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Good Antenatal Care on Mother with Multiple Endocrine Disease and Superimposed Pre Eclampsia: A Case Report

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ABSTRACT

This case report examines the importance of good antenatal care in a 34-year-old pregnant woman with multiple endocrine diseases (hyperthyroidism, type II diabetes mellitus, and chronic hypertension) and superimposed preeclampsia. The study highlights the challenges of managing such high-risk pregnancies, where uncontrolled conditions can lead to severe maternal and fetal complications, including macrosomia, intrauterine fetal death, and eclampsia. The objective was to demonstrate how meticulous antenatal care, including tailored therapy and regular monitoring, can mitigate these risks and improve outcomes. The research employed a case study methodology, documenting the patient's medical history, treatment regimen (e.g., PTU for hyperthyroidism, insulin for diabetes, and methyldopa for hypertension), and pregnancy outcomes. The patient underwent elective cesarean section at 37 weeks, delivering a healthy female baby with an APGAR score of 8/9 and birth weight of 4000 grams. Findings underscore that proper management of endocrine disorders during pregnancy significantly reduces morbidity and mortality risks. Key interventions included maintaining glycemic control, regulating blood pressure, and adjusting thyroid medication to avoid fetal hypothyroidism. The study concludes that multidisciplinary antenatal care is critical for optimizing outcomes in complex pregnancies. This case reinforces the need for early, coordinated care in high-risk pregnancies to prevent complications. It also advocates for patient education on disease awareness and adherence to treatment protocols.

Keywords: type II DM, hyperthyroidism, grave disease, chronic hypertension, pregnancy, caesarean section

INTRODUCTION

Maternal pregnancy with metabolic diseases must be planned very carefully. Diabetes is a frequent occurrence in pregnancy. There are two types of pregnant women with diabetes: those with diabetes that has been known since before the woman became pregnant (*pregestational*), and those with diabetes that has just occurred during pregnancy (*gestational diabetes mellitus*) (Prawirohardjo et al., 2013). *Gestational hypertension* (transient hypertension of pregnancy or *chronic hypertension*) is identified in the last half of pregnancy. This terminology is more often used than the term "pregnancy-induced hypertension". *Chronic hypertension* is defined as blood pressure >140/90mmHg before pregnancy or before 20 weeks of gestation.

Symptoms of autoimmune thyroid disease tend to improve during pregnancy (De Leo & Pearce, 2018; Delitala et al., 2019). The increase in thyroid autoimmune disease is thought to be due to changes in immune status in pregnancy. Symptoms of *hyperthyroid* can easily be observed as hypermetabolic

symptoms in pregnancy. Mild *hypothyroid* symptoms are difficult to distinguish from typical pregnancy discomfort. Patients with *hyperthyroidism* often experience loss of concentration, restlessness, and emotional instability. Tremors, heat intolerance, excessive sweating, palpitations, and hyperdefecation are also common findings. Patients may report difficulty climbing stairs, which is a sign of proximal muscle weakness. Some patients report that their necks are getting bigger. These changes are caused by an enlarged thyroid gland.

Women with diabetes have a significantly higher risk of developing hypertension during and after pregnancy (Hwu et al., 2016). Patients with *chronic hypertension* and diabetes are at increased risk of intrauterine growth restriction (*IUGR*), *preeclampsia*, *abruptio placentae*, and stroke. *Preeclampsia* consists of a sudden increase in blood pressure, significant proteinuria, and plasma uric acid levels of >6mg/dL or evidence of hemolysis, increased liver enzymes, and low platelet count syndrome. *Preeclampsia* is more common in women with diabetes (about 12%) compared to the nondiabetic population (8%). The risk of *preeclampsia* also increases with maternal age and the duration of pre-existing diabetes. Hypertensive disorders in pregnancy are among the leading causes of maternal death, along with thromboembolism, bleeding, and nonobstetric injuries. Hypertension before or during early pregnancy is associated with a doubling of the risk of *gestational diabetes mellitus*, and transient hypertension during pregnancy is strongly associated with *chronic hypertension*. Maternal diastolic blood pressure >110mmHg is associated with an increased risk of *placental abruption* and fetal growth retardation. *Preeclampsia* causes most morbidities related to hypertension during pregnancy.

