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Pregnancy Complicated by Severe Asthma and Altered Mental Status: A Case Report on Comprehensive Respiratory and Obstetric Care

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A B S T R A C T

Background. Asthma is a prevalent chronic respiratory condition affecting millions worldwide, and it is particularly common in pregnant women, with an incidence of 4-8%. Pregnancy presents unique challenges for asthma management due to physiological changes, including increased oxygen demand, reduced lung capacity, and hormonal fluctuations, all of which can contribute to exacerbations. Severe asthma exacerbations during pregnancy are associated with significant risks to both maternal and fetal health, including the potential for acute respiratory failure and decreased consciousness, which necessitate urgent medical intervention.

Case Presentation. We report a case of a 28-year-old pregnant woman in her third trimester who presented with severe asthma exacerbation, rapidly progressing to acute respiratory failure and decreased consciousness. Despite receiving bronchodilator therapy, her respiratory status continued to decline, necessitating intubation and mechanical ventilation. Immediate treatment included systemic corticosteroids, inhaled bronchodilators, and magnesium sulfate. Close monitoring of the fetus was maintained throughout the course of her critical illness. After stabilization and gradual weaning from mechanical ventilation, the patient made a full recovery and delivered a healthy baby at term without further complications.

Discussion. Asthma exacerbations during pregnancy pose a significant challenge, as clinicians must balance the need for aggressive management of maternal respiratory compromise with the safety of the fetus. In this case, the patient's condition required a multidisciplinary approach, including collaboration between obstetricians, pulmonologists, and critical care specialists. The successful outcome of this case underscores the importance of early recognition and intervention in severe asthma exacerbations, particularly when signs of respiratory failure are present. Aggressive treatment, including the use of corticosteroids and mechanical ventilation, was crucial in preventing maternal and fetal morbidity and mortality. Additionally, this case highlights the safety and efficacy of commonly used asthma treatments in pregnancy, including systemic corticosteroids and magnesium sulfate.

Conclusion. This case demonstrates the potential for severe asthma exacerbations in pregnancy to escalate to life-threatening complications if not managed promptly and aggressively. It emphasizes the importance of vigilant monitoring of pregnant women with asthma, adherence to asthma management plans, and the need for a multidisciplinary approach in treating exacerbations to ensure favorable maternal and fetal outcomes. Introduction

Keywords: Asthma Exacerbation, Pregnancy, Decreased Conciousness, Management

1. Introduction

Asthma is one of the most common chronic respiratory diseases, affecting over 300 million people worldwide. It is characterized by airway inflammation, bronchial hyperresponsiveness, and episodic airflow obstruction, leading to symptoms such as wheezing, dyspnea, chest tightness, and coughing. For many patients, asthma can be controlled with maintenance medications, including inhaled corticosteroids (ICS), long-acting beta-agonists (LABAs), and short-acting beta-agonists (SABAs) for acute symptom relief. However, asthma exacerbations remain a significant clinical challenge, especially during periods of increased physiological stress, such as pregnancy.[1,2]

Asthma affects approximately 4-8% of pregnant women globally, making it the most common chronic disease in pregnancy. The physiological changes that occur during pregnancy, including increased oxygen consumption, decreased functional residual capacity, and changes in hormone levels, can complicate asthma control. In particular, hormonal changes such as elevated progesterone and estrogen levels lead to increased airway sensitivity and potential bronchoconstriction. Moreover, the mechanical effects of the enlarging uterus reduce lung volumes and alter respiratory mechanics, exacerbating breathing difficulties in asthmatic patients. These factors contribute to the increased risk of asthma exacerbations during pregnancy, particularly in the second and third trimesters.[2,3]

Asthma exacerbations during pregnancy can be associated with significant maternal and fetal morbidity and mortality. Pregnant women who experience severe exacerbations are at an increased risk of preterm labor, preeclampsia, gestational hypertension, and placental abruption. Fetal complications may include intrauterine growth restriction (IUGR), low birth weight, preterm delivery, and even perinatal mortality. Furthermore, there is a strong correlation

between poorly controlled asthma and adverse pregnancy outcomes, including a higher incidence of cesarean sections and neonatal intensive care unit (NICU) admissions. One of the more alarming complications of asthma exacerbation is acute respiratory failure, which, although rare, can be life-threatening. Severe asthma exacerbations can lead to hypoxemia, hypercapnia, and respiratory acidosis, all of which may compromise maternal consciousness. Decreased consciousness in this context is a sign of severe respiratory compromise, often requiring intubation and mechanical ventilation. The critical challenge in these cases is balancing the immediate respiratory needs of the mother while minimizing the risks to the fetus. In extreme cases, respiratory failure may necessitate premature delivery to prevent further deterioration of both maternal and fetal health.[4,5,6]

