

Liver Complications After Transplant

**Celebrating a Second Chance at Life
Survivorship Symposium**

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Liver Complications after Bone Marrow Transplant: What Patients and Caregivers Should Know

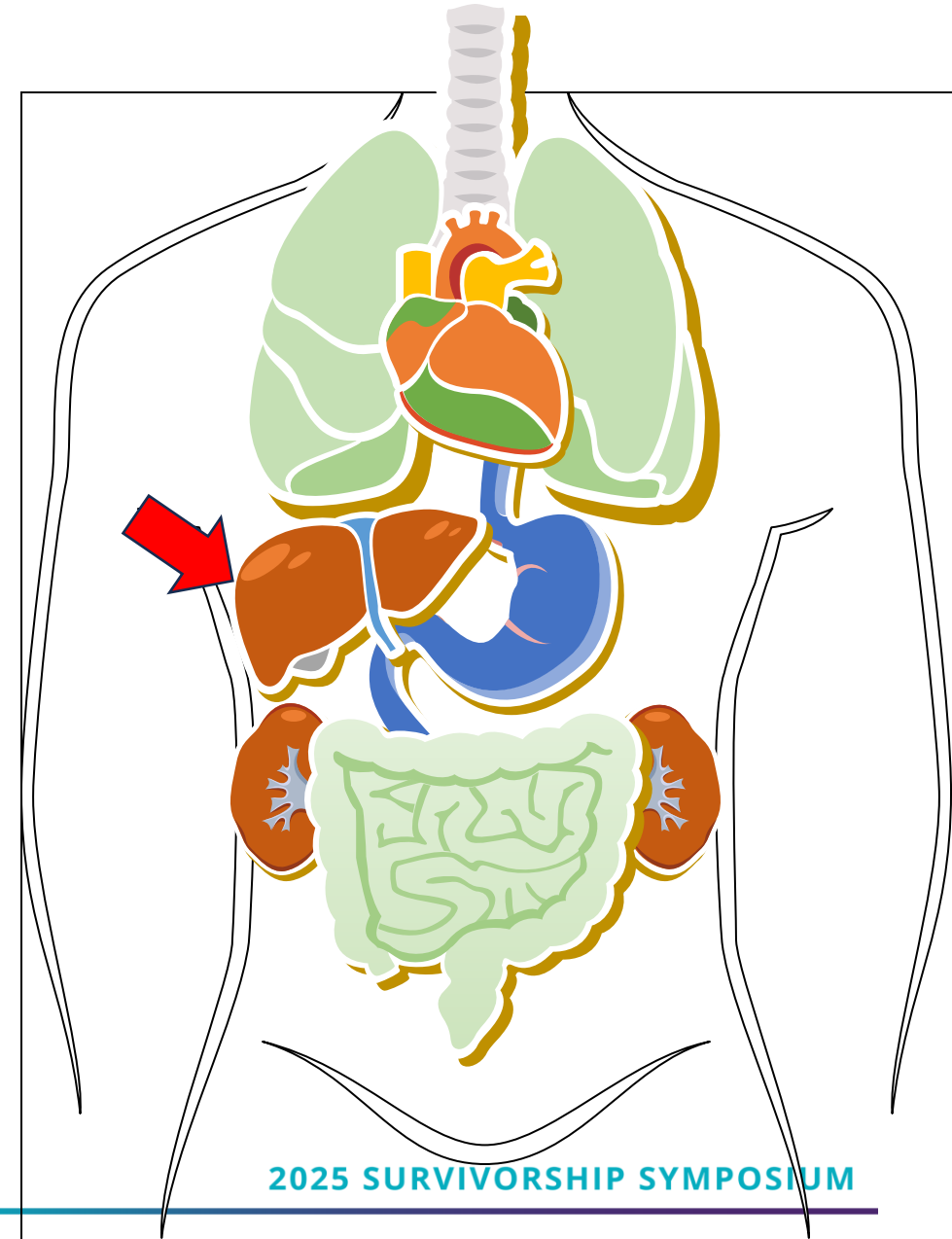
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Objectives

- Identify types and symptoms of liver complications that can occur post-transplant
- Recognize risk factors for liver complications post-transplant
- Understand outcomes and treatment of post-transplant liver-related complications

Why the Liver is Important?