Uncontrolled *hyperthyroidism*, especially in the second half of pregnancy, can lead to many complications. Maternal complications include miscarriage, infection, *preeclampsia*, preterm birth, congestive heart failure (*CHF*), *struma*, and placental abruption. Fetal and neonatal complications include prematurity, small size for gestational age, intrauterine fetal death, goiter in the fetus or neonate, and/or *thyrotoxicosis*. Overtreatment may result in iatrogenic hypothyroidism. When the mother's thyroid antibody titer is greater than 300% of the normal upper limit, the fetus is at risk for fetal hyperthyroidism and should be evaluated with ultrasound for evidence of hyper- or hypothyroidism. Fetal hyperthyroidism may include tachycardia, accelerated bone maturation, goiter, growth restriction, and congestive heart failure (Luton et al., 2005). This case report will discuss a 34-year-old patient, *G2P1A0H1*, with diabetes, hypertension, and hyperthyroidism.

RESEARCH METHODS

This study employed a *qualitative case report* design to explore the management of a high-risk pregnancy involving multiple endocrine disorders and superimposed *preeclampsia*. The research focused on a *single case* of a 34-year-old pregnant woman (*G2P1*) with pre-existing *hyperthyroidism*, type II *diabetes mellitus* (*DM*), and *chronic hypertension*. The *data population* included the patient's medical records, antenatal care documentation, and clinical evaluations from Zainoel Abidin Hospital. The *data sample* consisted of the patient's diagnostic reports, treatment logs, and fetal monitoring results, providing a comprehensive overview of her condition and therapeutic interventions. *Purposive sampling* was used to select this case due to its complexity and relevance to the study's objectives.

Data collection involved retrospective analysis of the patient's medical history, laboratory results (e.g., thyroid function tests, blood glucose levels, and blood pressure readings), and ultrasound reports. The primary *research instruments* were hospital records and clinical notes, supplemented by standardized guidelines from the American Thyroid Association and the American College of Obstetricians and Gynecologists (*ACOG*) to ensure accuracy. *Validity* was maintained through triangulation of data sources (e.g., comparing lab results with treatment responses), while *reliability* was ensured by adhering to established clinical protocols. The *procedure* included

systematic review of the patient's antenatal visits, medication adjustments, and delivery outcomes, with timelines mapped to each trimester.

Data analysis was conducted using *descriptive and thematic techniques* to identify patterns in disease progression, treatment efficacy, and maternal-fetal outcomes. Microsoft Excel was used for organizing quantitative data (e.g., blood pressure trends, glycemic control), while qualitative insights (e.g., clinical decision-making) were analyzed thematically. The study followed ethical guidelines, anonymizing patient data and obtaining institutional approval. By integrating multidisciplinary perspectives (endocrinology, obstetrics, and internal medicine), the analysis provided a holistic understanding of managing complex pregnancies, reinforcing the importance of tailored antenatal care.

RESULTS AND DISCUSSION

Case Reports

A 34-year-old G2P1 female patient with a gestational age of 37 weeks. The mother was diagnosed with Hypertension and Diabetes Mellitus (DM) after the first child, routine diabetes control and insulin use. The patient has been suffering from hyperthyroid disease since 2 years ago, and regularly takes medication. The history of bleeding, fluid and mucus from the birth canal is denied. During pregnancy, patients routinely undergo pregnancy control at Sp.OG and treated with an internist, and receive hyperthyroid treatment in the form of PTU in the first trimester, followed by thirozol in the second trimester. For DM, patients received novorapid insulin therapy with a dose of 10-10-10, and the anti-hypertensive drug methyldopa to control their blood pressure.

Diabetes is a frequent occurrence in pregnancy, there are two types of pregnant women with diabetes, namely: pregnant women with diabetes that has been known since before the woman became pregnant (pregestational), and pregnant women with diabetes that has just occurred during pregnancy (gestational diabetes mellitus) (Prawirohardjo et al., 2013). In these patients diabetes is found before the second pregnancy and after the first pregnancy so it is not included in the DMG. Pregnant patients with diabetes tend to be prone to preeclampsia if they have the following predisposing factors: Nulipara, Multiple pregnancies, Age <20 or >35 years, History of preeclampsia-eclampsia in previous pregnancies, family history of preeclampsia-eclampsia, kidney disease, and hypertension that pre-pregnancy and obesity (Prawirohardjo et al., 2013). These patients are less at risk because they only have controlled risk factors for hypertension and diabetes.