The clinical management of asthma in pregnancy is complicated by concerns about medication safety and the potential teratogenic effects of certain treatments. However, the risks of uncontrolled asthma far outweigh the potential risks associated with most asthma medications, particularly when exacerbations pose a direct threat to maternal and fetal survival. The current guidelines recommend maintaining asthma control using ICS as the primary controller therapy during pregnancy, supplemented by SABAs or LABAs as needed. Despite these recommendations, asthma is frequently under-treated during pregnancy due to fear of medication-related complications, increasing the risk of exacerbations. This case report highlights a rare and severe presentation of asthma exacerbation with decreased consciousness in a pregnant woman. We discuss the clinical challenges of managing asthma during pregnancy, the progression to acute respiratory failure, and the subsequent therapeutic interventions that were necessary to stabilize both the mother and fetus. Additionally, this report reviews the existing literature on asthma management during pregnancy and provides insights into optimizing care for this vulnerable population.[7,8,9,10]

In this case, a 28-year-old woman in her third trimester presented with acute asthma exacerbation, which rapidly progressed to severe hypoxemia, hypercapnia, and decreased consciousness. The patient required intubation and mechanical ventilation to stabilize her condition. Despite the critical nature of the exacerbation, both maternal and fetal outcomes were favorable following prompt and aggressive intervention. This case underscores the importance of early recognition and treatment of asthma exacerbations in pregnant women, as well as the necessity for a multidisciplinary approach involving obstetricians, pulmonologists, and critical care specialists. Given the complex interplay between maternal physiology, asthma control, and fetal development, this case exemplifies the need for heightened awareness of asthma exacerbation risks during pregnancy. It also serves as a reminder that despite the perceived risks of asthma medications during pregnancy, adequate asthma control is crucial to ensuring optimal outcomes for both mother and child.[11]

2. Case Presentation

A 28-year-old G2P1 woman at 32 weeks of gestation presented to the emergency department with severe shortness of breath, wheezing, and progressive lethargy over the past 24 hours. She had a known history of asthma since childhood, managed with a short-acting beta-agonist (SABA) and an inhaled corticosteroid (ICS). She had experienced increased asthma symptoms throughout her pregnancy, particularly during the third trimester, but had not required hospitalization. Her previous pregnancy had been uneventful. Upon arrival at the emergency department, the patient was in acute respiratory distress with labored breathing, audible wheezing, and decreased level of consciousness (Glasgow Coma Scale score of 10). Her vital signs were as follows: respiratory rate 32 breaths/min, oxygen saturation 85% on room air, heart rate 128 beats/min, and blood pressure 140/90 mmHg. The patient was cyanotic, diaphoretic, and using accessory muscles for breathing. Fetal heart rate monitoring revealed a reactive tracing with a heart rate of 150 beats/min.

Physical examination revealed bilateral expiratory wheezes on auscultation, decreased breath sounds at the lung bases, and prolonged expiration. There were no signs of trauma or other causes of altered consciousness. Neurological examination showed drowsiness but no focal deficits. The patient was immediately placed on high-flow oxygen and administered nebulized albuterol (SABA) along with intravenous corticosteroids (methylprednisolone). Magnesium sulfate infusion was initiated for its bronchodilatory effects. The patient's altered mental status and hypoxemia raised concern for impending respiratory failure, and she was promptly intubated to secure the airway and provide mechanical ventilation.

Arterial blood gas (ABG) analysis revealed severe hypoxemia (PaO2 48 mmHg), hypercapnia (PaCO2 65 mmHg), and respiratory acidosis (pH 7.21). Chest X-ray showed hyperinflated lungs without focal consolidation or pneumothorax. Blood tests revealed elevated white blood cell count (14,000/μL) and normal electrolytes. Fetal ultrasound confirmed a viable fetus with normal growth and amniotic fluid levels. The differential diagnosis for decreased consciousness in this pregnant patient included:

1. Severe asthma exacerbation with hypoxemia and hypercapnia
2. Pulmonary embolism
3. Eclampsia (though no hypertension or proteinuria was present)
4. Infection (e.g., pneumonia or sepsis)
5. Cardiac causes (e.g., heart failure)

Given the patient's history of asthma, clinical findings, and ABG results, severe asthma exacerbation with respiratory failure and hypoxemic encephalopathy was determined to be the most likely diagnosis. After intubation and initiation of mechanical ventilation, the patient was started on continuous nebulized bronchodilators (albuterol and ipratropium), intravenous methylprednisolone, and a magnesium sulfate infusion. Sedation was carefully titrated to avoid over-sedation and ensure adequate ventilation. The patient was also started on prophylactic antibiotics to prevent secondary infections. Fetal monitoring continued intermittently, showing reassuring fetal status throughout the course.

