



# 2026 California Thoracic Society Annual Educational Conference & Chronic Obstructive Pulmonary Disease Symposium

Thursday March 12, 2026-Sunday March 15, 2026

Earn up to 19 CME/CEU/MOC Credits  
Jointly Provided by AKH Inc., Advancing Knowledge in Healthcare  
and the California Thoracic Society



PORTOLA HOTEL & SPA  
AT MONTEREY BAY

Thursday March 12, 2026 (6 CME/CEU/MOC Credits)

COPD Symposium

Friday March 13, 2026 (6.5 CME/CEU/MOC Credits):

Advances in Interventional Pulmonary, Remote Monitoring in Pulmonary and Sleep Medicine,  
Approach to Symptom Management in Chronic Lung Disease and Critical Care

Saturday March 14, 2026 (6.5 CME/CEU/MOC Credits)

Sepsis and Shock, Extracorporeal Membrane Oxygenation, Inpatient Pulmonary  
Complications of Cancer Care

Sunday March 15, 2026

Fellow and Resident Track Symposium



# Saturday March 14, 2026

## Advances in Management of the Patient with Sepsis

8:00 am – 8:10 am: Welcome and Introduction

8:10 am – 8:55 am: Keynote Address – Phenotyping and Personalized Medicine in Sepsis

- **Angela Rogers, MD (Stanford)** - This speaker will discuss phenotyping in the patient with sepsis and septic shock and how close we are to precision medicine in managing sepsis.

8:55 am – 9:20 am: Incorporating Artificial Intelligence Decision Making in Identifying Sepsis

- **Gabriel Wardi, MD (UC San Diego)** - This speaker will describe how artificial intelligence can be used to identify the septic patient before they present with end stage symptoms to impact care earlier in the course of illness.

9:20 am – 9:35 pm: Pro: The Severe Sepsis and Septic Shock Early Management Bundle (SEP-1) Bundle Saves Lives

- **Sean Townsend, MD (CPMC-Sutter)**- This speaker will argue the benefits of the SEP-1 Bundle/how it saves lives.

9:35 pm – 9:50 pm: Con: : The Severe Sepsis and Septic Shock Early Management Bundle (SEP-1) Bundle Does Not Save Lives

- **Natalie Achamallah, MD, MS (Cottage Health)** - This speaker will argue the against the SEP-1 Bundle/highlight its limitations.

9:50-10:00 am Question and Answer

10:00 am – 10:30 am: Break

## Extracorporeal Membrane Oxygenation

10:30 am – 10:55 am: When to refer to an ECMO center and when to deploy ECMO

- **Nida Qadir, MD (UC Los Angeles)** - This speaker will discuss the evidence behind the use of ECMO in patients with respiratory failure and when providers should consider referral to an ECMO center and when centers should use ECMO.

10:55 am – 11:20 am: What about ECMO to go?

- **Mazen Odish, MD (UC San Diego)** - This speaker will discuss the advent of mobile ECMO services, how they can help improve patient care, and the use of extracorporeal cardiopulmonary resuscitation.

11:20 am – 11:45 pm: Ventilator Strategies for the patient on ECMO

- **Abirami Kumaresan, MD (Cedars-Sinai)** - This speaker will discuss the how ventilator strategies may differ in the patient on ECMO and how different ECMO configurations impact which ventilator strategy to use.

11:45 pm – 12:10 pm: What you need to know about pediatric ECMO

- **Kathleen Ryan, MD (Stanford)** - This speaker will discuss the utility of ECMO in neonates and children, and the complexities of management in children who needs mechanical support.

