Open Access Library Journal
2026, Volume 13, e14130
ISSN Online: 2333-9721
ISSN Print: 2333-9705

Young-Onset Autoimmune Myasthenia Gravis in a Resource-Limited Setting: A Clinical Case Report

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How to cite this paper: Soumah, C.O., Diallo, M.T., Touré, M.L., Barry, S.D. and Cissé, F.A. (2026) Young-Onset Autoimmune Myasthenia Gravis in a Resource-Limited Setting: A Clinical Case Report. *Open Access Library Journal*, **13**: e14130.
https://doi.org/10.4236/oalib.1114130

Received: August 17, 2025
Accepted: February 6, 2026
Published: February 9, 2026

Abstract

Autoimmune Myasthenia Gravis (MG) is rarely reported from low-resource settings, where diagnostic delays and limited therapeutic options remain major challenges. We report a young adult with progressive, fluctuating muscle weakness evolving over three years before diagnosis. In the absence of antibody testing and thoracic imaging, the diagnosis relied on clinical features and electrophysiological confirmation through a reproducible decrement on repetitive nerve stimulation. Corticosteroid therapy resulted in significant clinical improvement despite limited access to pyridostigmine and immunosuppressive agents. This report emphasizes the feasibility of diagnosing and managing myasthenia gravis based primarily on clinical expertise and electrophysiological testing in resource-constrained environments, and underscores the need for strengthened diagnostic capacity and access to essential medications.

Subject Areas

Neurology

Keywords

Myasthenia Gravis, Autoimmune Disease, Electromyography, Corticosteroids, Low-Resource Settings, Case Report

1. Introduction

Autoimmune Myasthenia Gravis (MG) is a prototypical antibody-mediated disorder of the neuromuscular junction characterized by fluctuating skeletal muscle

weakness with marked diurnal and exertional variability [1]. Although traditionally considered rare, recent epidemiological studies demonstrate increasing incidence and prevalence worldwide, attributed to improved recognition, aging populations, and enhanced survival [2]-[4].

Most patients harbor IgG1 and IgG3 antibodies directed against the nicotinic Acetylcholine Receptor (AChR), while smaller subsets present antibodies against Muscle-Specific Kinase (MuSK, predominantly IgG4) or low-density Lipoprotein Receptor-related Protein 4 (LRP4) [5]-[7]. These autoantibodies impair neuromuscular transmission through complement-mediated damage, antigenic modulation, or disruption of the agrin-LRP4-MuSK signaling pathway, resulting in fatigable weakness affecting ocular, bulbar, respiratory, or limb muscles [1] [5].

Diagnosis relies on the integration of clinical assessment, pharmacological testing, electrophysiological studies, and serological assays. In settings where antibody testing is unavailable, electrophysiological techniques—particularly Repetitive Nerve Stimulation (RNS) and Single-Fiber Electromyography (SFEMG)—remain essential diagnostic tools [5,8]. International consensus guidelines recommend adapting diagnostic strategies to local resource constraints while avoiding unnecessary delays in initiating treatment for clinically suggestive MG [8].

Although major therapeutic advances, including complement inhibitors and neonatal Fc receptor (FcRn) antagonists, have transformed MG management in high-income countries [9]-[11], access to these therapies remains extremely limited in many low- and middle-income countries (LMICs). Barriers include lack of antibody testing, limited electrophysiological facilities, etc., restricted access to thoracic imaging for thymic assessment [12], and inconsistent availability of first-line medications such as pyridostigmine and immunosuppressants [3] [13]-[15].

Here, we report a young Guinean adult presenting with chronic, progressive, fluctuating weakness consistent with generalized MG. Diagnosis was established through careful clinical evaluation and electrophysiological confirmation in the absence of serology and imaging, illustrating the practical realities of MG care in resource-limited settings.

2. Case Presentation

A 25-year-old male with no significant personal or family medical history presented with a three-year history of progressive, fluctuating muscle weakness. Symptoms were worse in the early morning and late afternoon and were exacerbated by sustained physical activity, with partial improvement after rest. (See **Figures 1-3**)

2.1. Clinical Evolution

Ocular onset: intermittent bilateral ptosis and horizontal diplopia fluctuating with fatigue.

Bulbar progression: episodic dysphagia, more pronounced for liquids, associated with nasal regurgitation and fatigable dysarthria.

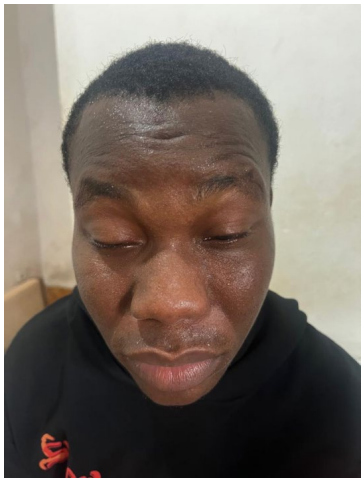

Figure 1. Bilateral ptosis before initiation of treatment.

Figure 2. Asymmetric eyelid opening with ocular fatigability before treatment.

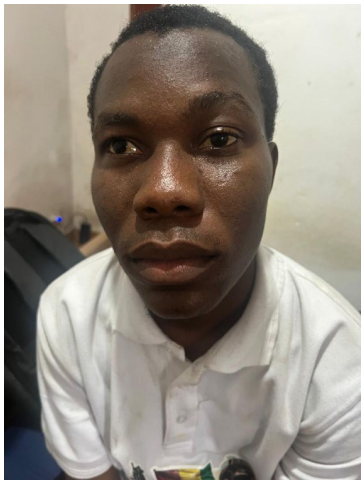

Figure 3. Resolution of ptosis and improved ocular function after corticosteroid therapy.

