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Acute Adrenal Insufficiency Revealing Bilateral Adrenal Hemorrhage Secondary to Epstein–Barr Virus Infection: A Report of an Exceptional Case

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Abstract | **Case Report**

Acute adrenal insufficiency is a rare but life-threatening endocrine emergency that may result from bilateral adrenal hemorrhage. Its association with Epstein–Barr virus (EBV) infection is exceptional. We report the case of a 30-year-old man with no significant medical history who was admitted for severe diffuse abdominal pain, vomiting, diarrhea, and persistent hypotension. Laboratory investigations revealed severe hyponatremia, hyperkalemia, thrombocytopenia, elevated inflammatory markers, and markedly decreased serum cortisol levels. Immediate intravenous hydrocortisone therapy was initiated. Imaging studies showed bilateral adrenal enlargement on computed tomography, and magnetic resonance imaging confirmed subacute bilateral adrenal hemorrhage. Extensive etiological investigations excluded autoimmune, coagulation, and other infectious causes. EBV serology demonstrated positive IgG with negative IgM, suggesting past infection or viral reactivation. The patient showed favorable clinical and biochemical improvement under corticosteroid replacement therapy. This case highlights the importance of considering bilateral adrenal hemorrhage in cases of unexplained acute adrenal insufficiency and underscores EBV infection as a rare but possible infectious trigger.

Keywords: Acute adrenal insufficiency, Bilateral adrenal hemorrhage, Epstein–Barr virus, Adrenal crisis, Infectious etiology, Hydrocortisone therapy, Thrombocytopenia.

INTRODUCTION

Acute adrenal insufficiency (adrenal crisis) is a potentially fatal endocrine emergency resulting from an abrupt deficiency of glucocorticoids and, in some cases, mineralocorticoids [1]. Clinically, it presents with hypotension, gastrointestinal symptoms, altered general condition, and electrolyte disturbances, which may rapidly progress to shock if diagnosis and treatment are delayed [2].

Among the rare causes of acute adrenal insufficiency, bilateral adrenal hemorrhage (BAH) represents an uncommon but severe entity [3]. It most frequently occurs in well-defined clinical settings such as severe sepsis particularly Waterhouse–Friderichsen syndrome coagulation disorders, anticoagulant therapy, trauma, and certain autoimmune diseases [4,5]. However, sporadic cases associated with viral infections have been reported, suggesting a potential role of systemic inflammation and vascular mechanisms in its pathophysiology [6].

Epstein–Barr virus (EBV), the etiological agent of infectious mononucleosis, is only rarely implicated in adrenal involvement. Endocrine manifestations related to EBV infection remain exceptional, and bilateral adrenal hemorrhage complicating this infection has been scarcely described in the literature [7,8].

Through this case report, we describe acute adrenal insufficiency revealing bilateral adrenal hemorrhage occurring in the context of EBV infection, highlighting the importance of considering this diagnosis in suggestive clinical presentations and discussing potential pathophysiological mechanisms and management strategies.

CASE REPORT

A 30-year-old man with no significant past medical history was admitted to the emergency department for severe diffuse abdominal pain associated with vomiting and diarrhea. The clinical presentation

included marked asthenia, signs of dehydration, and persistent hypotension.

Initial laboratory investigations revealed severe hyponatremia (119 mmol/L), hyperkalemia (6.32 mmol/L), thrombocytopenia (34,000/mm³), and elevated C-reactive protein (42.8 mg/L). Plasma cortisol measured at admission (8:00 PM sample) was profoundly decreased at 0.8 µg/dL, prompting immediate administration of a 100 mg intravenous bolus of hydrocortisone.

The patient was subsequently transferred to our department for specialized management and etiological investigations. Extensive evaluation for infectious, autoimmune, inflammatory, and neoplastic causes was performed. Serologies for HIV and hepatitis B and C were negative. Immunological testing (antinuclear antibodies, anti–double-stranded DNA antibodies, antiphospholipid antibodies, anticardiolipin antibodies, and ANCA) was unremarkable. Coagulation studies were normal. EBV serology revealed positive IgG and negative IgM, consistent with past infection or viral reactivation.

Abdominal computed tomography demonstrated bilateral adrenal enlargement without focal lesions (Figure 1).

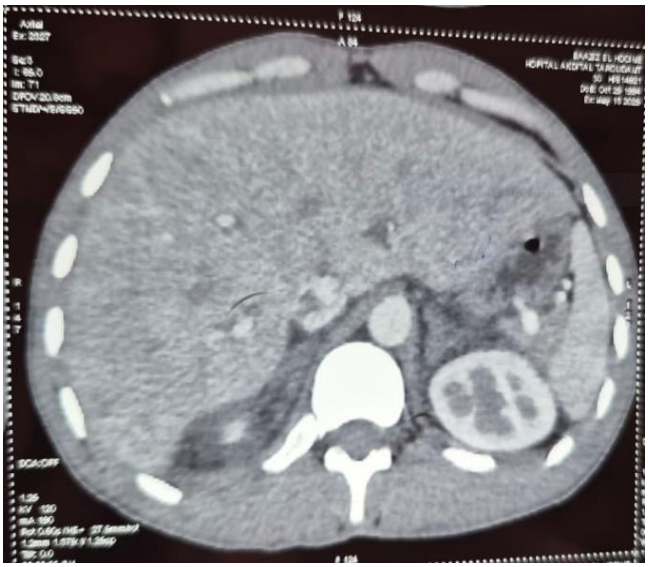

Figure 1: Axial contrast-enhanced computed tomography (CT) scan of the abdomen demonstrating bilateral adrenal gland enlargement with no discrete masses

Adrenal magnetic resonance imaging confirmed bilateral adrenal gland enlargement with imaging characteristics consistent with subacute bilateral adrenal hemorrhage (Figure 2).

