Steroid dependence in acute asthma due to myasthenia gravis

Sir,

Inhaled bronchodilators and systemic steroids remain the mainstay of treatment in acute asthma. De-escalation of systemic steroids after clinical improvement is a critical step in acute asthma management as some cases may relapse when we attempt the withdrawal or reduction. Steroid-dependent asthmatics require prolonged high-dose steroids for symptom control and subsequent cautious tapering. A subset of patients may require long-term oral steroids as controller medication.[1] We report a case of acute asthma in whom tapering of steroids proved cumbersome due to undermined myasthenia gravis (MG). We could not find any reports of steroid dependence in acute asthma due to MG.

A 52-year-old homemaker presented with productive cough and episodic shortness of breath of 1 year. She had multiple hospitalizations in the past year, and her symptoms had acutely worsened in the last 2 days. She also complained of episodic dysphagia to solids and liquids. General physical examination was unremarkable. The patient was tachypneic and had tachycardia, but she maintained adequate oxygenation, determined by pulse oximetry. There were bilateral diffuse rhonchi on chest auscultation. Cardiovascular, abdominal, and neurological examination was unremarkable.

Chest radiograph [Figure 1] was normal. Hemogram showed leukocytosis. Sputum culture showed no growth. Spirometry showed obstructive pattern with postbronchodilator reversibility. Echocardiography was normal. Barium swallow study [Figure 2] was healthy. Video diagnostic laryngoscopy and upper gastrointestinal endoscopy failed to reveal any apparent cause for dysphagia. Thyroid function tests and Vitamin B12 levels were also routine.

The patient was hospitalized and managed as a case of acute asthma with nebulized bronchodilators, systemic steroids, and antibiotics. As we could not detect any organic cause for dysphagia, and as she negated dysphagia during the hospital stay, we presumed it as hysterical. The patient's chest symptoms improved over 5 days, and accordingly, we started de-escalating her treatment. After steroids were tapered off, she started developing nocturnal episodes of breathing difficulty which did not respond to inhaled bronchodilators and steroid. Electrocardiogram and serum electrolyte monitoring did not reveal any abnormality. Chest radiograph and hemogram were repeated, which were unremarkable. We restarted intravenous methylprednisolone, after which the patient improved remarkably. Once we stabilized her, we re-attempted a gradual and cautious de-escalation, but the patient soon relapsed again. We also noticed that she had transient nocturnal slurring of speech and drooping of both eyelids, which resolved the subsequent morning. We performed repetitive nerve stimulation test, which showed a positive decremental response, which was suggestive of MG. We started her on pyridostigmine and gradually tapered off the steroids. We monitored her using single breath count and muscle power charts.

We deferred intravenous immunoglobulin therapy and plasmapheresis as she showed adequate response to steroids and pyridostigmine. She clinically improved and was doing well on follow-up.

Steroid-dependent asthma, which constitutes 5%–10% of all asthma cases, requires prolonged steroids at a high dose for adequate symptom control. These patients have an arduous clinical course and incur enormous treatment costs. Relapse during de-escalation of steroid therapy and the resultant over-reliance on systemic steroids in acute asthma may result from various other causes. Inadequate treatment of secondary infection, a new hospital-acquired infection, unrecognized or undertreated comorbidities such as congestive heart failure, obstructive sleep apnea, gastroesophageal reflux disease, chronic sinusitis, depression, and anxiety may contribute to the reappearance of symptoms. In some instances, poor compliance to medications, faulty inhaler technique, and psychosocial factors may contribute to this scenario. Alternatively, the clinician could have misdiagnosed conditions such as bronchiectasis, vocal cord dysfunction, or endobronchial tumors as asthma and could face a similar situation. Although actual steroid-dependent patients are in the minority, caregivers often wrongly label a sizeable number of patients as being steroid-dependent due to lack of a systematic approach to detect treatable causes. These patients receive continuous oral steroids or periodic intramuscular steroids resulting in long-term side effects of steroid therapy.[2]

The physicians overlook neuromuscular disorders such as MG in acute asthma even when they face difficulty in tapering off steroids. MG has been linked to a form of severe nonatopic asthma as both demonstrate autoantibodies and have been shown to coexist with other autoimmune diseases such as autoimmune thyroid disease, chronic idiopathic urticaria, and inflammatory bowel disease.[3] Both asthma and MG are also known to present with exacerbations, some of which are may be lethal. Viruses are one of the significant triggers of acute asthma and are also shown to activate several autoimmune diseases by tissue damage, self-antigen exposure, and molecular mimicry.[4] Moreover, respiratory muscles are handicapped mechanically in both diseases.[5] MG alone has been shown to present as restrictive lung disease.[6] Coexistence of both asthma and MG can thus lead to severe dyspnea.

There have been isolated case reports linking asthma with MG. Satkunam *et al*. reported a case of severe asthma associated with seropositive MG and chronic idiopathic urticaria.[3] More recently, Aktas *et al*. reported a case of coexisting myasthenic crisis and asthma exacerbation in a heroin abuser.[7] In the above cases, apart from coexistence of both diseases, clinical course and symptom progression were reasonably independent. Treatment of MG failed to improve dyspnea in the former case, and the dyspnea responded reasonably well to asthma treatment in the latter, even in the absence of drugs for MG. Nevertheless, the authors suggested that we should consider MG in cases of asthma or respiratory failure that does not respond to treatment. We could achieve control of chest symptoms only once we adequately manage asthma, and we establish the interdependence of asthma and MG.

