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Severe Drug Reaction with Eosinophilia and Systemic Symptoms (DRESS) Syndrome Requiring Intensive Care Management in A Young Adult: A Case Report

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ABSTRACT

Background: Drug Reaction with Eosinophilia and Systemic Symptoms (DRESS) syndrome is a rare but potentially life-threatening severe cutaneous adverse reaction characterized by extensive skin eruption, hematologic abnormalities, and multiorgan involvement. Early recognition is crucial, as delayed diagnosis may result in significant morbidity and mortality.

Case Presentation: We report the case of a 24-year-old previously healthy man admitted to the intensive care unit (ICU) with severe DRESS syndrome following carbamazepine exposure. Six weeks after initiation of treatment for newly diagnosed epilepsy, he developed high-grade fever, diffuse maculopapular rash, facial edema, cervical lymphadenopathy, and progressive respiratory distress. Laboratory investigations revealed marked eosinophilia (4.8 × 10⁹/L), atypical lymphocytosis, severe hepatitis (ALT 1,245 U/L; AST 987 U/L), acute kidney injury, and elevated inflammatory markers. Computed tomography demonstrated bilateral pulmonary infiltrates and generalized lymphadenopathy. The RegiSCAR score was 8, indicating definite DRESS syndrome.

Management and Outcome: Carbamazepine was immediately discontinued. The patient required ICU admission for acute hypoxemic respiratory failure and received systemic corticosteroids (methylprednisolone 1 mg/kg/day), supportive care, and close monitoring of organ dysfunction. Progressive clinical and biological improvement was observed, allowing discharge from the ICU after seven days and hospital discharge after three weeks. No relapse occurred during six months of follow-up.

Conclusion: This case highlights the importance of early recognition of DRESS syndrome and prompt withdrawal of the offending drug. Severe organ involvement may necessitate intensive care management, but favorable outcomes can be achieved with timely diagnosis and appropriate treatment.

KEYWORDS: DRESS syndrome; Carbamazepine; Eosinophilia; Intensive care; Severe cutaneous adverse reaction; Drug hypersensitivity.

INTRODUCTION

Drug Reaction with Eosinophilia and Systemic Symptoms (DRESS) syndrome is a severe idiosyncratic drug-induced hypersensitivity reaction characterized by cutaneous manifestations, hematological abnormalities, and visceral organ involvement. The syndrome typically develops 2–8 weeks after initiation of the culprit medication and is associated with a mortality rate estimated between 5% and 10%, primarily due to severe hepatic failure, myocarditis, or respiratory complications.

Several medications have been implicated, including aromatic anticonvulsants, allopurinol, sulfonamides, vancomycin, and certain antiretroviral agents. The pathogenesis remains incompletely understood but likely involves genetic susceptibility, immune dysregulation, drug metabolism abnormalities, and viral reactivation, particularly human herpesvirus-6 (HHV-6).

Because of its variable clinical presentation and delayed onset, diagnosis is often challenging. The RegiSCAR scoring system is widely used to establish diagnostic certainty.

We report a severe case of carbamazepine-induced DRESS syndrome requiring intensive care management in a previously healthy young adult.

CASE PRESENTATION

A 24-year-old man with no significant medical history was admitted to the emergency department for fever, diffuse skin eruption, and dyspnea.

Six weeks earlier, he had been prescribed carbamazepine 200 mg twice daily for newly diagnosed focal epilepsy. The initial course was uneventful.

Five weeks after treatment initiation, he developed malaise, fatigue, and low-grade fever. Over the following days, symptoms progressed to include high fever (39.8°C), diffuse pruritic rash, facial swelling, and progressive shortness of breath.

On admission, the patient appeared ill and febrile. Vital signs were as follows:

- Temperature: 39.5°C
- Heart rate: 126 beats/min
- Blood pressure: 112/68 mmHg
- Respiratory rate: 30 breaths/min
- Oxygen saturation: 88% on room air

Physical examination revealed:

- Diffuse confluent erythematous maculopapular eruption involving approximately 70% of body surface area
- Facial edema
- Bilateral cervical lymphadenopathy
- Mild conjunctival injection
- No mucosal erosions

Chest auscultation demonstrated bilateral crackles at the lung bases.

Laboratory Findings

Initial laboratory investigations showed:

Parameter	Value
WBC	18.9 ×10⁹/L
Eosinophils	4.8 ×10⁹/L
Lymphocytes	5.2 ×10⁹/L
Atypical lymphocytes	Present
Hemoglobin	13.6 g/dL
Platelets	212 ×10⁹/L
ALT	1245 U/L
AST	987 U/L
Total bilirubin	46 µmol/L
Creatinine	175 µmol/L
CRP	165 mg/L

Serological investigations for hepatitis A, B, C, HIV, EBV, and CMV were negative.