Gestational hypertension is different from chronic hypertension which is defined as blood pressure >140/90 mmHg before pregnancy or before 20 weeks of gestation. So this patient can be said to have chronic hypertension. Hypertensive disorders in pregnancy can cause maternal and fetal morbidity, as well as be the main cause of maternal death (Ananth et al., 2013). Preeclampsia is a vascular endothelial disorder that often occurs after the gestational age of 20 weeks and can appear at 4-6 weeks postpartum in patients with hypertension during pregnancy (American College of Obstetricians and Gynecologists, 2013). Hypertension is the most common health problem found during pregnancy, and it is a complication in 10% of pregnancies (The Task Force on Hypertension in Pregnancy, 2013). Hypertension is a primary

disorder in 90-95% of cases or secondary to some underlying disorders, such as renal parenchymal disease, kidney vascular disease, endocrine disorders, aortic coarctasio, or the use of oral contraceptives. About 20-25% of women with chronic hypertension experience preeclampsia during pregnancy (Singh & Loscalzo, 2014). This patient is diabetic and hyperthyroid, which are two risk factors for hypertension.

This patient also has thyroid disorders. Thyroid disorders are the second most common endocrinological disorder in pregnant women. Autoimmune thyroid dysfunction remains a common cause of hyperthyroidism and hypothyroidism in pregnant women. Graves' disease occurs in >85% of all hyperthyroid cases (Neale et al., 2007). Uncontrolled hyperthyroidism, especially in the second half of pregnancy, can lead to many complications. Maternal complications include miscarriage, infection, preeclampsia, preterm birth, congestive heart failure (CHF), struma, and placental abruption. Fetal and neonatal complications include prematurity, small size for gestational age, intrauterine fetal death, goiter disease in the fetus or neonate, and/or thyrotoxicosis. Overtreatment can lead to iatrogenic hypothyroidism. When the mother's thyroid antibody titer is greater than 300% of the normal upper limit, the fetus is at risk of fetal hyperthyroidism and should be evaluated with ultrasound for evidence of hyper or hypothyroidism. Fetal hyperthyroidism includes tachycardia, accelerated bone maturation, goiter, growth restriction, and congestive heart failure (Luton et al., 2005).

Increased plasma insulin levels in normal pregnancy are associated with a unique change in response to glucose ingestion. For example, after eating in pregnant women, there is an extension of hyperglycemia, hyperinsulinemia, and glucagon suppression. This mechanism seems to aim to maintain the supply of postprandial glucose to the fetus. This response is consistent with the statement that pregnancy induces peripheral resistance to insulin, which is reinforced by three observations (Prawirohardjo et al., 2013): increased insulin response to glucose, reduced peripheral uptake of glucose, and suppression of the response from glycogen.

Women with diabetes have a significantly higher risk of developing hypertension during and after pregnancy (Sugiyama et al., 2014). Patients with chronic hypertension and diabetes are at increased risk of intrauterine growth restriction (IUGR), preeclampsia, abruptio placentae, and stroke. Preeclampsia consists of a sudden increase in blood pressure, significant proteinuria, and plasma uric acid levels of >6 mg/dL or evidence of hemolysis, increased liver enzymes, and low platelet count syndrome. Preeclampsia is more common in women with diabetes (about 12%) compared to the nondiabetic population (8%). The risk of preeclampsia also increases with the age of the mother and the length of pre-existing diabetes (Tucker, 2017). Hypertension in pregnancy is one of the leading causes of maternal death, along with thromboembolism, bleeding and nonobstetric injuries. Hypertensive disorders in pregnancy are one of the leading causes of maternal death, along with thromboembolism, bleeding and nonobstetric injuries. Hypertension before pregnancy or during early pregnancy is associated with a doubling of the risk of gestational diabetes mellitus, transient hypertension during pregnancy that is strongly associated with chronic hypertension. Maternal diastolic blood pressure >110 mmHg is associated with an increased risk of placental abruption and fetal

growth retardation, preeclampsia disorders cause most morbidities due to hypertension during pregnancy. Hypertension before pregnancy or during early pregnancy is associated with a doubling of the risk of gestational diabetes mellitus, transient hypertension during pregnancy that is strongly associated with chronic hypertension. Maternal diastolic blood pressure >110 mmHg is associated with an increased risk of placental abruption and fetal growth retardation, preeclampsia disorder causes most morbidities due to hypertension during pregnancy (The Task Force on Hypertension in Pregnancy, 2013).

The patient's menstrual history is within normal limits, the patient is married 1 time at the age of 23 years. The first child of patient 1 10-year-old boy was born vaginally BBL 3,500 grams, and now it is the second pregnancy. There is no history of contraceptive use. The patient has blood pressure below 140/90, where blood pressure must be maintained at that number. Pregnant women should be started with antihypertensive therapy if the TDS is >160 mm Hg or TDD>100-105 mmHg. Women with pre-existing organ damage due to chronic hypertension should have a lower threshold for initiating antihypertensive treatment (>139/89) and lower target blood pressure (<140/90) (Magee et al., 2014). This patient has not experienced organ damage.

