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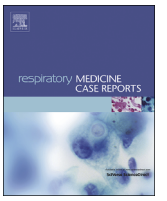

Case Report

Never too old: A case of fatal epstein barr virus pneumonia in an immunocompetent adult

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ABSTRACT

A 67-year-old immunocompetent male with COPD on supplemental oxygen presented with shortness of breath and was initially treated for bronchitis exacerbation with initial suspicion of bacterial pneumonia. He was later found to have EBV pneumonia diagnosed via positive EBV on bronchoalveolar lavage PCR. Severe lung involvement has been rarely reported in context of acute EBV infection. Treatment for this entity has not yet been established, with few reports of acyclovir and steroid use. This report describes the presentation, diagnosis, and treatment of acute EBV pneumonia.

1. Background

Epstein-Barr virus (EBV) is a member of the herpesvirus family and is one of the most common viruses in humans. It is estimated that over 90 % of adults have been infected with EBV at some point in their lives [1]. Detection of EBV infection is typically most effective through serological testing (see Table 1). EBV is known to cause infectious mononucleosis (IM), a condition characterized by fever, sore throat, swollen lymph nodes, and fatigue. IM is usually self-limiting and resolves within a few weeks, but in some cases, it can lead to more serious complications such as superimposed bacterial pneumonia. EBV pneumonia is a rare but serious complication of EBV infection. It occurs when the virus infects the lungs, causing inflammation and damage to the lung tissue [2]. EBV pneumonia is more common in immunocompromised individuals, such as those with HIV/AIDS, organ transplant recipients, and patients undergoing chemotherapy. However, it can rarely occur in otherwise healthy individuals.

2. Case report

A 67-year-old male with a history of chronic obstructive pulmonary disease (COPD) on supplemental 2L oxygen, tobacco use (> 50 pack years), atrial fibrillation post-cardioversion on warfarin, and a remote motor vehicle accident (MVA) with splenic repair/embolization presented with progressive shortness of breath, fever, and chills. He reported a history of present illness beginning 10–11 days prior with general malaise and gradually worsening dyspnea, fever, and dry cough. He had received the influenza vaccination two weeks prior and worked as an appliance repairman. He had 2 previous hospitalizations during the past few months, initially being for new onset atrial fibrillation and cardioversion and lastly being one month prior to presentation for presumed COPD exacerbation and atrial fibrillation with a rapid ventricular response. He received azithromycin and ceftriaxone and rate control with IV diltiazem.

In the emergency department, he was tachycardic with a heart rate of 124 bpm, blood pressure stable at 125/76 mmHg, febrile at 39.3 Celsius, and placed on 4L oxygen. Initial blood work was significant for elevated lactic acid of 2.7 mmol/L, AST/ALT 71/93

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Table 1
A validating cohort study assessed the sensitivity and specificity of 6 commercial test kits for detection of Epstein- Barr virus-specific antibodies (EBVCA and EBNA) [5].

Test	Sensitivity	Specificity
Monospot test	**87 %**	**91 %**
EBV IgM, IgG	**97 %**	**94 %**
EBNA	**97 %**	**94 %**
EBV PCR (BLOOD)	**75 %**	**95.5 %**

units/L, WBCs of 3.8 k/uL with 9.1 % lymphocytes, low platelets of 111k/uL and an INR of 3.4, but a negative respiratory viral panel. EKG showed sinus tachycardia with frequent premature ventricular complexes at a ventricular rate of 127 bpm. Physical exam was significant for expiratory wheeze and decreased air entry bilaterally.

Chest x-ray (Fig. 1) and chest Computed Tomography (CT) scan (Fig. 1) showed left basilar atelectasis and new infiltrates throughout the posterior right upper lobe, middle lobe, and posteromedial right lung base. He was admitted to the regular floors, and treatment included nebulizers, diltiazem, levofloxacin 750 mg, and prednisone 40 mg, with a presumptive diagnosis of bronchitis exacerbation with pneumonia. Over the night, his respiratory status worsened as he required a high-flow nasal cannula and thus was upgraded to the ICU. Arterial blood gas showed a pH of 7.47 with a pCO2 of 30.1 mmHg and pO2 of 78.3 mmHg. Antibiotics were broadened to include vancomycin and ceftriaxone with levofloxacin transitioned to azithromycin due to his recent history of receiving antibiotics. His hypoxic respiratory failure worsened; therefore, he was intubated and placed on ventilatory support by day 3 of admission.

A repeat CT chest abdomen pelvis (Fig. 2) revealed worsening interstitial pulmonary edema with an increase in dependent atelectasis and consolidation, especially throughout the dependent right lung, reactive mediastinal lymphadenopathy, and splenomegaly.

Infectious diseases were consulted and recommended to discontinue antibiotics except for azithromycin until the legionella antigen returns. The interstitial nature of the infiltrates and scant sputum was felt to suggest a viral etiology. A nasopharyngeal washing swab with respiratory viral culture was obtained. His Monospot test was positive, so a repeat was sent with specific serology for Epstein-Barr virus (EBV Viral capsid antigen (VCA) IgM and EBV VCA IgG returned positive), CMV blood PCR (negative), and HIV Ab/Ag screen (negative) since this virus can also cause atypical lymphocytes and liver enzyme elevation. His hemodynamic status worsened as he required vasopressors support, believed to be secondary to his sepsis, with an echocardiogram showing an ejection of 65 % with no other significant cardiac abnormalities.