Imaging

Chest CT scan revealed:

- Bilateral patchy ground-glass infiltrates
- Small pleural effusions
- Mediastinal lymphadenopathy

Abdominal CT demonstrated mild hepatomegaly and generalized lymph node enlargement.

Diagnostic Assessment

A skin biopsy showed interface dermatitis with eosinophilic infiltration consistent with drug-induced hypersensitivity.

The RegiSCAR score was calculated as follows:

- Fever >38.5°C (+1)
- Enlarged lymph nodes (+1)
- Eosinophilia (+2)
- Atypical lymphocytes (+1)
- Skin involvement >50% (+1)
- Internal organ involvement (+2)

Total score = 8 (Definite DRESS syndrome).

The diagnosis of carbamazepine-induced DRESS syndrome with hepatic, renal, pulmonary, and hematological involvement was established.

Intensive Care Management

Because of worsening hypoxemia and multiorgan involvement, the patient was admitted to the ICU.
Carbamazepine was immediately discontinued.
Management included:

- High-flow nasal oxygen therapy
- Intravenous methylprednisolone 1 mg/kg/day
- Aggressive intravenous hydration
- Thromboprophylaxis
- Nutritional support
- Daily monitoring of hepatic and renal function

Empirical antibiotics initiated in the emergency department were discontinued after exclusion of bacterial infection.
Mechanical ventilation was not required.

Outcome and Follow-Up

Clinical improvement became apparent within 72 hours.
Fever resolved on ICU day 4.
Progressive improvement was observed in:

- Oxygenation
- Cutaneous lesions
- Liver function tests
- Renal function

Peak eosinophilia occurred on ICU day 2 before gradually decreasing.
The patient was transferred to the internal medicine ward on day 7.
Prednisone was continued orally at 1 mg/kg/day and tapered progressively over three months.
At six-month follow-up:

- Complete resolution of skin lesions
- Normal liver and kidney function
- No recurrence
- No chronic autoimmune complications

DISCUSSION

DRESS syndrome is one of the most severe forms of delayed drug hypersensitivity reactions. The syndrome typically appears several weeks after exposure to the culprit medication, a delay that often complicates recognition.
Carbamazepine remains among the most frequently implicated agents worldwide. Aromatic anticonvulsants share structural similarities and demonstrate significant cross-reactivity, making future avoidance essential.
The pathogenesis of DRESS syndrome is multifactorial. Current evidence supports the interaction of genetic predisposition, abnormal drug metabolism, T-cell activation, cytokine release, and herpesvirus reactivation. Reactivation of HHV-6 has been particularly associated with severe disease and prolonged clinical courses.
The hallmark features include:

- Fever
- Extensive skin eruption
- Facial edema
- Eosinophilia
- Lymphadenopathy
- Internal organ involvement

Hepatic injury is the most common visceral manifestation and represents the principal cause of mortality. Pulmonary involvement occurs in approximately one-third of severe cases and may range from mild infiltrates to acute respiratory distress syndrome.
Our patient presented with four-organ involvement, including severe hepatitis, acute kidney injury, pulmonary infiltrates, and hematologic abnormalities, necessitating intensive care admission.
The differential diagnosis includes:

- Stevens–Johnson syndrome
- Toxic epidermal necrolysis
- Acute generalized exanthematous pustulosis

- Viral infections
- Autoimmune diseases
- Hemophagocytic lymphohistiocytosis

The RegiSCAR scoring system remains the most widely accepted diagnostic tool and was instrumental in confirming the diagnosis in our patient.

Immediate withdrawal of the offending drug is universally recommended. Systemic corticosteroids remain the cornerstone of treatment in cases with significant organ involvement despite the absence of randomized controlled trials. Severe refractory cases may require intravenous immunoglobulins, cyclosporine, plasmapheresis, or biologic therapies.

Early ICU admission is essential when respiratory failure, severe hepatitis, myocarditis, encephalitis, or hemodynamic instability develops.

CONCLUSION

DRESS syndrome should be considered in any patient presenting with fever, eosinophilia, extensive skin eruption, and multiorgan dysfunction several weeks after initiation of a high-risk medication. Carbamazepine remains a common culprit, particularly in young adults.

This case illustrates the potentially life-threatening nature of DRESS syndrome and emphasizes the importance of early recognition, prompt withdrawal of the offending drug, and multidisciplinary intensive care management. Timely intervention can lead to complete recovery even in patients with severe multiorgan involvement.

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