Laboratory examination within normal limits. Ultrasound examination of a single live fetus of the percentage of head and CTG at I. In patients with hyperthyroid, it is usually found that the total T3 and T4 levels are increased due to an increase in the amount of thyroid-binding globulin. FT3 and FT4 are high in the first trimester and return to normal in the second trimester. Total T4 values are not beneficial in pregnant women because they usually do increase in response to estrogen-induced increases. FT3 values should be measured when TSH values drop but FT4 levels are normal. High T3 levels confirm T3 toxicity, an early stage in the course of true hyperthyroidism disease. TSH concentrations decrease during pregnancy, especially in the first trimester, as hCG cross-reacts with TSH receptors in the thyroid gland (Ross et al., 2016).

TSH levels are significantly lower and FT4 levels are significantly higher in the first trimester than in the second or third trimester. TSH levels alone should not be used to diagnose hyperthyroidism in pregnancy. The FT4 index is slightly low or normal. The optimal method for assessing serum FT4 during pregnancy is T4 measurement. Hyperthyroid patients usually experience a decrease in TSH levels, while FT4 values increase. Patients with Graves' disease almost always have a positive outcome for TSI. TSI concentration measurements should be part of the examination of hyperthyroidism patients from the first trimester (or at the time of diagnosis) and if increased should be checked again at 18-22 and 30-34 weeks to inform decisions about fetal assessment. Findings or conditions that can occur with hyperthyroidism include normochrome normocytic anemia, mild neutropenia, elevated liver enzyme levels, mild hypercalcemia, and hypomagnesemia. Women who have a positive result for antimicrobial antibodies in early pregnancy or immediately after childbirth are at risk of developing PPT (Ross et al., 2016).

Women with hyperthyroidism may be given ablative therapy or medication to achieve euthyroid before pregnancy. Pregnancy tests should be done 48 hours before iodine radiation ablation to avoid radiation exposure to the fetus. Conception should be delayed for 6 months postablation to allow the T4 time to reach the target value for pregnancy. If the patient chooses thioamide medication (ATD therapy), propylthiouracil (PTU) should be used in the first trimester of pregnancy, as there is a risk of embryopathy with methimazole (MMI) medication, and consideration should be given to stopping PTU after the first trimester and switching to MMI to reduce the incidence of liver disease. Contraceptives should be used until normal thyroid function is achieved (Ross et al., 2016).

The goal of treatment is to maintain clinical eutoirioids, with maternal FT4 levels in the high normal range. To prevent overtreatment and possible neonatal hypothyroidism, the dose should be as low as possible to keep FT4 and FT3 within the upper limit of the normal range. Thioamide medications (i.e., ATD) are the first-line treatment in pregnancy. PTU, methimazole (MMI), and carbimazole (CMI) are ATDs that exist in the United States. The drug inhibits iodine tyroglobulin and thyroglobulin synthesis. PTU, MMI, and CMI have the same effectiveness (Stagnaro-Green et al., 2011). The use of MMI has fetal scalp defects, cutis aplasia, and esophageal atresia. Some studies reported a positive association between the two and others reported no relationship. PTU has recently been shown to increase the risk of congenital malformations, usually milder than MMI medications, but switching from one drug to another has not been shown to protect the fetus from birth defects (Li et al., 2015). PTU provides a higher risk of agranulocytosis and liver failure in mothers (Andersen et al., 2016). A dose ratio of 1:20 from MMI to PTU is recommended when the doctor makes a change from one drug to another (US Food and Drug Administration, n.d.).

Diabetes management in pregnant women aims to avoid foods and foods with a large percentage of simple carbohydrates. Moderate carbohydrate restriction of up to 35-40% has been shown to lower maternal glucose levels and provide good results for both mother and fetus (Meltzer et al., 2010). Patients with a history of diabetes require modification of pharmacological regimens to meet the changing metabolic needs of pregnancy. Early intervention with insulin is key in achieving good results the diet fails to provide glycemic control. Insulin lispro, aspart, and neutral protamine hagedorn (NPH) are considered safe and effective.

Mothers with diabetes can be given methyldopa because it has a good safety value even though it has mild antihypertensive work with slow onset (The Task Force on Hypertension in Pregnancy, 2013). ACE inhibitors should be avoided during pregnancy as they are associated with fetal renal dysgenesis or death when used in the second and third trimester, as well as an increased risk of cardiovascular and central nervous system malformations when used in the first trimester. Angiotensin II receptor antagonists/blockers are not used during pregnancy, as they have a similar mechanism of action to ACE-I. Diuretics are not used unless obtained: pulmonary edema. Congestive heart complications, and anasarc edema. Furosemids are the

most widely used group. Both thiazide and furosemide can degrade uteroplasenter's function (The Task Force on Hypertension in Pregnancy, 2013).