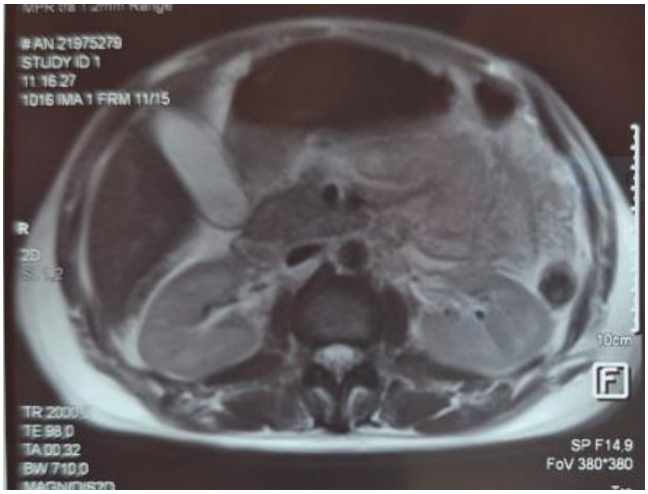

Figure 2: Adrenal Magnetic Resonance Imaging demonstrating subacute bilateral adrenal hemorrhage

A diagnosis of acute adrenal insufficiency secondary to bilateral adrenal hemorrhage, likely triggered in the context of EBV infection, was established. Clinical evolution was favorable under hydrocortisone replacement therapy, with progressive

correction of electrolyte abnormalities and marked clinical improvement.

DISCUSSION

Acute adrenal insufficiency secondary to bilateral adrenal hemorrhage is a rare but serious condition whose diagnosis remains challenging due to the nonspecific nature of early clinical manifestations [1,3]. Gastrointestinal symptoms, hypotension, and general deterioration may mimic other medical emergencies, delaying the initiation of life-saving corticosteroid therapy [2].

The most commonly reported causes of BAH include severe sepsis particularly Waterhouse–Friderichsen syndrome coagulation disorders, anticoagulant therapy, trauma, and autoimmune diseases [4,5]. Viral infections have more rarely been implicated, suggesting that systemic inflammatory responses and microvascular alterations may contribute to adrenal vascular injury [6,9].

In our case, the absence of coagulation disorders, anticoagulant therapy, or autoimmune disease, combined with marked thrombocytopenia and elevated inflammatory markers, supports an infectious etiology. EBV serology showing positive IgG with negative IgM is consistent with prior infection or viral reactivation. Although rare, EBV-related adrenal involvement has been described in isolated reports, including cases of adrenal hemorrhage and acute adrenal insufficiency [7,8].

Several pathophysiological mechanisms have been proposed to explain adrenal hemorrhage during viral infections, including inflammatory vasculitis, venous congestion secondary to adrenal hypervascularization, microthrombotic phenomena, and localized intravascular coagulation [6,9,10]. The anatomical particularity of the adrenal glands rich arterial supply with limited venous drainage renders them especially vulnerable to hemodynamic instability and systemic inflammatory aggression [10].

Imaging plays a pivotal role in diagnosis. Computed tomography may suggest adrenal hemorrhage by demonstrating bilateral gland enlargement [11], whereas magnetic resonance imaging remains the gold standard for characterizing the stage of hemorrhage and confirming the diagnosis [12]. In our patient, MRI identified subacute bilateral hemorrhage, consolidating the organic origin of adrenal failure.

Management requires urgent intravenous hydrocortisone administration without waiting for complete investigation results, along with correction of electrolyte disturbances and treatment of the underlying cause when identified [2,13]. Clinical outcome is generally favorable with early corticosteroid replacement, although recovery of adrenal function is variable, warranting long-term endocrine follow-up [3,13].

This case emphasizes the importance of considering bilateral adrenal hemorrhage in any unexplained acute adrenal insufficiency, particularly in an infectious context. It also highlights EBV as a rare but potential triggering factor, broadening the spectrum of infectious causes of adrenal crisis [7,8].

CONCLUSION

Bilateral adrenal hemorrhage is a rare but life-threatening cause of acute adrenal insufficiency [3]. This case illustrates an unusual presentation occurring in a probable context of EBV infection, in the absence of classical risk factors [7]. Clinicians should consider this diagnosis in patients presenting with hypotension, gastrointestinal symptoms, and electrolyte abnormalities, even in young individuals without prior medical history. Early administration of hydrocortisone allows favorable outcomes [2], and prolonged endocrine follow-up is recommended given the potential for persistent adrenal dysfunction [13].

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