- Filters toxins and waste from your blood.
- Helps digest food by producing bile, which breaks down fats.
- Stores energy in the form of sugar (glycogen) for when your body needs it.
- Makes proteins that help your blood clot and fight infections.



Post-BMT Liver Disease

Medication Induced

Graft Versus
Host Disease

Pre-existing
liver disease
(e.g., fat or iron
accumulation
in the liver)

Viral

Direct Liver
Injury

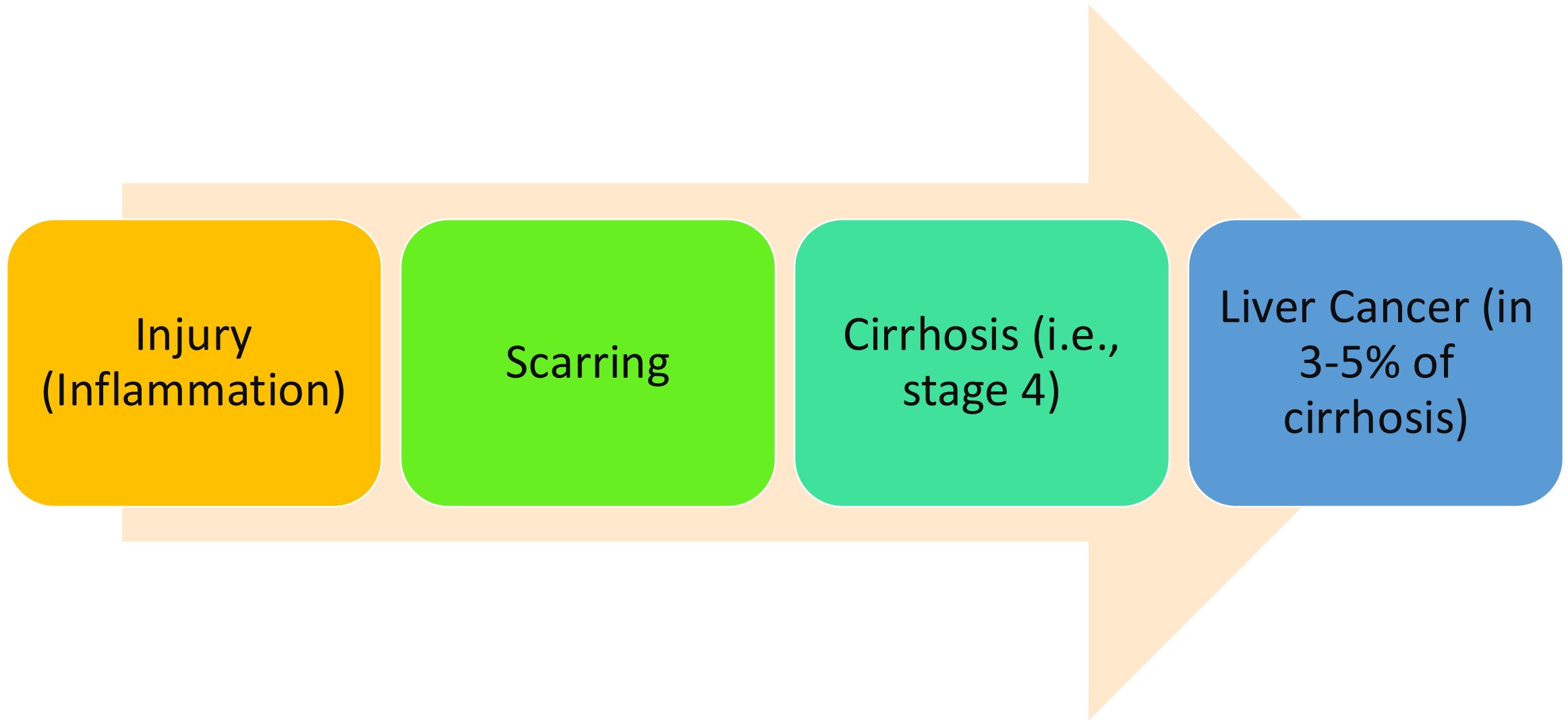
Blood flow
problem

Hepatitis
viruses
(A, B, C, E)

Cytomegalo
virus &
Others



Natural Course of Liver Disease



Symptoms of Liver Disease

STOMACH SWELLING (ASCITES)

Fluid builds up in the abdomen, causing discomfort and bloating.

YELLOWING OF EYES OR SKIN (JAUNDICE)

Bilirubin builds up in the blood, which occurs when the liver is not processing it properly.

CONFUSION (HEPATIC ENCEPHALOPATHY)

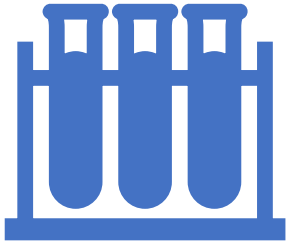
Toxins build up in the brain due to the liver's inability to filter waste.

VOMITING OR DEFECATING BLOOD

Blood backs up in the veins in the esophagus and/or anus, which then burst and bleed.



Testing Clues to Liver Disease (Diagnosis of Liver Disease)



Blood tests: Elevated Liver enzymes and/or bilirubin



Anormal Imaging: Ultrasound, CT scan, MRI, and Elastography



Liver biopsy



Medication (Drug) Induced Liver Injury: DILI

- **Mechanism:**
 - Injury to the liver cells by medications used in BMT patients or by supplements taken to “make the liver healthier” (e.g., green tea extract)
- **Diagnosis**
 - Elevated liver labs (AST, ALT, Total bilirubin (can lead to jaundice))
 - Liver biopsy, if there is no improvement upon holding the medication
