

# Diffuse Alveolar Hemorrhage Secondary to Infective Endocarditis

Arnot Ogden Medical Center

Dr. Louis Riley; Dr. Hasasn Asghar, Dr. Shilpa Akula, Dr. Wesley Livingston, Dr. Zhezheng Li, Dr. Asad Nasir

## Introduction:

Diffuse alveolar hemorrhage (DAH) is a life threatening disease characterized by Neutrophilic infiltrations of the Alveolar Septa, which subsequently leads to necrosis, loss of capillary integrity, and hemorrhage into the alveolar space and interstitium. DAH is diagnosed by diffuse radiographic pulmonary infiltrates and progressively bloody aliquots in sequential bronchoalveolar lavage (BAL) samples. Diffuse alveolar damage (DAD), a cause of DAH, is characterized by edema of the alveolar septa and by formation of hyalien membranes that line the alveolar spaces. It has many causes such as any infectious process, including infective endocarditis.

Infective endocarditis has been seen in up to 13% of patients with Mitral Valve Regurgitation, including Mitral Valve Prolapse [1]. Diffuse alveolar hemorrhage has been seen in chronic and/or severe cases of mitral regurgitation resulting in usually a bilateral distribution, although there have been unusual causes of unilateral presentation. We present a case of bilateral diffuse aveolar damage without significant hemorrhage in a patient with acute mitral valve prolapse

## Case:

A 35 year old caucasian male with previous medical history of Hypertension and obesity came in due to shortness of breath. Patient was a stay at home dad with 15 pack year smoking history who stopped three years ago. He smoked a cornpipe twice a month and denied any vaping, marijuana or other illicit substance abuse. He had a history of asthma as a teenager. He denied ill contacts, history of TB or any previous occurrences of pneumonia. He had a pet dog and no pet birds.

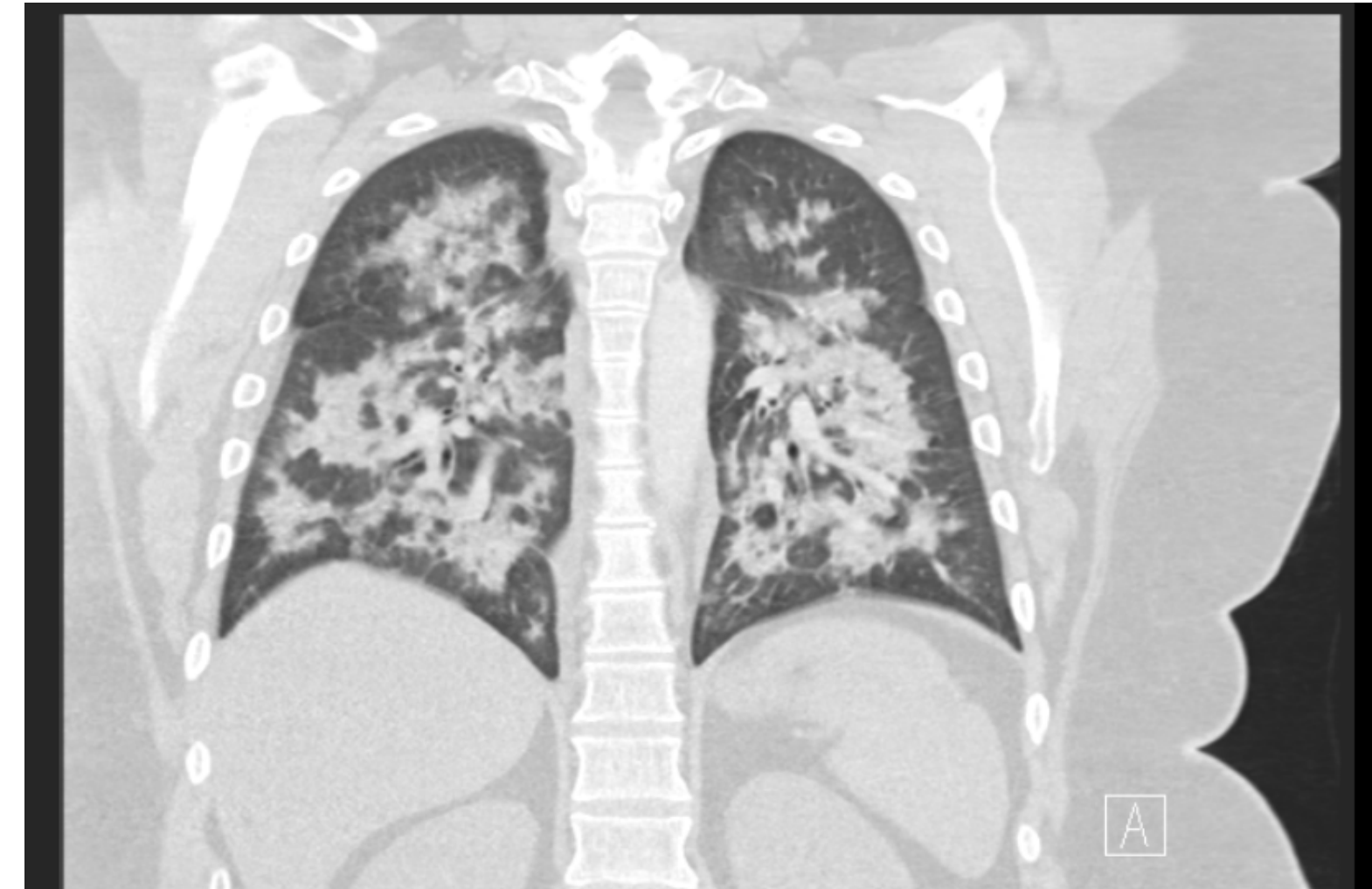
His Chest CT revealed atypical bilateral consolidates within the upper lobes as well as basilar consolidations which were concerning for diffuse alveolar damage. He progressively developed acute hypoxemic respiratory failure requiring supplemental oxygen via nasal canula and eventual intubation. He was started on high dose steroids with methylprednisolone , scheduled bronchodilator therapy as well as empiric antibiotic coverage.