A bronchoscopy done on day 7 of admission revealed a copious amount of thick tannish colored secretions with no apparent endobronchial lesions or bleeding or foreign bodies. Fluid was sent for manual count, bacterial cultures, EBV PCR, and fungal panel from the bronchoalveolar lavage (BAL). He was later found to have positive EBV on bronchoalveolar lavage PCR and light growth Methicillin-Resistant *Staphylococcus aureus* on the bacterial culture of bronchial wash, and a positive fungal culture for Aspergillus fumigatus was later isolated. On day 8 of admission, his condition continued to deteriorate, and after a discussion with the family regarding

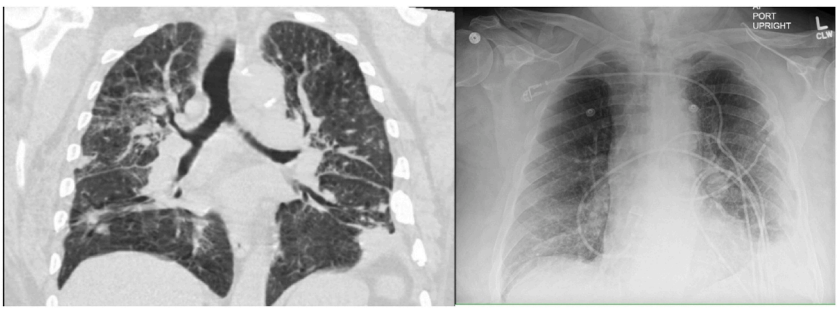

Fig. 1. Chest x-ray and Coronal section of Computed Tomography of the chest showed left basilar atelectasis and new infiltrates throughout the posterior right upper lobe, middle lobe, and posteromedial right lung base.

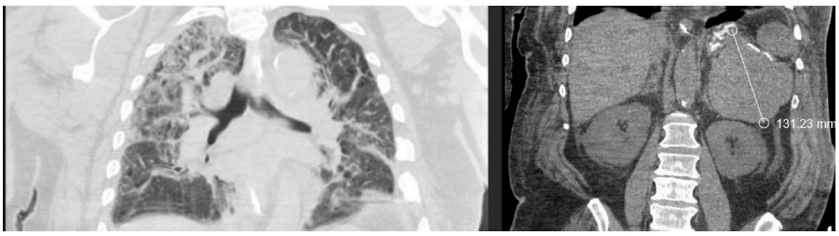

Fig. 2. Coronal section of Computed tomography of the chest abdomen and pelvis revealed worsening interstitial pulmonary edema with an increase in dependent atelectasis and consolidation, especially throughout the dependent right lung, reactive mediastinal lymphadenopathy, and splenomegaly.

goals of care, they decided, per his past wishes, not to escalate care. He passed away on day 9 of admission. Cytology for the BAL returned negative for malignant cells; however, it revealed a few benign bronchial cells, squamous cells, and macrophages. There is a focus on fungal hyphae showing acute angle branching. These fungi are of uncertain identity and clinical significance.

3. Discussion

This case highlights the importance of recognizing EBV as a potential cause of the severe respiratory syndrome and can present as a nidus for superimposed infections. The early use of antiviral and immunoglobulin treatments has yet to be extensively studied, and only case reports have been described in treatment.

EBV pneumonia is a rare but potentially life-threatening complication of EBV infection. It occurs when the virus infects the lung tissue and causes inflammation and damage to the respiratory system. There is a paucity of reports describing EBV pneumonia in immunocompetent patients [3]. In our case, the patient has had previous hospitalization where he was placed on short-term steroids for COPD exacerbation and on a 3-day course of oral prednisone along with one day of IV 60 mg of methylprednisolone during this course for presumed COPD exacerbations. He has had no testing of EBV in the past and had previous splenic repair due to a remote MVA. His spleen appeared enlarged with deformity and capsular calcification, suggesting prior splenic injury on previous scans; however, he was not recognized as immunocompromised. He did have advanced COPD seen on an earlier CT scan of the chest, with diffuse bullous emphysema seen throughout. The prominent features seen in EBV pneumonia are severe hypoxemia, lymphadenopathy (mediastinal and hilar), and interstitial edema [4]. Early recognition of complicated EBV infection is crucial as treatment described in the literature, which has yet to be established in the literature and practice involves initially anti-retroviral therapy with ganciclovir or acyclovir and later treatment with methylprednisolone (40 mg, once a day) and immunoglobulin (400 mg/kg, once a day) [6,7]. Another case report has described using acyclovir and polyclonal immunoglobulins in the early phase and corticosteroids in the late stage in treating ARDS, complicating EBV pneumonia [8]. It is important to note that treatment with antiretroviral has been shown to inhibit replication of EBV and decrease the genome copies following treatment; however, it does not affect the episome of EBV, therefore, requiring prolonged treatment [7]. Further data is to be done to shed additional light on the use of antiretroviral therapy in EBV pneumonia.

4. Conclusion

Severe lung involvement in the setting of acute EBV infection is an unusual complication and is rarely reported. It is unclear whether lung involvement is the result of direct viral invasion of lung tissue, or it represents an immunological reaction, which makes it a diagnostic and therapeutic challenge [7]. Acyclovir combined with prednisolone has been shown to inhibit oropharyngeal EBV replication with limited evidence of complete recovery with treatment [9]. Some studies have reported successful use of acyclovir and polyclonal immunoglobulins [10,11].

Declaration of competing interest

None

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