12:10 pm – 12:20 pm: Question and Answer

12:20 pm – 1:20 pm: Lunch

## Hands-On Session:

1:20 pm – 2:20 pm: Non-Invasive Cardiac Output Monitors **Speaker Abirami Kumaresan, MD (Cedars-Sinai)** ECMO Machines **Mazen Odish, MD (UC San Diego)** ECMO Placement **David Gordon, DNP (UC San Francisco) & Brianna Zuckerman, NP (UC San Francisco)** Ventilator Settings and Portable ventilators **Joe Van Vleet, RT (UC Los Angeles) & Theresa Cantu, RT (Valley Children's)**

2:20 pm – 2:45 pm: Break

## Inpatient and Pulmonary Complications of Cancer Care

2:45 pm – 3:10 pm: Pulmonary Complications of Hematopoietic Stem Cell Transplantation

- **Husham Sharifi, MD (Stanford)** - This speaker will discuss the pulmonary complications that arise after HCT, in particular the development of bronchiolitis obliterans syndrome and approaches to management.

3:10 pm – 3:35 pm: Pulmonary Vascular Complications of Malignancy

- **Naomi Habib, MD (Norton Thoracic Institute)**- This speaker will discuss the Pulmonary Vascular Disease complications of malignancy including PA sarcoma, pulmonary tumor thrombotic microangiopathy, and medications that can cause PAH.

3:35 pm – 4:00 pm: Drug induced Interstitial Lung Disease and Pneumonitis During Cancer Therapy

- **Weijia Chua, MD (Stanford)** - This speaker will discuss the pulmonary complications of interstitial lung disease and pneumonitis that develop after chemotherapy and targeted immunotherapy

4:00 pm – 4:25 pm: Respiratory Complications of Acute Leukemia

- **Hugh Davis, MD (City of Hope)** - The speaker will discuss various oncologic emergencies, how they are recognized, and how they are managed in the acute setting.

4:25 pm – 4:35 pm: Question and Answer

5:30 pm – 7:30 pm: Trainee Poster Competition (NON-CME) – Food and beverages will be served






Naomi Habib began her career as an ICU nurse, transitioning eventually to medical school at the University of Arizona and residency at Creighton University/Phoenix. It was during her time there that she met and was inspired by mentors in pulmonary hypertension, and she ultimately chose PCCM with further specialized training in PH under the mentorship of Jeremy Feldman. She became codirector of the PH center at Arizona Pulmonary Specialists and recently joined the state's largest lung transplant program at Norton Thoracic Institute where she is helping to further develop their pulmonary hypertension clinical and research trial program.

# Pulmonary Vascular Complications of Malignancy

Naomi Habib  
Norton Thoracic Institute  
Phoenix, AZ



# Objectives

- Describe clinical clues that point to the diagnosis of PA sarcoma
- Compare and contrast PA sarcoma to CTEPH on imaging
- Identify the most common presentation of patients with pulmonary tumor thrombotic microangiopathy
- Discuss the classification of drugs linked to the development of PAH
- Identify 5 classes of chemotherapeutic agents and their effects on the pulmonary vasculature

# General Outline

- 1) Cancer of the pulmonary circulation
  - Primary intimal infiltration - PA Sarcoma
  - Embolic tumor obliteration - PTTM
- 1) Cancer therapies affecting the pulmonary circulation

# PA Sarcoma

- Subset of undifferentiated intimal sarcomas affecting the circulation, primarily affecting the intima and causing embolic seeding to peripheral organs.

- Systemic circulation

- Heart

- Pulmonary circulation (67%)

- Pulmonary arteries - 338 cases (as of 2023)

- Pulmonary veins - 2 cases (as of 2023)

# PA Sarcoma: Presentation

- Symptoms = dyspnea, cough, chest pain, hemoptysis, syncope.

