DIFFUSE ALVEOLAR HEMORRHAGE (DAH)

CATEGORIES

- Pulmonary capillaritis
- Diffuse alveolar damage (DAD)
- Bland pulmonary hemorrhage

Pulmonary capillaritis

Characterized by capillary structural damage resulting in hemorrhage into the alveolar space and interstitium.

- Systemic vasculitis
    - ANCA associated vasculitis (AAV)
        - Granulomatosis with polyangiitis (GPA)
        - Microscopic polyangiitis (MPA)
        - Eosinophilic granulomatosis polyangiitis (EGPA)
        - Drugs
            - Hydralazine
            - Propylthiouracil
            - Cocaine adulterated with levamisole
            - Others: minocycline, and anti–tumor necrosis factor agents
    - Connective tissue diseases (CTD)
- Pulmonary-renal syndromes
    - Anti-GBM - Goodpasture's disease
    - Pauci-immune glomerulonephritis
    - IgA nephropathy
- Other conditions such as isolated pulmonary capillaritis, infective endocarditis, ulcerative colitis, and others

Diffuse alveolar damage (DAD)

Histologically characterized by the presence of hyaline membranes which defines the presence of acute lung injury commonly seen in:

- ARDS
- AIP
- ILD acute exacerbation
- IIM specially DM-MDA5 +

Bland pulmonary hemorrhage

Characterized by hemorrhage into the alveolar spaces without inflammation or destruction of the alveolar structure.

- Elevated EDLVP usually associated with underlying bleeding disorders or ongoing anticoagulant therapy is the most common condition
- Idiopathic pulmonary hemosiderosis

DIAGNOSIS

When DAH is suspected the following labs should be requested

- CBC with differential
- Platelets, INR, PTT
- BCs, viral and PNA respiratory panel

- UA including examination for red cell casts
- ProBNP
- Bronchoscopy with sequential BAL with cultures, cell counts and Prussian blue staining
    - Findings consistent with DAH
        - Bloodier BAL
        - Hemosiderin-laden macrophages demonstrated by Prussian blue staining

When pulmonary capillaritis is suspected the following labs should be requested

- ANCA, PR3, MPO
- Anti-GBM antibodies
- ANA, anti-double-stranded DNA, anti-CCP, and RA
- Anticardiolipin antibodies and lupus anticoagulant
- Others
    - CTD markers depending on clinical suspicion guided by Rheumatology consultation
    - Consider anti-transglutaminase or anti-endomysial IgA antibodies if clinically indicated
        - The presence of anti-transglutaminase or anti-endomysial IgA antibodies may suggest the combination of celiac disease and pulmonary hemosiderosis

DAH without systemic findings

- Anti-GBM antibody disease (Goodpasture's disease) confined to the lung
- Isolated pulmonary capillaritis – ANCA-MPO positive or without autoantibodies
- Idiopathic pulmonary hemosiderosis

TREATMENT

Pulmonary capillaritis

- Intravenous pulse methylprednisolone (500 to 2000 mg in divided doses daily) for up to five days followed by transition to an oral preparation with gradual tapering and then maintenance.
    - Most common regimens are:
    - 1 Gr IV single dose in AM (less insomnia)
    - 250 mg IV q6h
- TXA 300 mg q8h by nebulization
- Management of underlying condition

DAD and bland are directed to underlying condition