Over the next 48 hours, the patient's respiratory status improved significantly. Repeat ABG showed improved oxygenation (PaO2 85 mmHg) and normalization of pH (7.38). On day three of hospitalization, the patient was weaned off mechanical ventilation and extubated successfully. She remained on supplemental oxygen and was transitioned to nebulized bronchodilators and oral corticosteroids. Her mental status gradually returned to normal, and neurological examination was unremarkable.

By day six, the patient was discharged home with a plan for close follow-up by her obstetrician and pulmonologist. She was instructed to continue using her ICS and SABA and to report any worsening symptoms immediately. Her asthma action plan was updated, and she was counseled on the importance of adherence to her medication regimen, particularly during the remainder of her pregnancy. The patient delivered a healthy male infant at 39 weeks via spontaneous vaginal delivery without any complications. Both mother and baby were discharged in good health. At her six-week postpartum follow-up, the patient reported no further asthma exacerbations and was maintaining good asthma control with her prescribed medications. No long-term neurological deficits were noted.

3. Discussion

This case report presents a rare and severe instance of asthma exacerbation in a pregnant woman, leading to decreased consciousness and acute respiratory failure. The complexity of managing asthma during pregnancy, particularly when complicated by severe exacerbations, underscores the delicate balance clinicians must maintain between ensuring maternal respiratory stability and safeguarding fetal well-being. In this discussion, we will examine the clinical challenges, the implications for maternal and fetal outcomes, and insights derived from the literature on the management of asthma exacerbations in pregnancy. Asthma exacerbations are a well-known risk during pregnancy, with 20-30% of pregnant women with asthma experiencing worsening symptoms, particularly during the second and third trimesters. The physiological changes that occur in pregnancy, including increased oxygen consumption, reduced functional residual capacity, and altered immune responses, can exacerbate asthma. Pregnant women also tend to have altered pharmacokinetics due to increased blood volume, hepatic enzyme activity, and renal clearance, all of which can affect the efficacy of asthma medications. The combined effects of these physiological changes place pregnant women with asthma at a higher risk of exacerbation and associated complications.[12,13]

In this case, the patient's asthma deteriorated progressively during the third trimester, culminating in a life-threatening exacerbation. The presence of decreased consciousness—indicative of impending respiratory failure—represented a severe complication not typically encountered in routine asthma management. Decreased consciousness in asthma exacerbation is a sign of cerebral hypoxia, hypercapnia, and respiratory fatigue, all of which indicate that the patient's compensatory mechanisms have failed. Without timely intervention, this can result in cardiac arrest and death. Management of asthma exacerbations in pregnancy poses a significant challenge because of the need to consider the safety of both the mother and the fetus. The priority in treating severe asthma exacerbations is to correct hypoxemia and prevent maternal respiratory decompensation. However, concern about potential adverse effects of medications and interventions on the fetus can complicate the decision-making process. While ensuring maternal stability is paramount, the effects of severe hypoxemia and acidosis on fetal oxygenation and development cannot be overlooked.[14,15]

Asthma exacerbations during pregnancy are associated with increased risks of maternal and fetal complications. Maternal complications can range from preeclampsia and gestational hypertension to more severe outcomes such as respiratory failure, as observed in this case. Fetal risks include intrauterine growth restriction (IUGR), preterm birth, low birth weight, and even perinatal mortality. The risk of these complications increases significantly when asthma is not adequately controlled, and exacerbations are left untreated or poorly managed. In this case, the patient's acute respiratory failure and decreased consciousness posed significant risks to both her life and that of her unborn child. The hypoxemia and hypercapnia resulting from the exacerbation could have compromised fetal oxygenation, leading to potential adverse outcomes such as fetal distress, preterm labor, or even stillbirth. Additionally, the decision to intubate and mechanically ventilate the mother presented its own set of risks, including the possibility of premature delivery due to the stress of the exacerbation and subsequent treatments on the uterus.[16,17]