Insidiousness is key (diagnosis delayed by 2-3 months)

Insidious in onset → pulmonary hypertension >> acute PE-like presentation

Clues to diagnosis

**Persistent pulmonary obstruction despite anticoagulation**

Incidental pathologic detection after PTE (1-4% of PTE cases)

# PA Sarcoma: Diagnosis

## Imaging

- CT

MRI = increased gadolinium enhancement of pulmonary sarcoma

PET scan = FDG-avid

## Imaging features

Rounded, bulged, lobulated

Forms acute angle with vessel wall

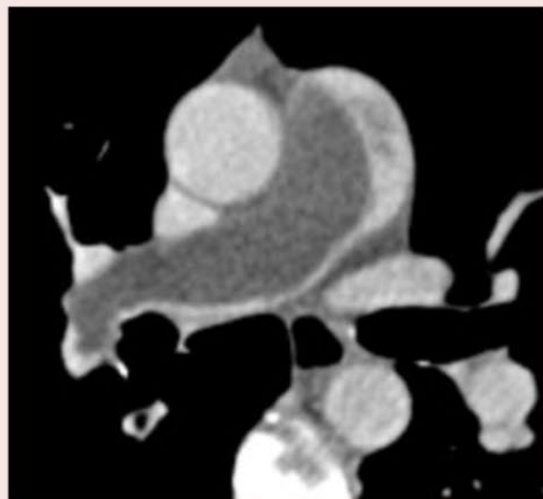
Molds to fill central lumen and often grows “backwards” into heart

Exhibits intralesional blood flow

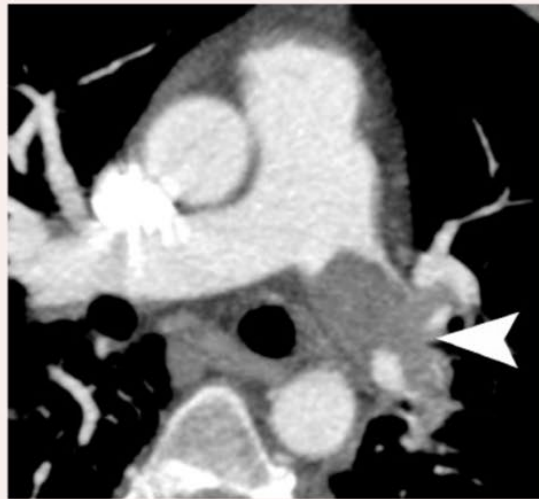
	<b>PULMONARY EMBOLISM</b>	<b>PULMONARY ARTERY SARCOMA</b>
<b>Location</b>	Lobar, segmental arteries	Main pulmonary artery R/L pulmonary artery trunks
<b>Appearance</b>		“Wall eclipsing sign” Sarcoma at acute angle to wall
<b>Vessel appearance</b>	Smooth	Irregular contour, dilated distal regions due to expansile growth
<b>Enhancement</b>	None	Mild/delayed
<b>Mediastinal appearance</b>	Normal	Often involved

# Intimal Sarcoma of the Great Vessels

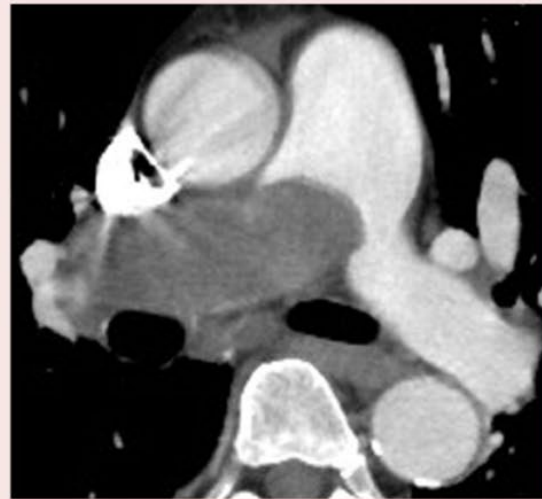
## Pulmonary Artery Sarcoma Imaging Findings



