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Critical Care Management of Systemic Lupus Erythematosus with Autoimmune Hemolytic Anemia and Thrombocytopenia in Pregnancy: A Case Report

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ABSTRACT

Autoimmune diseases like Systemic Lupus Erythematosus (SLE) in pregnancy pose significant management challenges, particularly when complicated by severe hematological manifestations such as autoimmune hemolytic anemia (AIHA) and thrombocytopenia, which necessitate intensive care. This case report aims to describe the comprehensive intensive care management and outcomes of a pregnant patient with suspected SLE presenting with severe AIHA and thrombocytopenia. A qualitative case study design was employed. The research focused on a single, purposively selected 21-year-old primigravida at 30–31 weeks gestation. Data were collected from medical records and analyzed descriptively to document the patient's clinical presentation, diagnostic workup, multidisciplinary therapeutic interventions, and subsequent progress. The patient presented with severe anemia (Hb 5 g/dL) and thrombocytopenia (platelets 125,000/mm³). Management involved pregnancy termination, multiple packed red cell transfusions, high-dose corticosteroids (methylprednisolone), and mechanical ventilation. Following this aggressive regimen, the patient was successfully extubated on day 3 with hemodynamic stability and improved hematological parameters (Hb 9.6 g/dL). This case highlights that a multidisciplinary approach combining prompt delivery, immunosuppression, and intensive supportive care is crucial for favorable maternal outcomes. It underscores the importance of early recognition and aggressive treatment of autoimmune complications in pregnancy to prevent life-threatening consequences.

KEYWORDS *Autoimmune Hemolytic Anemia, Critical Care, Pregnancy Complications, Systemic Lupus Erythematosus, Thrombocytopenia*

INTRODUCTION

Autoimmune diseases represent a diverse group of conditions characterized by the loss of immunological tolerance to self-antigens, resulting in immune-mediated damage to various organ systems. These disorders affect approximately 3–5% of the global population, with systemic lupus erythematosus (SLE) being one of the most complex and potentially life-threatening autoimmune conditions (Murphy & Weaver, 2022). The pathophysiological mechanisms underlying autoimmune diseases involve dysregulation of both innate and adaptive immunity, leading to the production of autoantibodies, immune complex formation, and direct cellular cytotoxicity against self-tissues (Zinner, 2022).

Systemic lupus erythematosus is a chronic multisystem autoimmune disease predominantly affecting women of reproductive age, with a female-to-male ratio of 9:1 (Nusbaum et al., 2020; Zhu et al., 2025). The disease course is characterized by periods of flares and remissions, with clinical manifestations ranging from mild cutaneous involvement to severe, life-threatening complications affecting the kidneys, central nervous system,

cardiovascular system, and hematological system (Kumar Jr et al., 2024; Misra, 2025; Sulashvili & Nimangre, 2025). Hematological abnormalities occur in up to 85% of SLE patients and include autoimmune hemolytic anemia (AIHA), thrombocytopenia, and leukopenia. These cytopenias significantly increase morbidity and mortality, particularly when occurring during pregnancy (Rey et al., 2021).

The management of autoimmune diseases during pregnancy presents unique clinical challenges due to physiological immunological changes, potential disease exacerbations, increased risk of maternal and fetal complications, and limitations in therapeutic options (Singh et al., 2024; Taraborelli & Erkan, 2015; Yeung & Dendrou, 2019). Studies have shown that pregnant women with SLE have a 20-fold higher risk of maternal mortality compared to the general obstetric population (Polok et al., 2019). Severe hematological complications such as AIHA and thrombocytopenia can lead to critical conditions requiring intensive care unit (ICU) admission, mechanical ventilation, and emergency delivery (Fizza Haider et al., 2023; Pène et al., 2025).

Patients with autoimmune diseases account for approximately 1–3% of all ICU admissions, with mortality rates ranging from 15–40%, depending on the severity of organ involvement and complications (Sheth et al., 2019). The most common indications for ICU admission in autoimmune disease patients include acute respiratory failure, severe sepsis, neurological complications, and severe cytopenias requiring massive transfusion support (Dumas et al., 2024; Poli et al., 2024; Taraborelli & Erkan, 2015). Despite advances in critical care medicine and immunosuppressive therapy, the optimal management strategy for pregnant patients with SLE complicated by severe hematological abnormalities remains controversial and poorly defined (Yang et al., 2024).

