1. Introduction

Endobronchial masses are often grouped into inflammatory, malignant or autoimmune in etiology primarily consisting of lipomas, papillomas, squamous/adenocarcinomas, lymphomas, amyloidosis, carcinoids, and infectious masses such as tuberculosis. It is equally important to acknowledge masses from a viral origin such as herpes, cytomegalovirus, epstein-barr and human papillomavirus as these are medically treatable conditions. We report a case of an endobronchial mass obstructing the right main stem bronchus positive for HSV I and HSV II, demonstrable on biopsy and immunohistochemistry.

2. Hospital course

A 78 year old female with a past medical history of COPD, hypertension, hyperlipidemia, prior CVA, uterine cancer s/p hysterectomy, was brought to the emergency room for altered mentation for two days. She was found to have a urinary tract infection with resultant septic shock and was admitted to the medical intensive care unit (MICU). She was intubated for airway protection secondary to her encephalopathy. Initial chest xray done showed volume loss and atelectasis on the right lower lobe. She was treated with intravenous (IV) antibiotics and pressor support. During her ICU stay, she developed renal failure requiring dialysis. She was liberated from mechanical ventilation on day eight of her hospitalization and was subsequently transferred to the medical floor.

Two days later, she was found to be in acute hypercapnic, hypoxic respiratory failure. Chest XRAY revealed total opacification of the right lung with hazy infiltrates in the left lung raising concern for right sided airway obstruction secondary to mucus plugging. (Fig. 1). The patient was re-intubated and placed on mechanical ventilation. A bedside bronchoscopy was performed, which revealed bloody secretions in the trachea above the carina as well as a lobulated mass obstructing the right main stem bronchus. (Fig. 2A and Fig. 2B). Differentials at the time included papillomas, lipomas, squamous cell or adenocarcinomas. The mass was biopsied and sent for histological analysis. The patient also had a CT scan of the neck, chest, abdomen, and pelvis which showed a collapsed right lung with right endobronchial soft tissue. (Fig. 3). Left lung showed areas of ground glass attenuation, patchy peribronchial consolidation and interlobular septal thickening. (Fig. 4). The biopsy from the first bronchoscopy showed an organizing blood clot with rare benign bronchial epithelial cells. Tracheal aspirate cytology was negative for malignant cells. A second biopsy taken during a subsequent bronchoscopy demonstrated a herpetic ulcerated benign respiratory mucosa with focal atypia, extensive fibrin deposition and detached fibrinopurulent exudate. Cytology showed fibrinous deposition. Immunostaining demonstrated HSV I and HSV II intra-nuclear inclusions. (Figs. 5–7). Bronchial wash cultures grew only Candida tropicalis. During this time, the patient’s family decided to transition the patient to comfort care. Thus, all medical treatment and further work up was halted.

3. Discussion

Herpes simplex (HSV) is a DNA virus that is part of the Alpha-herpesviridae family. HSV I is transmitted orally or via other infected
body fluids and HSV II is transmitted through sexual contact. Infections are usually asymptomatic or present with varying severity in patients that may be immunocompromised. There can be isolated or extensive involvement in the body including sites like the brain, lungs, skin, eyes, oral cavity or genitalia. The pathophysiology behind herpes infection involves entry of HSV through direct contact with breaks in mucous membranes and activation of toll-like receptors which initiates a complex cascade of DNA production and viral replication.

Herpetic endobronchial masses are rare, but must be on the differential when investigating endobronchial masses, as prompt treatment with acyclovir can decrease mass size. Not only can it decrease mass size, but it has also been described that treatment of herpetic endobronchial masses with acyclovir can even reverse the mass [1].

In one prospective observational study, it shows that HSV pneumonia is common in patients that are ventilated for greater than five days, even in non immunocompromised individuals [2]. Another study which involved 45 patients in a randomized, double blinded trial observed the prophylactic use of acyclovir in ventilated patients with ARDS. It showed that though a significant number of patients did not develop herpes simplex pneumonia with prophylactic acyclovir, it also did not alter the overall mortality or respiratory support required [3]. The incidence of HSV pneumonia is relatively unknown. Bryunseels et al.’s study shows HSV incidence of 22 % in the upper respiratory tract and 16 % in the lower respiratory tract of critically ill patients [4].

Theories for the development of the endobronchial mass and herpes simplex pneumonia could involve translocation of latent virus from oral cavity into the lower airways during the process of intubation. It is known that herpes simplex virus can remain latent in the trigeminal ganglion for several years after infection. Additionally, viral reactivation can occur in critically ill subjects and prophylactic acyclovir administration must be considered especially in intubated patients [1].

Sputum cultures obtained on our patient did not grow herpes which exemplifies the importance of having this type of infection on the differential from the get-go in order to obtain appropriate serologic testing from the start. CT imaging can also aid in the diagnosis by demonstrating typical findings seen in herpes pneumonia such as “multifocal peribronchial consolidations with air bronchograms, ground glass attenuation, and interlobular septal thickening” [5] which were seen in our patient in the uncollapsed left lung.
4. Conclusion

In summary, the importance of early diagnosis of these types of pneumonias and their associated lesions is vital to early treatment. This is especially true in high risk groups such as intubated patients in the ICU with multiple comorbidities and prolonged intubation. Though literature has not shown any benefit in mortality from acyclovir treatment of herpes simplex pneumonia, the mortality benefit of treating endobronchial herpetic masses is yet to be studied. The prophylactic and/or therapeutic treatment of herpes simplex pneumonia or herpetic endobronchial masses must continue to be studied in order to protect the subset of intubated patients that are at high risk for contracting this infection. In our case, the endobronchial mass led to sudden decompensation and a cascade of other events and complications. Thus, further studies are required on the role of acyclovir in not only preventing herpes simplex pneumonias, but perhaps also their role in preventing endobronchial masses in intubated patients leading to better airway ventilation and decreased adverse events.

**Declaration of competing interest**

We do not have any conflicts of interest to disclose.

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Fig. 5. Immunostaining demonstrating HSV I and HSV II intranuclear inclusions.

Fig. 6. Immunostaining demonstrating HSV I and HSV II intranuclear inclusions.

Fig. 7. Immunostaining demonstrating HSV I and HSV II intranuclear inclusions.