Fortunately, prompt and aggressive intervention, including intubation, mechanical ventilation, and the use of bronchodilators and corticosteroids, led to a positive outcome for both the mother and fetus in this case. The patient was extubated successfully after her respiratory status improved, and she ultimately delivered a healthy baby at term without complications. This favorable outcome emphasizes the importance of early recognition and treatment of severe asthma exacerbations in pregnant women to prevent irreversible damage and optimize maternal and fetal outcomes. The treatment of asthma exacerbations during pregnancy follows the same principles as in non-pregnant patients, with the goal of rapidly reversing bronchoconstriction, reducing airway inflammation, and correcting hypoxemia. However, concerns about the safety of asthma medications during pregnancy often lead to under-treatment, which in turn increases the risk of exacerbations. A survey of pregnant women with asthma has shown that fear of medication-related fetal harm often leads to poor adherence to prescribed asthma therapies, particularly inhaled corticosteroids (ICS).[18,19]

In this case, the patient was receiving both ICS and a short-acting beta-agonist (SABA) as part of her asthma management. However, it is unclear whether she was fully adherent to this regimen throughout her pregnancy, as is often seen in pregnant women with asthma. The fear of potential side effects from medications, compounded by the physiological changes of pregnancy, may have contributed to her worsening symptoms and eventual exacerbation. Corticosteroids remain a cornerstone of asthma exacerbation treatment in pregnancy, and there is substantial evidence supporting their safety and efficacy. Both inhaled and systemic corticosteroids have been shown to improve maternal asthma control without significant teratogenic effects. However, systemic corticosteroids, which are often used in severe exacerbations, may increase the risk of adverse outcomes such as gestational diabetes, hypertension, and preterm birth. Despite these risks, the benefits of treating severe exacerbations with corticosteroids far outweigh the potential harm when maternal life is at stake.[20,21]

The use of magnesium sulfate, as seen in this case, is another effective treatment for severe asthma exacerbations. Magnesium sulfate acts as a smooth muscle relaxant and has been shown to improve lung function and oxygenation in patients with severe asthma. It also has the added benefit of preventing eclamptic seizures in pregnant women, making it particularly useful in cases where preeclampsia may be a concern. In this patient, magnesium sulfate was used as an adjunctive treatment and contributed to the reversal of bronchoconstriction and stabilization of her respiratory status. This case highlights the critical importance of a multidisciplinary approach in managing severe asthma exacerbations during pregnancy. Close collaboration between obstetricians, pulmonologists, and critical care specialists is essential to optimize outcomes for both mother and fetus. In this case, the rapid involvement of the critical care team allowed for timely intubation and mechanical ventilation, which were essential in preventing further deterioration. The obstetrics team also played a key role in monitoring fetal well-being throughout the patient's hospitalization, ensuring that the fetus remained stable during the mother's acute illness.[18,22,23]

The management of asthma during pregnancy requires careful planning and coordination between different specialties, particularly when exacerbations occur. Regular antenatal visits, close monitoring of asthma control, and frequent adjustment of asthma management plans are necessary to reduce the risk of exacerbations and their associated complications. Women with poorly controlled asthma should be closely monitored during pregnancy, with an emphasis on preventing exacerbations and ensuring adherence to prescribed therapies. This case serves as a reminder that severe asthma exacerbations in pregnancy, although rare, can lead to life-threatening complications if not treated promptly. Clinicians must be vigilant in recognizing the early signs of exacerbation and must not hesitate to escalate treatment when necessary. Early intervention with bronchodilators, corticosteroids, and oxygen therapy can prevent the progression to respiratory failure, and intubation should be considered when patients show signs of respiratory fatigue or decreased consciousness. In terms of preventive strategies, it is important to counsel pregnant women with asthma on the safety of their medications and the importance of maintaining good asthma control throughout pregnancy. Asthma action plans should be reviewed and updated regularly, and patients should be educated on recognizing the warning signs of exacerbation. Clinicians should also be prepared to manage asthma exacerbations aggressively in pregnant women, knowing that maternal stability is the best way to protect fetal health.[24,25]

4. Conclusion

This case illustrates the significant risks associated with asthma exacerbations during pregnancy, particularly when they lead to life-threatening complications such as respiratory failure and decreased consciousness. Early recognition and aggressive treatment are essential to preventing adverse maternal and fetal outcomes. Multidisciplinary care involving obstetricians, pulmonologists, and critical care specialists is crucial to managing severe exacerbations and optimizing outcomes for both mother and fetus. Clinicians must remain vigilant in monitoring pregnant women with asthma, particularly in the third trimester, and must ensure that asthma management plans are carefully adhered to in order to minimize the risk of exacerbations.

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