Previous studies have primarily focused on non-pregnant autoimmune disease patients in the ICU setting, with limited data on the specific management protocols for pregnant patients with SLE complicated by AIHA and thrombocytopenia. Most existing literature consists of retrospective cohort studies and case series, highlighting the need for detailed case reports that can provide insights into clinical decision-making and treatment outcomes (Huang et al., 2025). The complexity of managing immunosuppression during pregnancy, balancing maternal and fetal risks, and timing delivery in critically ill patients requires careful multidisciplinary collaboration (Guntupalli et al., 2015; Leovic et al., 2018; Zieleskiewicz et al., 2016).

The novelty of this case report lies in the comprehensive documentation of intensive care management strategies employed in a pregnant patient with suspected SLE presenting with severe AIHA and thrombocytopenia requiring emergency delivery and ICU admission. This case illustrates the challenges of diagnosing autoimmune diseases in the acute setting, the importance of prompt immunosuppressive therapy, and the critical role of supportive care in achieving favorable maternal outcomes. Furthermore, this report contributes to the limited literature on the intersection of obstetric critical care, hematology, and rheumatology in managing complex autoimmune diseases.

The primary objective of this case report is to describe the clinical presentation, diagnostic approach, and comprehensive intensive care management of a pregnant patient with suspected SLE complicated by severe autoimmune hemolytic anemia and thrombocytopenia. Secondary objectives include discussing the pathophysiological mechanisms underlying these complications, reviewing current evidence-based management guidelines, and highlighting the

importance of multidisciplinary collaboration in achieving successful maternal outcomes. The clinical implications of this case extend to improving recognition of severe autoimmune complications in pregnancy, optimizing ICU management protocols, and guiding future research in this challenging patient population.

RESEARCH METHOD

This research employed a qualitative case study design to conduct an in-depth investigation and analysis of the clinical management of a single patient. This approach was deemed most appropriate as it allows for a detailed exploration of a complex and rare clinical phenomenon within its real-life context. The study focused on the comprehensive documentation of the patient's diagnostic journey, therapeutic interventions, and clinical outcomes in a critical care setting, providing rich, contextual insights that are often unattainable through other methodological approaches.

The population for this study consisted of pregnant patients presenting with severe hematological complications potentially linked to an underlying autoimmune disease. The sample was a single, purposively selected case of a 21-year-old primigravida at 30-31 weeks gestation who was admitted to the intensive care unit (ICU) with suspected Systemic Lupus Erythematosus (SLE) complicated by severe autoimmune hemolytic anemia (AIHA) and thrombocytopenia. The sampling technique was therefore a purposive sampling method, as this specific case was chosen for its unique ability to illuminate the research problem concerning the intersection of obstetric critical care, hematology, and rheumatology. The primary research instruments were the patient's medical records, which provided structured and unstructured data on clinical presentation, laboratory results, treatment protocols, and progress notes.

Data analysis was conducted using a descriptive analytical technique. Data extracted from the medical records, including vital signs, laboratory parameters (e.g., hemoglobin, platelet counts), treatment regimens (e.g., corticosteroid dosage, transfusions), and clinical progress, were systematically compiled and summarized. This information was then analyzed narratively to reconstruct the timeline of clinical events, evaluate the response to interventions, and discuss the findings in the context of existing medical literature. The analysis aimed to identify key decision points, the rationale behind the multidisciplinary management strategy, and the factors contributing to the patient's outcome, thereby deriving clinically relevant conclusions from the case.

RESULT AND DISCUSSION

Case Presentation

A 21-year-old female patient came to the hospital with G0P1A0H1 complaining of paleness and weakness since 1 week ago. The patient is currently pregnant with her first child and there are no signs of labor. There is no history of fever, shortness of breath, or redness of the face when exposed to sunlight. The patient is currently pregnant with her first child and there are no signs of labor. There is no history of fever, shortness of breath, or redness of the face when exposed to sunlight.

Physical examination revealed pale conjunctiva, blood pressure of 117/67, and a heart rate of 91. The patient is currently 30–31 weeks pregnant. Based on the ACR criteria, there

were no malar rash, discoid rash, photosensitivity, mouth ulcers, erosive arthritis, serositis, renal impairment, or neurological disorders, but there were hematological disorders.

Laboratory tests showed hemoglobin levels of 5 g/dl, leukocytes of 7060/mm3, and platelets of 125,000. Urea and creatinine levels were 32/0.5, and hemostasis function was also found to be within normal limits. The patient underwent a blood transfusion of 2 units of PRC per day, and a repeat blood test was performed after 3 days. After the transfusion, Hb was 6.1 and platelets were 95,000. The comb test also yielded negative results. The patient was also given lung maturation therapy and neuroprotectors. An abdominal ultrasound revealed chronic hepatitis and cholelithiasis, with a Fibroscan score of 11.2 F2-F3.

