</sup>

Based on a study conducted in Germany (2006), the number of fetal deaths in utero was reported to be higher in mothers with gestational diabetes than in healthy mothers. Studies on the mechanism of gestational diabetes that act as a predisposing factor for IUFD are still limited.<sup>13</sup> However, a study in Iran (2018) found a significant relationship between gestational diabetes and acidosis in the umbilical cord blood.<sup>14</sup> The study by Bradley and associates also found a significant association between acidosis and hyperlactatemia in mothers with gestational diabetes.<sup>15</sup> Acidotic conditions are thought to be one of the underlying causes of fetal death in the third trimester of utero in mothers with gestational diabetes.

## 5. Conclusion

The incidence of diabetes in pregnancy is still quite high in the world at 16.2% and in Indonesia at 1.9% - 3.6%. Pregnant women with diabetes mellitus pose a five times greater risk of experiencing fetal death in the uterus and increased risk of preterm labor. Based on those 2 cases, poor fetal outcomes were identified in women with diabetes mellitus in pregnancy. From these cases we learn that diabetes mellitus in pregnancy has numerous effects that need to detect and treat earlier. Excellent compliance of pregnant woman with antenatal care plays important role to reduce poor pregnancy outcomes secondary to diabetes mellitus.

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## Author Profile



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