Broad-based attachment  
in central pulmonary artery



Acute margin with vessel wall



Wall eclipsing sign

# PA Sarcoma: Diagnosis

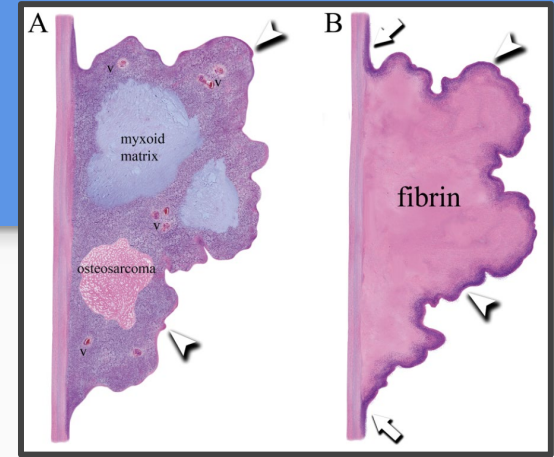
## ● Pathology

**Gross** = White to yellow polypoid mass, +/- hemorrhage and necrosis

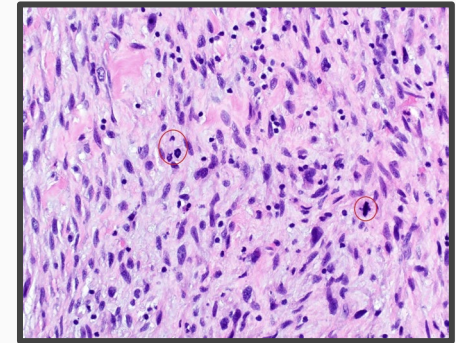
**Histo/Cytology** = Pleomorphic malignant spindle cells with hyperchromatic nuclei

**IHC** = not required for diagnosis.

**MDM2, CD31, SMA, Vimentin**



Ropp AM, Burke AP, Kligerman SJ, Leb JS, Frazier AA. Intimal Sarcoma of the Great Vessels. *Radiographics*. 2021 Mar-Apr;41(2):361-379.



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# PA Sarcoma: Treatment

- Neoadjuvant chemotherapy regimens

  - Epirubicin/doxorubicin

- Surgical resection - aggressive

  - Pneumonectomy, lobectomy, tumor resection

  - Tumor endarterectomy

- Multimodal approach increasingly being used

  - 2018 case series (12 cases, 2005-2016) - **8 months** survival (surgery or chemo) vs **28 months** survival (combination)

  - 2023 case series (20 cases, 2000-2021) - Survival from first initial diagnosis at 1, 3, 5, and 10 years was 85.0%, 49.1%, 49.1%, and 16.4%, with median survival **34 months** from diagnosis.

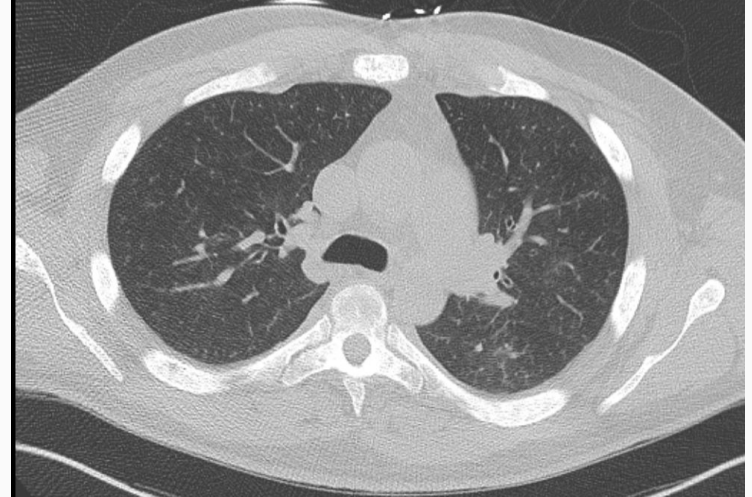
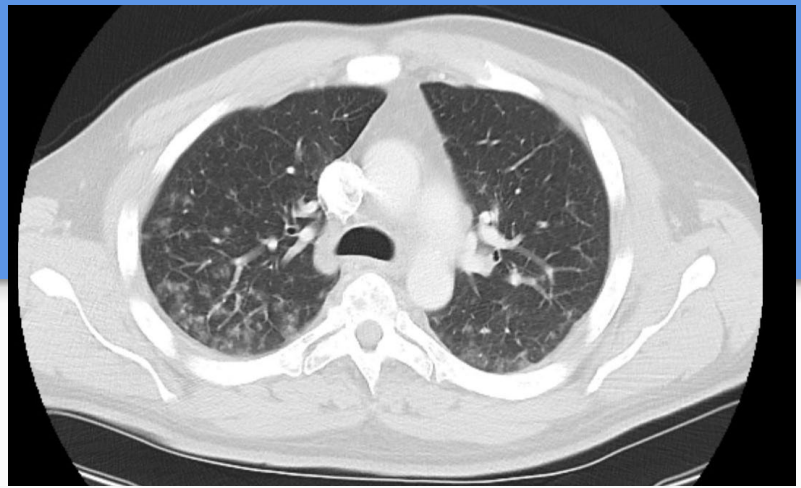
  - 2025 case series (31 cases, 2000-2024) - The 1-, 3-, and 5-year survival rates were 78.1%, 50.5%, and 19.9%, respectively, with a median overall survival of **44 months**.