Generalization: progressive proximal limb fatigability interfering with daily activities such as climbing stairs and prolonged walking.

The patient denied sensory disturbances, seizures, sphincter dysfunction, toxin exposure, or use of neuromuscular-blocking medications. General health status and lifestyle history were otherwise unremarkable.

2.2. Neurological Examination

Mental status and higher cortical functions were intact. Examination revealed bilateral, fluctuating ptosis worsening during sustained upgaze, with diplopia on prolonged lateral gaze. Mild dysphagia for liquids and fatigable dysarthria were noted. Motor examination showed symmetrical proximal limb weakness with preserved distal strength, normal muscle tone and bulk, and rapid fatigability on repetitive testing. Deep tendon reflexes were symmetric and normal, with no sensory deficits or pyramidal signs. There was no respiratory distress or evidence of impending myasthenic crisis.

2.3. Paraclinical Findings

Routine laboratory investigations, including complete blood count, renal and hepatic function tests, and thyroid profile, were within normal limits. Due to resource limitations, AChR and MuSK antibody testing and chest computed tomography for thymic evaluation were unavailable.

Electroneuromyography demonstrated a 15% decrement in compound muscle action potential amplitude on low-frequency (3 Hz) repetitive nerve stimulation of the ulnar nerve with recording from the abductor digiti minimi muscle, confirming a postsynaptic neuromuscular junction transmission defect consistent with myasthenia gravis. Single-fiber electromyography, although more sensitive, was not available.

2.4. Treatment and Outcome

The patient was initiated on oral prednisone at a dose of 1 mg/kg/day. Regular access to pyridostigmine was not possible due to supply limitations, precluding consistent symptomatic therapy. After six weeks of corticosteroid treatment, there was marked improvement in ptosis and bulbar symptoms, followed by substantial recovery of proximal muscle strength by three months. The patient returned to full occupational activities without experiencing respiratory compromise or myasthenic crisis. He remains under regular follow-up, with ongoing efforts focused on minimizing long-term corticosteroid-related adverse effects and evaluating the need for steroid-sparing immunosuppressive therapy should symptoms recur.

3. Discussion

Myasthenia gravis is a chronic autoimmune disorder characterized by fluctuating muscle weakness and fatigability, with ocular involvement representing the most common initial manifestation [1]-[3]. In many patients, ocular symptoms may

precede generalized disease by months or years, contributing to diagnostic uncertainty and delays.

3.1. Diagnostic Delays in Resource-Limited Settings

The nearly three-year diagnostic delay observed in this case reflects a pattern frequently reported in LMICs and is attributable to limited awareness among frontline healthcare providers, frequent misdiagnosis as primary ocular or functional disorders, and restricted access to electrophysiological testing, immunological assays, and thoracic imaging. Financial barriers and fragmented referral pathways further compound these challenges. Prolonged diagnostic delays increase morbidity and expose patients to the risk of myasthenic crisis, a life-threatening emergency requiring prompt ventilatory support and rescue therapies [14].

3.2. Diagnostic Challenges

Although serological testing enhances diagnostic specificity, particularly in MuSK-positive MG, electrophysiology remains the diagnostic cornerstone in many low-resource environments. A significant decrement in low-frequency RNS, typically greater than 10% - 15%, provides reliable evidence of neuromuscular junction dysfunction [5]. In the present case, the absence of antibody testing, thymic imaging, and SFEMG necessitated reliance on clinical judgment and conventional ENMG, a scenario representative of routine practice in many West African neurology centers [15].

3.3. Treatment Constraints and Health System Implications

Standard MG management combines symptomatic therapy with immunomodulatory treatment [1] [8]. However, therapeutic access in LMICs is highly variable. Pyridostigmine availability is often inconsistent due to supply shortages, while immunosuppressive agents such as azathioprine or mycophenolate mofetil may be limited by cost. Advanced therapies including intravenous immunoglobulin, plasma exchange, and biologic agents remain largely inaccessible because of infrastructure and financial constraints. In this context, corticosteroids frequently serve as first-line therapy despite concerns regarding long-term adverse effects and limited monitoring capacity.

This case highlights the urgent need for strengthened electrophysiological infrastructure, targeted training programs to enhance early recognition of MG, and improved access to essential medications. Locally adapted treatment algorithms emphasizing early corticosteroid initiation with structured monitoring protocols could substantially improve outcomes in resource-constrained settings.

4. Conclusion

Autoimmune myasthenia gravis remains underdiagnosed in resource-limited environments due to restricted access to serological testing, electrophysiological facilities, and imaging modalities, resulting in significant delays in management.

This case underscores the critical role of high clinical suspicion and the practical value of electroneuromyography in establishing diagnosis when advanced diagnostics are unavailable. Strengthening access to essential investigations and treatments, alongside clinician training and international collaboration, is vital to reducing MG-related morbidity and mortality in low-resource settings.

Ethical Considerations

Written informed consent was obtained from the patient for publication of this case report and the accompanying images. The study was conducted in accordance with the principles of the Declaration of Helsinki.

Conflicts of Interest

The authors declare no conflicts of interest.

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