Multimorbidity: The New Frontier in Internal Medicine

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Abstract
Multimorbidity, defined as the coexistence of multiple chronic or acute disorders in a single individual, is emerging as one of the most challenging aspects of modern internal medicine. In younger patients, its presentation can be particularly complex—often blurring diagnostic lines between primary and secondary diseases. This case report highlights a diagnostically intricate presentation of Muscle-Specific Kinase (MuSK)-positive Myasthenia Gravis in a young patient who initially presented with severe pneumonitis and respiratory failure.

Case Summary: A young male, previously obese with significant recent weight loss, presented with acute respiratory failure secondary to fulminant pneumonitis. Despite optimal antimicrobial and ventilatory management, the patient exhibited persistent CO_2 retention and ventilatory muscle weakness. Further evaluation revealed MuSK-positive Myasthenia Gravis with concurrent nutritional cardiomyopathy and esophageal ulcerations—representing a classic example of multimorbidity that required coordinated multidisciplinary care.

Conclusion: This case underscores the diagnostic complexity of multimorbidity in young adults and emphasizes the importance of integrating neuromuscular evaluation in patients with persistent hypercapnia despite pulmonary recovery.

Introduction

Multimorbidity is no longer confined to elderly populations; it increasingly affects young adults with intersecting systemic disorders that challenge linear diagnostic reasoning. In such patients, clinical deterioration may not stem from a single etiology but rather from a complex interplay of infectious, nutritional, cardiac, and neuromuscular factors.

Myasthenia Gravis (MG), a rare autoimmune disorder of the neuromuscular junction, can present with respiratory failure, sometimes in the absence of classical ocular or limb symptoms. The MuSK antibody-positive variant accounts for a small fraction of MG cases (<5%) but is particularly associated with early bulbar involvement and life-threatening respiratory muscle weakness.

Case Presentation

A young male patient presented to the emergency department in acute respiratory distress, hypotensive and cyanotic. His history revealed progressive fatigue and weight loss over six months. He had a prior episode of dysphonia, treated elsewhere as laryngitis, and recent poor nutritional intake.

On admission, he was intubated and ventilated for severe respiratory failure with severe metabollic acidosis (Pco2 - 69.9 mmhg, pH -7.0, HC03 - 21 mmhg, Lactate - 1mmol/L) . Initial HRCT thorax revealed diffuse bilateral ground-glass opacities consistent with fulminant pneumonitis. Blood and sputum cultures grew Staphylococcus aureus, and the patient was started on Meropenem and Teicoplanin according to culture sensitivity the bacteria was pan resistant. Despite radiological resolution, the patient continued to exhibit persistent hypercapnia ($PaCO_2$ > 60 mmHg) and difficulty weaning from the ventilator. A multidisciplinary team discussion was held and a consensus to do MuSK anti-bodies (Msucle Specific Kinsase anti-bodies) was reached and it turned out to be poistive. Patient was started on IVIGs (Intra Venous Immunoglobulins). Patient showed significant clinical improvement and was extubated 48 hours after initiation of the IVIGs. Post extubation the patinet's blood gas analysis showed significant improvement. (Pco2 - 42.9 mmhg, pH -7.33, HC03 - 24 mmhg, Lactate - 1mmol/L)

Diagnostic Work-up

The persistence of hypercapnia despite pulmonary improvement warranted a systemic diagnostic evaluation.

1. Pulmonary Evaluation: HRCT showed acute pneumonitis resolving post-treatment. Despite normalized oxygenation, CO_2 retention persisted.
2. Neuromuscular Evaluation: Electrophysiological studies revealed decremental response. MuSK antibodies were positive, confirming MuSK-positive Myasthenia Gravis.
3. Cardiac Evaluation: 2D Echocardiography revealed dilated cardiomyopathy (EF(ejection fraction) : 40–45%) secondary to nutritional deficiency.
4. Gastrointestinal Evaluation: Endoscopy revealed esophageal ulcerations due to reflux and malnutrition.

