The first signs of VOD may alert you to the potential threat of progressing disease and life-threatening consequences:1

- Weight gain (>5%) a
- Hepatomegaly
- Rising bilirubin (>2mg/dL)

When VOD progresses in patients post hematopoietic stem cell transplant, mortality rates can exceed 80% in severe disease.2

a Based on Baltimore criteria. Modified Seattle criteria require a >2% weight gain from baseline.

VOD = veno-occlusive disease (also known as sinusoidal obstruction syndrome, or SOS).
THE FIRST 21 DAYS POST-HSCT ARE CRITICAL FOR VOD DETECTION\textsuperscript{1,3}

In a cohort of 271 patients who underwent the same reduced-intensity conditioning regimen, 24 patients developed hepatic VOD, with clinical and/or laboratory signs occurring a median of 3 days post-HSCT (range, 0 to 24 days)\textsuperscript{3}

In another cohort study of 355 patients...

\textbf{INCIDENCE OF SYMPTOMS IN SEVERE VOD PATIENTS}\textsuperscript{4}

Data reported in a cohort study of 355 patients post bone marrow transplantation to determine the incidence and clinical course of VOD. Patients were prospectively evaluated for VOD and risk factors for severe VOD were analyzed using logistic regression models. VOD developed in 190 patients, 54 of whom had severe VOD. VOD diagnosis was made based on modified Seattle criteria.\textsuperscript{4}

Although VOD most often appears within 21 days post-HSCT, onset can still occur later in a patient’s transplant journey, even after patient discharge\textsuperscript{1}

\textsuperscript{HSCT} = hematopoietic stem cell transplantation.
THE VOD PATHWAY IS COMPLEX AND POTENTIALLY LIFE-THREATENING\textsuperscript{1,5,6}

- VOD is thought to be triggered by activation and damage to the sinusoidal endothelial cells, which may lead to a series of events
  - Activation of inflammatory and coagulation pathways
  - Impairment of fibrinolysis
  - Clot formation and narrowing of the sinusoids

- Hepatic venous outflow is reduced, resulting in post-sinusoidal hypertension
  - In severe cases, reversal of portal venous flow and hepatorenal syndrome may occur, followed by multiorgan failure and death

Not all patients will develop progressive VOD.

ENDOTHELIAL AND HEPATOCYTE DAMAGE

TRIGGERING OF MULTIPLE PATHWAYS

THROMBOSIS

FIBRINOLYSIS

INFLAMMATION

CYTOSKELETAL STRUCTURE

SINUSOIDAL NARROWING

VOD
- Elevated bilirubin
- Hepatomegaly
- Weight gain
- Ascites
- Edema

PROGRESSIVE VOD
- Pleural effusion
- Cardiac failure
- Pulmonary failure
- Renal failure

DEATH
VOD is an unpredictable disease with the potential to rapidly progress.

Progressive VOD may result in life-threatening consequences, including multiorgan failure or even death.

Signs of VOD progression include timing of symptom onset, speed of symptomatic change, and severity of symptoms.⁴,⁷

Average symptomatic progression in VOD⁴,⁷

Time of onset of VOD and multiorgan failure is based on 190 patients from a prospective cohort evaluation of 355 consecutive patients. A diagnosis of VOD was made based on the occurrence of 2 of the following events within 20 days of transplantation: bilirubin >2mg/dL, hepatomegaly or right upper quadrant pain of hepatic origin, and sudden weight gain (>2% of baseline weight). No other explanation for these signs and symptoms could be present at the time of diagnosis.⁴,⁷

Be proactive in assessing VOD symptoms and disease progression.
**Mortality Rates Are Unacceptably High When VOD Progresses**

- VOD diagnosis is an iterative process, and the patient’s condition can rapidly progress from moderate to severe. In 2 studies that investigated the incidence of VOD after HSCT using different diagnostic criteria, 12.5% and 48% of cases progressed to severe disease.
- VOD mortality rates with severe disease have exceeded 80%. Multiorgan failure was the most frequent cause of death.
- In one study of 190 patients who developed VOD, the mortality rate for severe disease was approximately 10x and 4x higher than that for mild VOD and moderate VOD, respectively.

**As VOD progresses, mortality rates increase**

> **80%**

Mortality with severe VOD

Graphic for illustrative purposes only.

*Based on 19 studies (235 patients) that specifically determined mortality from severe VOD, as reported within a comprehensive meta-analysis of 135 studies performed between 1979 and 2007.*
Progressing symptoms of weight gain, hepatomegaly, and rising bilirubin may lead to life-threatening consequences

- Vigilance for the signs of VOD is imperative as it may progress rapidly and unpredictably
- When VOD progresses, mortality rates can exceed 80% in severe disease
- Symptom-related factors, such as timing of onset, speed of change, and severity, are thought to be predictive of progressive VOD and poor patient outcomes

To learn more about identifying progressive VOD, including the full diagnostic criteria, visit www.PROGRESSIVEVOD.com

References: