|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **History/onset** | **Symptoms** | **Radiology** | **PFT/****catheterization** | **BAL** | **Histology (TB or surgical via VATS)** |
| **PEGS** | * \*Periengraftment
* G-CSF use
* More common in autoHCT
* Acute onset
 | * Fever
* \*Rash
 | * Diffuse infiltrates
 | * Not needed
 | * Neutrophil predominance
 | * Not needed
 |
| **DAH** | * \*Periengraftment
* Median 23 days
* Acute onset
 | * Dyspnea
* Cough
* Hypoxemia
* Often fever
* Rarely

 hemopthysis | * Bilateral areas of ground-glass attenuation or consolidation involving middle and lower lung zones
 | * Not useful
 | * \*Bloody
* Or greater than 20% hemosiderin-laden macrophages
 | * Diffuse alveolar damage with alveolar hemorrhage
 |
| **IPS** | * 21 to 65 days (range 0 to 1,600 days)
* Subacute onset
 | * Dyspnea
* Dry cough
* Fever
 | * Diffuse bilateral interstitial infiltrates
 | * Not useful
 | * Excludes infection
 | * TB will suffice
* Diffuse alveolar damage or
* Inters­titial pneumonitis
 |
| **PCT** | * 2 to 3 months
* Children
* GVHD
 | * Cough
* Chest pain
* Fever
 | * Peripheral nodules
 | * Not needed
 | * Excludes infection, in particular IFI
 | * VATS is optimal
* \*Occlusive vascular lesions and hemorrhagic infarcts
 |
| **BOOP** | * 2 to 12 months
* Acute onset
 | * Fever
* Dyspnea
* Dry cough
 | * Peripheral or peribronchovascular patchy infiltrate
 | * \*Restrictive
* Normal FEV1/FVC
* ↓DLCO
* ↓ TLC
 | * Excludes infection
* Lymphocyte predominance
 | * \*Peribronchiolar lymphocytic infiltration
* Fibrosis and granulation tissue in the lumen of the distal airways
 |
| **BO** | * Greater than100 days
* 6 to 12 months
* GVHD
* \*AlloHCT
* Insidious onset
 | * \*No fever
* Wheezing
 | * Normal
* Hyperinflation
* Air trapping
* Small airway thickening
* Bronchiectasis
* Pneumothorax in advanced cases
 | * \*Obstructive
* FEV1 less than 75%
* FEV1:FVC less than 0.7
* RV greater than 120%
* Normal or ↓DLCO
 | * Excludes infection
* Neutrophil predominance
 | * Intraluminal dense fibrosis
* Narrowing or obliteration of lumen of bronchioles
* No mononuclear cell infiltration in interstitial or alveolar tissue.
 |
| **VOD of lung** | * Male
 | * Dyspnea
* Syncope
* Rarely hemoptysis
 | * \*Septal lines
* Ground-glass opacities
* Lymph node enlargement
 | * DLCO less than 55%
* \*Pulmonary HTN
* Normal PCWP) (less than 15 mmHg)
 | * Occult alveolar hemorrhage
* Excludes infection
 | * Not recommended
 |

**Table I. Differences between pulmonary complications of hematopoietic stem cell transplantation**

**(complications are listed in an order of predicted onset)**

\*Most important factor in differential diagnosis

**Abbreviations:**

PEGS: periengraftment syndrome

DAH: diffuse alveolar hemorrhage

IPS: idiopathic pneumonia syndrome

PCT: pulmonary cytolytic thrombi

BO: bronchiolitis obliterans

BOOP: bronchiolitis obliterans organizing pneumonia

GVHD: graft-versus-host disease

IFI: invasive fungal infections

VOD: veno-occlusive disease of lung

TB: transbronchial biopsy

VATS: video-assisted thoracoscopic surgery

HTN: hypertension

TLC: total lung volume

RV: residual volume

PCWP: pulmonary capillary wedge pressure

DLCO: diffusion lung capacity for carbon monoxide

PFT: pulmonary function test

GCSF: granulocyte colony-stimulating factor