Low-Dose and Short-Term Corticosteroid Therapy for Aspiration-Induced Lung Injury in an Elderly Patient with Alzheimer's Disease

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ABSTRACT

Backgrounds: Despite the clinical importance of aspiration pneumonitis, the underlying mechanisms responsible for progression to severe inflammation are not fully understood. Thus, optimal treatment is now debated. Especially, whether corticosteroids are indicated or not depends on the situations. We experienced an Alzheimer's Disease patient with aspiration-induced lung injury who responded to low-dose and short-term corticosteroid therapy.

Case presentation: The patient was an 85-year-old man who was diagnosed with Alzheimer's disease 5 years prior to the current episode. He was administered memantine 20 mg/day and has become somnolence. He had high fever and poor appetite 2 days prior to this admission. On admission, initial arterial blood gas analysis under CPAP 5 cmH₂O and FiO₂ 0.4 conditions showed a PaO₂/FiO₂ of 166 mmHg, which indicated the moderate grade in acute respiratory distress syndrome (ARDS). The patient was diagnosed with acute lung injury due to aspiration pneumonitis based on the observation of the ground glass opacity findings during computed tomography scanning. We administered 125 mg/day methylpredonisolone for 3 consecutive days. Surprisingly, at hospital day 4, his dyspnea markedly improved and oxygen inhalation did not need to maintain oxygenation.

Conclusions: Physicians should be aware of the aspiration risk for elderly people treated with memantine. Low-dose and short-term corticosteroid therapy may have an impact on the management in aspiration-related lung injury. The presence of a ground glass opacities pattern can alert the physician that the patient may respond positively to corticosteroid therapy.

KEY WORDS

Alzheimer's disease, aspiration pneumonitis, ground glass opacities, low-dose corticosteroid therapy, memantine

INTRODUCTION

Aspiration of oropharyngeal or gastric contents flowing into the lower respiratory tract may result in several severe pulmonary diseases such as aspiration pneumonitis. Life threatening acute lung injury might occur in about 1/3 of the aspiration pneumonitis patients. Despite the clinical importance of gastric aspiration-induced lung injury, there is still a lack of convincing data about the effective therapy, especially about the efficacy of corticosteroids. We experienced an elderly patient with aspiration-induced lung injury who responded to low-dose and short-term corticosteroid therapy.

CASE PRESENTATION

The patient was an 85-year-old man who was diagnosed with Alzheimer's disease 5 years prior to the current episode. He was administered memantine 20 mg/day and has become somnolence. He complained of nocturnal dry cough without any treatment. He had high fever and poor appetite 2 days prior to this admission. He was given intravenous meropenem by his attending physician for empiric treatment of aspiration pneumonia. He was immediately put on oxygen by mask. However, he developed respiratory failure and was transferred to the emergency department of our hospital. On admission, we immediately introduced non-invasive positive pressure ventilation and maintained at the level of 5 cmH₂O continuous positive airway pressure (CPAP). Arterial blood gas analysis under CPAP 5 cmH₂O and FiO₂ 0.4 conditions showed a pH of 7.490, a Pco₂ of 36.5 mmHg, a Po₂ of 66.4 mmHg, and a PaO₂/FiO₂ of 166 mmHg, which indicated the moderate grade in acute respiratory distress syndrome (ARDS). Physical examination revealed fine crackles in the right lung. The patient was diagnosed with acute lung injury due to aspiration pneumonitis based on a poor blood oxygen concentration and the observation of the ground glass opacity findings over a broad range of right lung field during computed tomography (CT) scan (Figure 1). We administered 125 mg/day methylpredonisolone for 3 consecutive days. Surprisingly, at hospital day 4, his dyspnea markedly improved and oxygen inhalation did not need to maintain oxygenation. At this time, arterial blood gas analysis with the patient breathing ambient air conditions showed a pH of 7.485, a Pco₂ of 37.6 mmHg, a Po₂ of 89.6 mmHg, and an oxygen saturation of 94%. We performed following chest CT scan at hospital day 7 and confirmed that markedly decreased extent of pulmonary opacities (Figure 2). Sputum culture revealed no pathogen.

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DISCUSSION

The role of memantine as a treatment for Alzheimer's disease has been controversial. In clinical trials, a high dropout rate and numerous adverse events associated with memantine have been observed. Especially, it did increase the risk for somnolence. Physicians should be aware of the aspiration risk for elderly people treated with memantine.

Several pulmonary syndromes such as aspiration pneumonia and aspiration pneumonitis may occur after aspiration, depending on the amount and nature of the aspirated material, the frequency of aspiration, and the host's response to the aspirated material. Aspiration pneumonitis is a chemical injury caused by the inhalation of sterile gastric contents, whereas aspiration pneumonia is an infectious process caused by the inhalation of oropharyngeal secretions that are colonized by pathogenic bacteria. Although there is some overlap between these syndromes, they are distinct clinical entities. Aspiration pneumonitis is a chemical injury from acute inflammation that occurs after chemical burns in the airways and lung parenchyma. In aspiration pneumonitis, antibiotic therapy is not always necessary. Patients who have aspirated massive gastric materials may present with dramatic signs and symptoms such as wheezing, coughing, dyspnea, cyanosis, pulmonary edema, and hypoxia. Any of these signs or symptoms could rapidly progress to severe respiratory failure. Despite the clinical importance of aspiration pneumonitis, the underlying mechanisms responsible for progression to severe inflammation and acute lung injury are not fully understood. Thus, optimal treatment is now debated. Especially, whether corticosteroids are indicated or not depends on the situations. The role of corticosteroids in managing acute lung injury due to the aspiration pneumonia remains uncertain because of insufficient scientific evidence to provide clinicians with clear and robust guidance. High-dose and long-term corticosteroid therapy can cause serious side effects such as new infection, hyperglycemia and gastrointestinal bleeding, even though its anti-inflammatory effect. However, a systematic review and meta-analysis showed that the use of low-dose corticosteroids was associated with improved mortality and morbidity outcomes without notable side effects. The occurrence of adverse events did not differ between the patients treated with and without the low-dose and short-term corticosteroid therapy. Recently, it is reported that patients with ground glass opacities pattern in chest CT images responded better to corticosteroid therapy than those who did not present that radiologic pattern. The ground glass opacities were defined as increased pulmonary attenuation, with preserved bronchial and vascular margins. Our patient responded to corticosteroid therapy because he showed massive ground glass opacities by chest CT images.

CONCLUSIONS

We presented an Alzheimer's disease patient suffered from acute respiratory distress by memantine treatment, in which low dose corticosteroid therapy attenuated aspiration-induced respiratory insufficiency. Physicians should be aware of the aspiration risk for elderly people treated with memantine because it did increase the risk for somnolence. Low-dose and short-term corticosteroid therapy has an impact on the management in aspiration-related lung injury. The presence of a ground glass opacities pattern on CT can alert the physician that the patient may respond positively to corticosteroid therapy. Thus, chest CT images are crucial for treatment of aspiration pneumonitis. Consequently, in future studies to elucidate the role of corticosteroids in aspiration-related lung injury, it should be taken into account the optimal dose and duration of corticosteroid therapy.

REFERENCES