# Case 1

- 52 yo M was transferred to our hospital with findings of PAH
    - PMH of RCC s/p partial nephrectomy in 2021
    - Undiagnosed malignancy 5 months earlier - ?recurrence vs new primary, with lytic bone lesions on PET scan, undifferentiated renal mass
- CC: 3 weeks of dyspnea, severe dry cough

# Case 1

- **Echo:** LVEF of 60 to 65%, moderate RA dilation, severe RV dilation, small pericardial effusion, RVSP 110 mmHg
- **CT chest (6 weeks prior):** Innumerable bilateral predominantly dependent ground-glass to partially solid nodules
- **CT chest (on admission):** Small areas of groundglass interstitial infiltrate and mild intralobular septal thickening. Small pericardial effusion
- **VQ scan:** negative



# Case 1

## ● Labs:

BNP 421→795, Hb 8.6, PLT 104→57

LDH undetectable, Haptoglobin 505

## Right heart catheterization

RA 8/8/6, RV 76/0, PA 75/36/50, PW 10, CO (TD) 4, CI (TD) 1.8, PVR 10

Vasodilator challenge: 77/37/52, PW 6, CO (TD) 4, CI (TD) 1.8, PVR 11.5

## DDx

PAH

PVOD

PTTM

# Case 1

- Cautious initiation of pulmonary vasodilators in stepwise fashion.  
Attempts to further characterize cancer limited by progressive hypoxia  
Rapid and progressive hypoxia → died on day 5 of admission

## Autopsy report:

Extensive lymphangitic carcinomatosis in the lung with mucin-producing signet ring cell carcinoma

Pulmonary tumor thrombotic microangiopathy - acute, organizing, late-stage arterial thrombi with a few plexiform lesions

Extensive involvement of both lungs with additional metastases to the pericardium and pericardial surfaces of the heart, bone, and peripancreatic lymph nodes

No evidence of renal cell carcinoma

# Pulmonary Tumor Thrombotic Microangiopathy

- Infiltration of pulmonary vasculature by seeded tumor cells from adenocarcinoma

Gastric adenocarcinoma most common

Symptoms: rapidly progressive dyspnea. Severe COUGH.

Chest CT: centrilobular nodules, cloudy peribronchial vessel capillaries, interlobular septal thickening

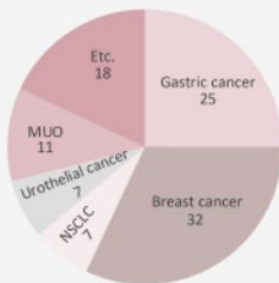
Common treatments: PH therapies, anticoagulation

