

Cortical necrosis with urticarial rash revealing a thyrotoxic crisis: A case report

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GSC Advanced Research and Reviews, 2025, 23(02), 046-048

Publication history: Received on 02 April 2025; revised on 10 May 2025; accepted on 12 May 2025

Article DOI: <https://doi.org/10.30574/gscarr.2025.23.2.0133>

Abstract

Introduction: Acute cortical necrosis (ACN) is a rare and often irreversible cause of anuric acute kidney injury (AKI), typically associated with shock or vasculitis. We report an exceptional case of ACN occurring in the context of severe thyrotoxicosis with an urticarial rash.

Case Observation: A 30-year-old female, previously diagnosed with hyperthyroidism and treated with carbimazole, was admitted for prolonged oligo-anuria with gastrointestinal symptoms, a recent urticarial rash, and moderate pancytopenia. Hemodialysis was required. Renal ultrasound showed normal-sized kidneys. Renal biopsy revealed extensive bilateral cortical necrosis. The immunological and infectious workup was negative. The pancytopenia was considered medication-induced. The progression was marked by the onset of end-stage chronic kidney disease.

Discussion: ACN is exceptionally associated with thyrotoxicosis. Potential pathophysiological mechanisms include hemodynamic dysregulation, endothelial activation, and a prothrombotic state promoted by thyrotoxicosis. The urticarial rash may represent a hypersensitivity vasculitis. The combination of pancytopenia, rash, and thyrotoxicosis suggests a systemic immunoallergic syndrome.

Conclusion: This case highlights a rare and severe complication of thyrotoxicosis, associated with an immunoallergic context. It underscores the importance of a broad etiological approach in unexplained anuric AKI.

Keywords: Renal Cortical Necrosis; Thyrotoxicosis; Hypersensitivity; Urticarial Rash; Acute Kidney Injury

1. Introduction

Renal cortical necrosis (RCN) is a rare and severe cause of anuric acute kidney injury (AKI), often irreversible, that typically occurs in the context of circulatory failure or vasculitis(1, 2). Thyrotoxicosis, despite its renal effects, is rarely implicated in severe renal injury(3). We report an unprecedented case of bilateral RCN occurring in the context of a thyrotoxic crisis, complicated by an urticarial rash, which suggests an immunoallergic component in the pathogenesis.

2. Case Report

A 30-year-old female with no significant medical history other than hyperthyroidism, treated with carbimazole (Thyrozol® 10 mg three times daily), and recently diagnosed hypertension, presented to the hospital with a generalized urticarial rash following fish consumption two months prior. She also experienced abdominal pain, vomiting, oligo-anuria, and arthralgia.

Initially admitted for severe anuric AKI with uremic syndrome, she underwent 8 sessions of hemodialysis. Renal ultrasound showed normal kidney size.

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At the time of admission to our unit, she presented with persistent oligo-anuria (<300 mL/24h), serum creatinine of 89 mg/L, hyponatremia of 132 mmol/L, moderate pancytopenia (Hb: 8 g/dL, WBC: 3230/mm³, platelets: 130,000/mm³), and proteinuria of 0.34 g/24h. Infectious and immunological screening (ANA, ANCA, anti-GBM) were negative.

Renal biopsy revealed extensive bilateral cortical necrosis. Bone marrow examination was normal. The diagnosis of acute cortical necrosis was made, likely due to an immunoallergic-mediated vasculitis in the context of thyrotoxicosis. Long-term hemodialysis was initiated.



Figure 1 Multiple annular, erythematous plaques with central clearing and slightly raised borders, consistent with an urticarial rash, seen on the lateral aspect of the right thigh

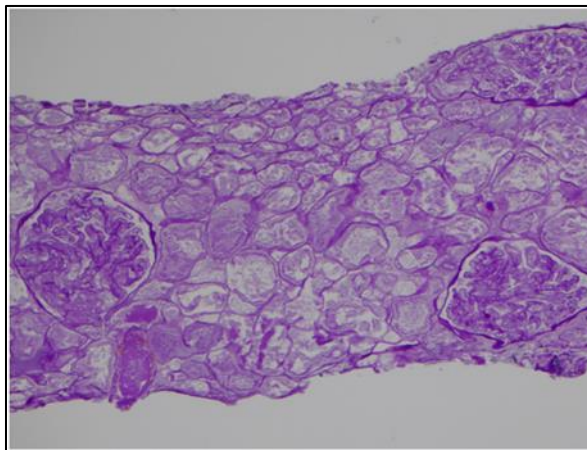


Figure 2 Histopathological image showing extensive bilateral cortical necrosis (H&E, ×100)

3. Discussion

Cortical necrosis is a rare and severe form of renal injury(1), most often linked to obstetric complications, severe infections, or systemic vasculitis. However, the occurrence of ACN in the context of thyrotoxicosis is extremely rare, with few reported cases in the literature.

Thyrotoxicosis is known to induce multiple systemic effects that could potentially contribute to renal injury (1, 5). These effects include hemodynamic disturbances, endothelial activation, and a procoagulant state that could lead to microvascular damage(2,4,9). Additionally, thyrotoxicosis may induce renal vasodilation and an increased renal blood flow, which paradoxically increases the vulnerability of renal tissue to ischemia during acute events. The interaction of these mechanisms with existing vascular inflammation could create an environment conducive to the development of ACN.

In this case, the urticarial rash, which preceded the renal injury by several weeks, may suggest an underlying hypersensitivity reaction. Urticaria in the context of thyrotoxicosis is uncommon but has been reported in some cases as a manifestation of autoimmune thyroid disease. The skin rash observed in our patient may be indicative of a vascular hypersensitivity response that extends to the renal microvasculature, thus triggering cortical necrosis.

Carbimazole, the antithyroid medication used in this patient, is known for its hematological and vascular side effects (3), including the potential to cause vasculitis. Although the pancytopenia in this case was deemed drug-induced, it could also reflect a systemic immune-mediated response(6,8). The combination of pancytopenia, urticarial rash, and thyrotoxicosis in our patient is highly suggestive of a systemic immunoallergic syndrome that may have contributed to the renal damage(2, 4, 7).

This case highlights the need for clinicians to be aware of the rare but serious renal complications associated with thyrotoxicosis and the potential for medication-induced hypersensitivity reactions. A high index of suspicion and a multidisciplinary approach are crucial for diagnosing and managing such complex cases. Early recognition and intervention may improve outcomes, although the prognosis remains guarded due to the irreversible nature of bilateral cortical necrosis.

4. Conclusion

This case underscores the rarity of bilateral cortical necrosis in the context of thyrotoxicosis. The combination of anuric AKI, urticarial rash, pancytopenia, and thyrotoxicosis suggests an immunoallergic vasculitis, likely triggered by carbimazole. A prompt and comprehensive diagnostic workup is essential when faced with unexplained anuric AKI, and early intervention is critical, given the poor prognosis associated with ACN. Further studies are needed to elucidate the pathophysiological mechanisms linking thyrotoxicosis and renal injury.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of informed consent

Informed consent was obtained from the patient for publication of this case report and accompanying images.

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