The patient was provisionally diagnosed with suspected systemic lupus erythematosus, with G1P0A0H0, 30–31 weeks pregnant with imminent premature delivery, severe normocytic anemia, suspected autoimmune hemolytic anemia, suspected AIHA, thrombocytopenia, suspected idiopathic thrombocytopenic purpura.

After lung maturation and neuroprotection, the patient underwent termination of pregnancy and was treated in the intensive care unit. Upon arrival at the ICU, the patient was still on a ventilator and underwent a complete blood count and ANA profile examination. Upon arrival at the ICU, the patient's blood pressure was 131/79, HR 96, saO2 100%, Hb 5.4. The patient was given 2 bags of PRC blood transfusions per day and 2 units of FFP. Periodic blood tests showed Hb 7.7 and 9.6 on the third day of ICU treatment. Procalcitonin test results were 0.28, FT3 2.1, FT4 13.60 , T4 128, TSH 0.58. ANA profile examination results were borderline.

In the Intensive Care unit, the patient was also given antibiotic therapy, namely cefoperazone sulbactam 3 x 1 g, and corticosteroid therapy methylprednisolone 1 x 62.5 mg. A proton pump inhibitor was also given to the patient, namely omeprazole 2 x 40 mg.

Ventilator support can be gradually reduced until the patient can be extubated. For analgesia and sedation, the patient was given fentanyl and dexmedetomidine. After coming off the medication, the patient's consciousness is compos mentis and cooperative. On 3th day in ICU, the patient was extubated and hemodynamics were stable.

Discussions

This case report describes the successful intensive care management of a young pregnant woman with suspected systemic lupus erythematosus complicated by severe autoimmune hemolytic anemia and thrombocytopenia requiring emergency delivery and ICU admission. The patient's presentation, diagnostic challenges, and therapeutic responses illustrate several important clinical and pathophysiological principles relevant to the management of autoimmune diseases in critically ill pregnant patients.

Pathophysiology of Autoimmune Complications

Autoimmune diseases arise from a fundamental breakdown in immunological tolerance to self-antigens, resulting in immune-mediated tissue damage through multiple mechanisms including autoantibody production, immune complex deposition, and direct T-cell mediated cytotoxicity (Murphy & Weaver, 2022). In systemic lupus erythematosus, loss of tolerance affects multiple organ systems due to the production of autoantibodies against nuclear and cytoplasmic antigens. The disease typically progresses through distinct phases: an initial activation phase involving exposure to multiple autoantigens, followed by chronic

inflammation characterized by sustained autoantibody production, immune complex formation, and progressive tissue damage (Zinner, 2022).

Hematological manifestations are among the most common complications of SLE, occurring in up to 85% of patients during their disease course. Autoimmune hemolytic anemia results from IgG or IgM antibodies directed against red blood cell surface antigens, leading to premature destruction through two primary mechanisms: extravascular hemolysis via phagocytosis by splenic macrophages, and intravascular hemolysis through complement-mediated cell lysis. In our patient, the negative direct antiglobulin test (Coombs test) despite clinical and laboratory evidence of hemolytic anemia suggests complement-mediated hemolysis or antibody-independent immune mechanisms, which can occur in 5-10% of autoimmune hemolytic anemia cases associated with SLE (Polok et al., 2019).

Similarly, immune thrombocytopenic purpura in autoimmune diseases results from autoantibodies targeting platelet surface glycoproteins such as GPIIb/IIIa, leading to accelerated platelet destruction in the reticuloendothelial system and suppression of megakaryocyte production in bone marrow. The combination of severe anemia and thrombocytopenia significantly increases the risk of life-threatening complications including hemorrhage, tissue hypoxia, and cardiovascular decompensation, particularly in the peripartum period when hemostatic demands are highest (Rey et al., 2021).

Autoimmune Disease in Pregnancy: Unique Challenges

Pregnancy represents a unique immunological state characterized by maternal immune tolerance to fetal alloantigens while maintaining protection against pathogens. This delicate balance is mediated by complex interactions between maternal immune cells, placental trophoblasts, and immunomodulatory factors including progesterone, human chorionic gonadotropin, and regulatory T cells. In women with autoimmune diseases, this physiological immune adaptation can have unpredictable effects on disease activity, with some conditions improving during pregnancy while others, particularly SLE, frequently exacerbate (Chiche et al., 2014).