# Pulmonary Tumor Thrombotic Microangiopathy

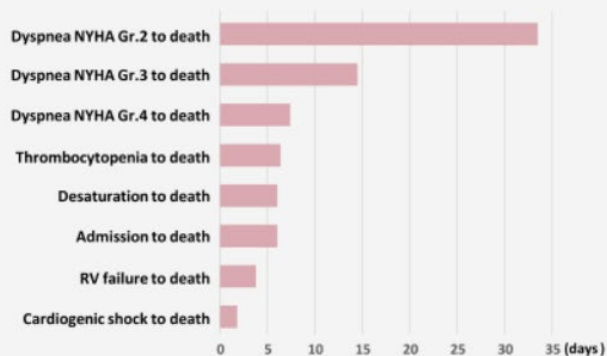
## Clinical course of suspected diagnosis of pulmonary tumor thrombotic microangiopathy A 10 -year experience of rapid progressive right ventricular failure syndrome in advanced cancer patients

From 2011 to 2021, 28 patients with clinically suspected PTTM with one biopsy confirmed case were derived from the one tertiary cancer

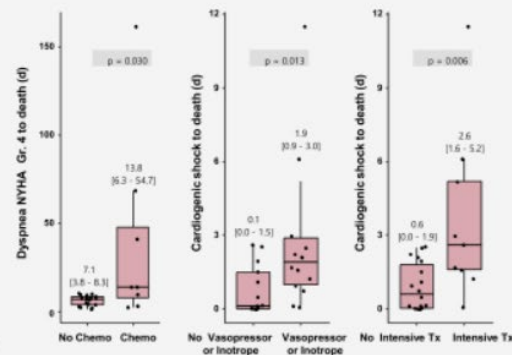
### Characteristics



### Disease Progression



### Treatment effects



### CONCLUSION

Rapid RV failure syndrome with suspected diagnosis of PTTM showed a rapid progressive course from symptom onset to death. Although chemotherapy was effective, increased life survival was negligible, and treatments other than chemotherapy did not help to improve the patient's prognosis.

	PTTM	PVOD	PA Sarcoma	CTEPH
<b>Pathophysiology</b>	Tumor embolization→diffuse intimal <b>pulmonary arteriole</b> obliteration	Fibrous intimal thickening/capillary proliferation→diffuse <b>pulmonary venule</b> obliteration	Primary <b>pulmonary arterial</b> intimal infiltration	Thrombus embolization→obstruction of medium- to large-sized <b>pulmonary arteries</b>
<b>Risk Factors</b>	Cancer (adenocarcinoma, gastric)	Cancer, Systemic sclerosis Akllyating agents, Organic solvents, tobacco EIF2AK4 gene		PEs Cancer (17% prevalence) APLA/SLE Splenectomy
<b>Symptoms</b>	Dyspnea, cough	Dyspnea	Dyspnea, cough, hemoptysis, chest pain	Dyspnea, cough, hemoptysis, chest pain
<b>Chronology</b>	Acute, rapidly progressive (days-weeks)	Chronic (months)	Chronic (months)	Chronic (months-years)
<b>Lab Findings</b>	Anemia, Elevated LDH, Elevated D-dimer	Elevated BNP	Elevated BNP	Elevated BNP
<b>Imaging</b>	GGOs, tree-in-bud opacities, nodules, mediastinal LN	Mosaic attenuation, centrilobular GGOs, septal thickening, pleural effusion	Main/left or right main PAs Wall eclipsing sign Acute angle of mass to vessel walls	Lobar/segmental PAs Webbing, beading inside vessels
<b>RHC</b>	Precapillary PAH	Precapillary PAH	Precapillary PAH	Precapillary PAH
<b>Additional diagnostic aids</b>	Biopsy	New-onset pulmonary edema after vasodilator initiation	Biopsy	Pulmonary angiogram

# Case 2

- 51 yo M with PMH of anal cancer for the past year presented with shortness of breath

Initial regimen: 5-fluorouracil, and Mitomycin-C (1 year ago)

Recent regimen: Carboplatin, Paclitaxel

Echocardiogram: Severely dilated RA/RV, systolic/diastolic septal flattening

CT chest: interlobular septal thickening, pleural effusions

Right heart catheterization (after diuresis): RA 3, RV 52/2, PA 54/18/30, PW 12, CO (TD) 3.7, CI (TD) 2.3, PVR 4.9