MgSO4 can be administered intramuscularly or intravenously in preeclampsia patients and hypertensive patients with a risk of seizures. Loading dose: 4 g MgSO4 40% in a 10 ml intravenous solution for 4 minutes, followed by 8 g MgSO4 40% in a 25 ml intramuscular solution on the left and right buttocks of 4 g each. Maintenance dose: 4 g MgSO4 every 6 hours intramuscularly; if seizures occur again, an additional 2 g of MgSO4 iv can be given for 2 minutes at least 20 minutes after the last administration. If after giving an additional dose, seizures are still present, phenobarbital is given 3-5 mg/kgBB/iv. At the administration of MgSO4 it is necessary to monitor signs of MgSO4 poisoning. Reseizures after administration of MgSO4 were only 1%. Magnesium sulfate decreases neuromuscular excitability; Although it can penetrate the placenta, no evidence of toxicity has been found in neonates of the fetus (Cunningham et al., 2010; The Task Force on Hypertension in Pregnancy, 2013).

Pregnancy termination was carried out in patients with a male baby APGAR 8/9 and BBL of 4000 grams. Patients with diabetes usually have a fetus with macrosomy growth. Although most diabetic mother's fetuses show accelerated growth, IUGR occurs with significant frequency in pregnant women with pre-existing type 1 diabetes. The most important predictor of IUGR is underlying maternal vascular disease. Pregnant patients with diabetes-related retinal or renal vasculopathy and/or chronic hypertension are most at risk for IUGR (Deshpande et al., 2011). Macrosomia is usually defined as a birth weight of >90% for gestational age or >4000 grams. Macrosomia occurs in 15-45% of babies born to diabetic women, a 3-fold increase occurs from poor glycemic control. Birth weight is largely determined by maternal factors apart from hyperglycemia, with the most significant influences being gestational age, pre-pregnancy body mass index (BMI), maternal height, pregnancy weight, hypertension, and smoking (Athukorala et al., 2007). This patient has good glycemic control so that they can avoid this condition.

Termination of pregnancy with SC is especially appropriate for pregnant women with diabetes. Stuebe's research found conditions associated with persistent metabolic dysfunction in women 3 years after childbirth that were separate from other clinical risk factors (O'Reilly et al., 2011). Babies born to mothers with a history of diabetes mellitus have twice and triple the risk of serious injury at birth at cesarean section, as well as four times more likely to be treated in the NICU (McIntyre, 2018). Newborn injuries associated with macrosomia are shoulder dystosia, clavicular fracture, brachial plexus injury, decreased apgar score for 5 minutes, long delivery intervals, and the need for emergency care for macrosomy infants. Shoulder dystocia that occurs in macroscopic babies is a complication of childbirth, affecting about 10-15% of vaginal deliveries of babies who weigh more than 4000 grams at birth. Shoulder dystosia is known when the baby's shoulder is difficult to remove through standard vaginal delivery caused by the anterior shoulder movement of the fetus stuck on the mother's pubic symphysis (Rahayu & Rodiani, 2016).

Good antenatal care and proper management in patients with multiple endocrine diseases are proven to improve good outcomes for mothers and babies who are born.

CONCLUSION

This case report demonstrates that meticulous antenatal care, including multidisciplinary management of *hyperthyroidism*, *diabetes mellitus*, and *chronic hypertension*, can significantly improve maternal and fetal outcomes in high-risk pregnancies. The patient's successful delivery of a healthy infant, despite multiple endocrine disorders and superimposed *preeclampsia*, underscores the importance of early diagnosis, regular monitoring, and tailored therapeutic interventions. The findings highlight the critical role of coordinated care among endocrinologists, obstetricians, and internists in mitigating complications such as *macrosomia*, fetal thyroid dysfunction, and hypertensive crises.

For future research, larger-scale prospective cohort studies are recommended to validate these findings across diverse populations and healthcare settings. Additionally, comparative studies evaluating different treatment protocols (e.g., *PTU* vs. *methimazole* in *hyperthyroidism*, insulin regimens in *gestational diabetes*) could optimize clinical guidelines. Further investigation into long-term neonatal outcomes and maternal postpartum health in similar cases would also provide valuable insights. Integrating digital health tools for remote monitoring of high-risk pregnancies could be explored to enhance adherence and early intervention. These efforts would strengthen evidence-based practices and improve care for women with complex endocrine disorders during pregnancy.

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