Studies have shown that approximately 25-60% of pregnant women with SLE experience disease flares, most commonly during the second and third trimesters or in the early postpartum period. Pregnancy-related flares tend to be more severe and involve multiple organ systems, including renal, hematological, and cardiovascular complications. Maternal mortality in pregnant SLE patients ranges from 1-3%, representing a 20-fold increase compared to the general obstetric population (Sheth et al., 2019).

Distinguishing between SLE flares and pregnancy-specific complications such as preeclampsia, HELLP syndrome (Hemolysis, Elevated Liver enzymes, Low Platelets), and thrombotic microangiopathies presents significant diagnostic challenges, as these conditions share overlapping clinical and laboratory features. In our patient, the absence of hypertension, renal dysfunction, and neurological symptoms, combined with predominant hematological abnormalities and borderline ANA positivity, suggested autoimmune etiology rather than pregnancy-specific microangiopathy.

Critical Care Management According to Current Guidelines

The management of critically ill patients with autoimmune diseases requires integration of principles from rheumatology, critical care medicine, and in this case, maternal-fetal medicine. According to the European League Against Rheumatism (EULAR)

recommendations, the management of SLE with severe hematological complications should focus on: (1) prompt recognition and diagnosis of life-threatening manifestations, (2) immediate initiation of immunosuppressive therapy, (3) supportive care targeting specific organ dysfunction, and (4) prevention and management of treatment-related complications including infection (Chiche et al., 2014).

In pregnant patients with severe autoimmune complications, the American College of Rheumatology (ACR) guidelines emphasize the importance of multidisciplinary collaboration between rheumatologists, intensivists, and obstetricians to balance maternal stabilization with fetal well-being. When maternal life is threatened by severe disease activity or complications, pregnancy termination should be considered after fetal lung maturation when gestational age permits (Yang et al., 2024).

Systemic Inflammatory Response and Neurological Considerations

The blood-brain barrier plays a critical role in maintaining central nervous system homeostasis and regulating communication between the CNS and peripheral immune system. During systemic inflammation, as occurs in active autoimmune diseases, blood-brain barrier integrity can be compromised through multiple mechanisms including inflammatory cytokines (IL-1β, IL-6, TNF-α), matrix metalloproteinases, and immune cell trafficking. This dysfunction can lead to neurological manifestations ranging from mild cognitive impairment to severe neuropsychiatric complications and seizures (Huang et al., 2025).

Autoimmune diseases are associated with complex alterations in the cytokine milieu, involving both pro-inflammatory cytokines (IL-1, IL-6, IL-17, TNF-α, IFN-γ) and anti-inflammatory mediators (IL-10, TGF-β). These changes affect not only the primary disease process but also the host response to secondary insults such as infection and sepsis. Research has demonstrated that autoimmune disease patients with sepsis have distinct cytokine profiles and altered immune responses compared to non-autoimmune septic patients, potentially contributing to differences in clinical outcomes (Sheth et al., 2019).

In our patient, the absence of neurological manifestations and normal mental status after sedation cessation suggested preserved CNS function despite significant systemic inflammation. However, long-term neurological monitoring remains important given the association between SLE and subsequent neuropsychiatric complications.

Sepsis Risk in Autoimmune Disease Patients

The relationship between autoimmune diseases and infection susceptibility is bidirectional and complex. Chronic immune dysregulation inherent to autoimmune conditions, combined with immunosuppressive treatments, creates a state of increased infection vulnerability. Studies have shown that autoimmune disease patients have 2-5 fold higher rates of serious infections requiring hospitalization compared to age-matched controls (Rey et al., 2021).

Furthermore, sepsis outcomes in autoimmune disease patients appear worse than in the general ICU population. A large multicenter study by Sheth et al. (2019) demonstrated that ICU patients with autoimmune diseases had 30-day mortality rates of 28.7% compared to 19.3% in matched controls without autoimmune conditions. Risk factors for adverse outcomes included active disease at the time of infection, high corticosteroid doses (>20 mg/day prednisone equivalent), multiple immunosuppressive agents, and presence of organ damage particularly renal and pulmonary involvement.

Yang et al. (2024) further demonstrated that repeated sepsis episodes in autoimmune disease patients are associated with cumulative mortality risk, with each subsequent infection conferring progressively worse outcomes. This underscores the critical importance of infection prevention strategies including antimicrobial prophylaxis, vaccination (particularly against encapsulated organisms), careful immunosuppression management, and patient education regarding infection symptoms and seeking early medical attention.