The importance of an early diagnosis of MG rises when other comorbidities (i.e., infectious, cardiac) require the use of medications that can worsen MG. Antibiotics, such as fluoroquinolones and macrolides, beta blockers, antiretrovirals, magnesium, and anesthetic agents, can unmask MG and in some cases, trigger MG crisis.

Early diagnosis of underlying MG in acute asthma assumes significance as antibiotics such as macrolides and fluoroquinolones and magnesium can trigger a myasthenic crisis in severe acute asthma. In MG, nocturnal breathing difficulty can be mistaken for a nocturnal asthma attack. In the absence of visible neurological signs, diagnosis of MG becomes difficult, as in our case. The acetylcholine esterase inhibitor, pyridostigmine, used in the treatment of MG is generally safe in asthmatics, but clinicians should preferably use lower doses and should exercise caution.[8]

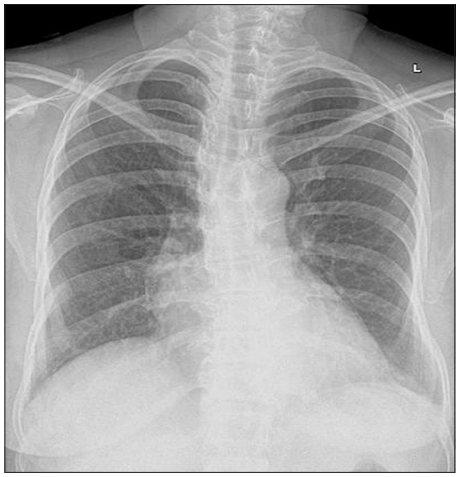

Figure 1: Normal chest radiograph

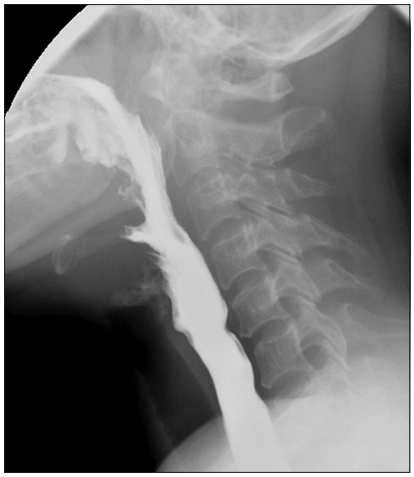

Figure 2: Normal barium swallow study

In light of our clinical experience, we recommend considering neuromuscular disorders such as MG in asthma patients in whom de-escalation of steroid therapy is challenging.

Financial support and sponsorship
Nil.

Conflicts of interest
There are no conflicts of interest.

Hameed Aboobackar Shahul, Mohan K. Manu, Aswini Kumar Mohapatra

Department of Respiratory Medicine, Kasturba Medical College, Manipal, Manipal Academy of Higher Education, Manipal, Karnataka, India.
E-mail: manumohan73@gmail.com

Submitted: 16-Sep-2019 **Accepted:** 08-Jul-2021
Published: 30-Aug-2021

REFERENCES

1. Upham JW, Chung LP. Optimising treatment for severe asthma. Med J Aust 2018;209:S22-7.
2. Al-Hajjaj MS. Difficult-to-treat asthma, is it really difficult? Ann Thorac Med 2011;6:1-2.
3. Satkunam N, Siddiqi ZA, Vethanayagam D. Severe asthma associated with myasthenia gravis. Can Respir J 2014;21:e1-3.
4. Souza-Machado A, Ponte E, Cruz AA. Severe asthma associated with myasthenia gravis and upper airway obstruction. J Investig Allergol Clin Immunol 2007;17:267-70.
5. Weiner P, Ganem R, Weiner M. Unusual treatment for myasthenia gravis associated with asthma. Harefuah 1993;124:474-7, 527.
6. Montalbano MM, Bowman M, Stickler D. Myasthenia gravis presenting as restrictive lung disease. J Allergy Clin Immunol 2006;117:S281.
7. Aktas A, Rojas E, Parikh HA, Pergament K. Myasthenia gravis crisis coinciding with asthma exacerbation in a patient with recent heroin use: three causes of acute hypercarbic respiratory failure. BMJ Case Rep 2018;2018:bcr2018224176.
8. Echaniz-Laguna A, Pistea C, Philippi N, Enache I, Oswald-Mammosser M, De Sèze J, *et al*. Asthma as a cause of persistent dyspnea in treated myasthenia gravis patients. Eur Neurol 2012;68:300-3.

Access this article online

Quick Response Code:

Website: www.lungindia.com

DOI: 10.4103/lungindia.lungindia_433_19

How to cite this article: Shahul HA, Manu MK, Mohapatra AK. Steroid dependence in acute asthma due to myasthenia gravis. Lung India 2021;38:496-8.