Management and Multidisciplinary Collaboration

A coordinated multidisciplinary approach was adopted involving:

Internal Medicine: Diagnostic coordination and stabilization.

Physician Overall clinical coordination, diagnostic strategy, and patient stabilization.

Chest Physician-Ventilatory management and pulmonary rehabilitation.

Intensivist: Critical care oversight, infection control, and ventilator weaning protocols.

Dr. Nilesh Palesdeokar (Neurophysician): Diagnostic confirmation of MuSK-positive MG and initiation of immunotherapy (corticosteroids and intravenous immunoglobulin).

The patient improved gradually with normalized CO_2 levels and muscle strength recovery.

Discussion

This case exemplifies multimorbidity in a young adult, where infective pneumonitis, neuromuscular dysfunction, and nutritional cardiomyopathy coexisted. Persistent hypercapnia despite infection control was the diagnostic pivot leading to neuromuscular evaluation. Early bulbar symptoms and nutritional compromise further compounded respiratory dysfunction.

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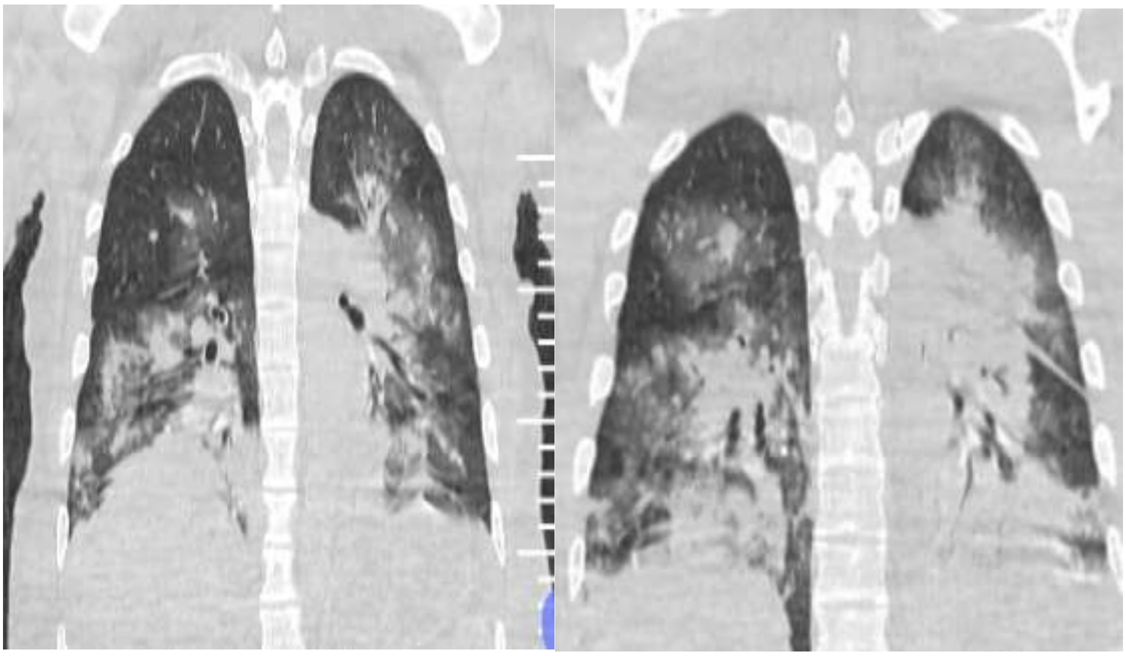

Fig 1a and 1b High Resolution Computed Tomography of Chest (Coronal Section).

Conclusion

This case highlights the importance of multidisciplinary evaluation in young patients with unexplained hypercapnia. When pulmonary causes are excluded, neuromuscular disorders like MuSK-positive Myasthenia Gravis should be considered early. Multimorbidity requires internal medicine physicians to integrate multi-system insights for accurate diagnosis and effective management.