# Case 2

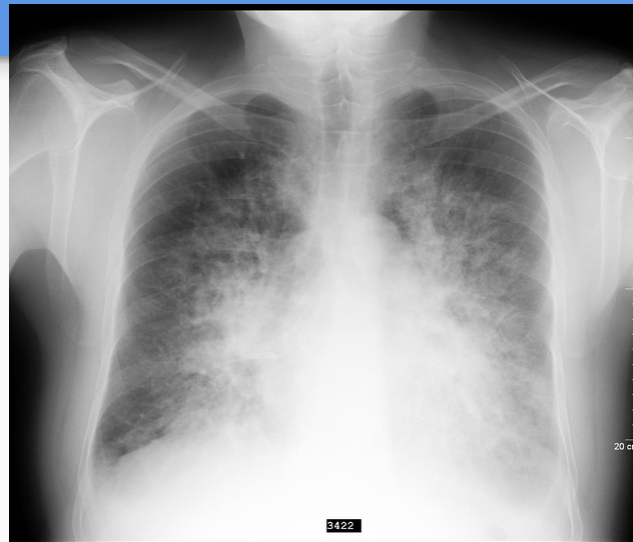
- ICU admission

Required pressors, high flow-nasal cannula 50 L/80%

Sildenafil started with improvement after in-depth discussion of risks.

Macitentan added → increased hypoxia, pulmonary edema 2 days later on chest X-ray

Transitioned to comfort care → passed at home 24 hours later



# Drug-Induced PAH

- Classification by WSPH 2024

- DEFINITE - based on data due to outbreaks, epidemiological case-control studies or large multicentre series

- POSSIBLE - suggested by multiple case series or cases with drugs having similar mechanisms of action

## Cancer therapeutics linked to PAH

- Alkylating agents - **mitomycin -C**

- Interferon therapies - alpha-interferon?

- Proteasome inhibitors - **carfilzomib**

- Tyrosine kinase inhibitors - **dasatinib**

- Immune checkpoint inhibitors - ?

- VEGF inhibitors - bevacizumab?

THERAPY		MECHANISM
<b>Alkylating agents</b> <i>Leukemias, Lymphomas, MM</i> <i>Breast, Lung, Ovarian, Brain, Prostate</i>	<b>Definite:</b> Mitomycin-C	Endothelial damage Pulmonary venous remodeling→ PVOD
	<b>Possible:</b> Melphalan, Busulfan, Cyclophosphamide	
<b>Interferon therapy</b> <i>Leukemias, Lymphomas</i> <i>RCC, Malignant Melanoma</i>	<b>Possible:</b> Alpha, Beta	Endothelin-1-mediated vasoconstriction, Thromboxane B cascade activation→Increased vascular permeability
<b>Proteasome inhibitors</b> <i>MM, Lymphoma</i>	<b>Definite:</b> Carfilzomib	Thrombotic microangiopathy
	<b>Possible:</b> Bortezomib	
<b>Tyrosine Kinase Inhibitors</b> <i>Leukemias</i> <i>Breast, Lung (NSCLC), RCC, HCC,</i> <i>Thyroid, GIST</i>	<b>Definite:</b> Dasatinib	Dasatinib: c-Src kinase inhibition→vascular proliferation, ROS→apoptosis Bosutinib, Ponatinib: Decreased eNOS expression
	<b>Possible:</b> Bosutinib, Ponatinib	
<b>Immune checkpoint inhibitors</b> <i>Lung, RCC, HCC, CRC, Bladder,</i> <i>Melanoma</i>	<b>Possible:</b> Atezolizumab, Nivolumab	?Multifactorial - Left sided cardiomyopathy, pneumonitis
<b>VEGF inhibitors</b> <i>Breast, Lung (NSCLC), RCC, HCC,</i> <i>CRC, Cervical, Brain</i>	<b>Possible:</b> Bevacizumab	

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