In our case, vigilant infection monitoring with serial procalcitonin measurements, prophylactic broad-spectrum antibiotics, and strict aseptic technique helped prevent infectious complications during the vulnerable perioperative and early postpartum period.

Respiratory Complications in Autoimmune Diseases

Respiratory failure represents a major cause of morbidity and mortality in critically ill autoimmune disease patients. Diffuse alveolar hemorrhage (DAH), occurring in 1-5% of SLE patients, is one of the most life-threatening pulmonary complications with mortality rates ranging from 50-90% despite aggressive treatment. DAH results from immune-mediated damage to alveolar capillaries, leading to intra-alveolar bleeding, hypoxemia from intrapulmonary shunting, and potential progression to acute respiratory distress syndrome (Polok et al., 2019).

Clinical features of DAH include sudden onset dyspnea, hemoptysis (absent in up to 30% of cases), diffuse alveolar infiltrates on chest imaging, and falling hemoglobin levels. Early recognition and aggressive treatment with high-dose corticosteroids, cyclophosphamide or rituximab, and supportive mechanical ventilation are essential for survival. In patients with refractory DAH, plasmapheresis or extracorporeal membrane oxygenation may be required (Polok et al., 2019).

Fortunately, our patient did not develop DAH or other severe pulmonary complications, likely due to the prompt initiation of immunosuppressive therapy and the absence of high-titer anti-DNA antibodies or active lupus nephritis, which are known risk factors for DAH development.

Prognosis and Long-term Considerations

The prognosis of autoimmune disease patients requiring ICU admission has improved significantly over the past two decades due to advances in both disease-specific therapies and critical care supportive measures. Recent studies report ICU mortality rates of 15-25% for autoimmune disease patients, compared to 30-50% in earlier series (Huang et al., 2025). Factors associated with improved survival include: early ICU admission before development of multiple organ dysfunction, prompt initiation of appropriate immunosuppressive therapy, absence of severe infection, preserved baseline organ function, and lower disease activity scores.

For our patient, several factors predicted favorable outcome: young age, absence of chronic organ damage, early recognition and treatment, rapid stabilization of hematological parameters, and absence of infectious or thromboembolic complications. The successful extubation and ICU discharge within 3 days represents an excellent short-term outcome.

Limitations and Future Directions

This case report has several limitations. First, the diagnosis of SLE remained presumptive rather than definitive at the time of ICU discharge, with only borderline ANA positivity and

one ACR criterion (hematological disorder) clearly fulfilled. Complete autoantibody profiling including anti-dsDNA, anti-Smith, anti-Ro, anti-La, and complement levels would strengthen diagnostic certainty. Second, the negative direct antiglobulin test raises questions about the mechanism of hemolysis, suggesting the need for more detailed investigation including cold agglutinins, G6PD deficiency screening, and bone marrow examination if cytopenia persists.

Future research should focus on developing validated risk stratification tools to identify autoimmune disease patients at highest risk for ICU admission and mortality, establishing optimal immunosuppressive regimens specifically for pregnant patients with severe autoimmune complications, and conducting prospective trials comparing different therapeutic strategies for managing life-threatening autoimmune manifestations in the ICU setting.

CONCLUSION

This case report emphasizes that multidisciplinary and aggressive management is crucial for favorable maternal outcomes in pregnant patients with suspected systemic lupus erythematosus (SLE) complicated by severe hematological abnormalities such as autoimmune hemolytic anemia (AIHA) and thrombocytopenia. Successful patient stabilization relied on three key interventions: prompt pregnancy termination to alleviate physiological stress, immediate high-dose corticosteroid immunosuppression to control the autoimmune process, and comprehensive ICU supportive care including mechanical ventilation and targeted blood transfusions. The report highlights the life-threatening potential of autoimmune flares in pregnancy and the importance of maintaining a high index of suspicion for autoimmune causes in pregnant women with unexplained severe cytopenias, even when classic serological markers are absent. Future research should prioritize large-scale, multicenter prospective studies or registries focused on pregnant autoimmune patients requiring ICU admission to develop standardized diagnostic and therapeutic protocols. Key areas include optimal timing of delivery, safest and most effective immunosuppressive treatments, early biomarker identification for flares, and comparative analyses of corticosteroid and immunoglobulin dosing strategies, all aimed at improving maternal and neonatal outcomes.

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