Further workup revealed negative or unremarkable levels of ANA, dsDNA, C3, C4, Fungitell, Galactomannan, Calcitonin, ANCA, and TSH. His HIV levels and pneumonitis panel were also unremarkable. He had 2 positive blood cultures revealing MSSA. Echo revealed a mobile mass over the anterior mitral leaflet concerning for vegetation and associated with moderate to severe regurgitation.

Followup TEE was negative for vegetation. Bronchoscopy was performed during which diffuse alveolar hemorrhage was found and cleared through lavage. Fluid analysis was negative for any pathology or organisms. The patient met two major DUKE criteria of endocardial involvement as well as bacteremia.

Repeat echo revealed mitral valve prolapse necessitating mitral valve replacement. Prior to replacement patient's oxygen demands progressively improved maintaining his steroid therapy. After mitral valve replacement patient was extubated and his symptoms continued to progressively improve until discharge. On discharge patient required 2 Liters of oxygen to maintain saturations and was discharged on this.

## Imaging:



## Discussion:

Capillaritis caused by autoimmune diseases like systemic lupus erythematosus and anti-neutrophil cytoplasmic antibody associated vasculitis are the most common pathological findings of DAH. A review of 34 cases of histopathologically confirmed DAH indicate capillaritis occurred in 88% of occasions [2]. In such instances, treatment typically includes corticosteroids, immunosuppressive agents and occasionally plasmapheresis.

Therefore, DAH is likely to be associated with autoimmune diseases, erroneous treatment selection may occur. It must be remembered that DAH is due to various disorders and, although rare, infectious diseases may also cause DAH [[3], [4]]. For example, in immunocompromised patients, the main infectious diseases that cause DAH are cytomegalovirus, adenovirus, invasive aspergillosis, Mycoplasma, Legionella, and Strongyloides [5] In immunocompetent patients, the infectious diseases that most frequently are the reason behind DAH are influenza A (H1N1), dengue, leptospirosis, malaria, and Staphylococcus aureus infection [5].

According to our research, there has been few case reports of IE presenting as DAH [6]. It is presumed that small vasculitis occurs in the alveolar capillary, similar to an Osler nodule being formed in the fingertip with small vasculitis established by the immunological mechanism. This case underlines the importance of suspecting infectious diseases such as IE as an etiology of DAH. For this case, treatment for MSSA bacteremia was completed and he came back with vegetation in mitral valve, Dukes criteria of two major with positive blood cultures and endocardial involvement.

Although infective endocarditis is primarily treated conservatively with antimicrobial therapy, early surgical intervention is often mandatory when various complications arise. These include intractable heart failure, persistent uncontrollable infection, large mobile vegetations, peripheral embolism and prosthetic valve endocarditis. Optimal timing of surgical intervention in patients with infected heart valves results in reduced early and late mortality. In this case, patient was treated with antibiotics, MV replacement due to large mobile vegetation and uncontrollable infection.

In conclusion, we have here reported a case of DAH associated with IE. IE should be considered in the diagnosis of DAH cases since IE can prove to be lethal if diagnosis is delayed. If accompanied by signs of infection such as fever, it is important to obtain blood cultures for diagnosis

[1] <https://annals.org/aim/fullarticle/703313/mitral-valve-prolapse-causes-clinical-manifestations-management>

[2] Lara A.R., Schwarz M.I. Diffuse alveolar hemorrhage. Chest. 2010;137(5):1164–1171. [\[PubMed\]](#) [\[Google Scholar\]](#) [Ref list]

[3] Colby TV, Fukuoka J, Ewaskow S.P, Helmers R., Leslie K.O. Pathologic approach to pulmonary hemorrhage. Ann. Diagn. Pathol. 2001 Oct;5(5):309–319. [\[PubMed\]](#) [\[Google Scholar\]](#) [\[Ref list\]](#)6.Travis W.D., Colby TV, Lombard C., Carpenter H.A. A

[4] Travis W.D., Colby TV, Lombard C., Carpenter H.A. A clinicopathologic study of 34 cases of diffuse pulmonary hemorrhage with lung biopsy confirmation. Am. J. Surg. Pathol. 1990 Dec;14(12):1112–1125. [\[PubMed\]](#) [\[Google Scholar\]](#)

[5] von Ranke F.M., Zanetti G., Hochegger B., Marchiori E. Infectious diseases causing diffuse alveolar hemorrhage in immunocompetent patients: a state-of-the-art review. Lung. 2013 Feb;191(1):9–18. [\[PubMed\]](#) [\[Google Scholar\]](#)

[6] Wu H.C., Wen Y.K., Chen M.L., Fan C.S. Pulmonary-renal syndrome in a patient with bacterial endocarditis. J. Formos. Med. Assoc. 2005 Aug;104(8):588–592. [\[PubMed\]](#) [\[Google Scholar\]](#)