- **Treatment:** Stop the offending medication/supplement

Medication-Induced Blood Flow Impairment: Veno-Occlusive Disease *(also known as sinusoidal obstruction syndrome)*

- **Mechanism:**

- A condition where tiny blood vessels in the liver become blocked, making it harder for the liver to filter blood properly

- **Risk factor:**

- High dose chemotherapy

- **Diagnosis**

- Clinical: Jaundice (yellow body and eyes), ascites, and/or enlargement in the liver
- Elevated liver labs (AST, ALT, Alkaline Phosphatase, Total bilirubin)
- Liver biopsy



Medication Induced Blood Flow Impairment: Veno-Occlusive Disease - Treatment

- Largely Supportive
- Managing the extra fluid build-up in the body (ascites)
- Stop the offending medication(s)
- Defibrotide may help, but it needs further study



Graft Versus Host Disease (GVHD)

- **Mechanism:**

- The donor cells attack the host (i.e., patient) liver cells.

- **Risk Factors:**

- Old age of donor or recipient, viral infection (CMV or EBV), mismatch

- **Diagnosis:**

- Clinical: May also have skin rash or upset stomach
 - Blood testing: Elevated Liver enzymes
 - Liver biopsy is needed to prove liver GVHD

Graft Versus Host Disease (Cont'd)

- **Timeframe:**
 - Acute (within 100 days)
 - Chronic/late (post 100 days)
- **Treatment:**
 - Immunosuppression (e.g., prednisone or tacrolimus)
 - Prevention of infections (fungal, bacterial, and viral using antibiotics)

Pre-existing Liver Disease

Fat deposition in the liver

- Overweight-related (also known as metabolic dysfunction-associated steatotic liver disease; MASLD)
- Alcohol-related

Iron deposition in the liver due to prior blood transfusions

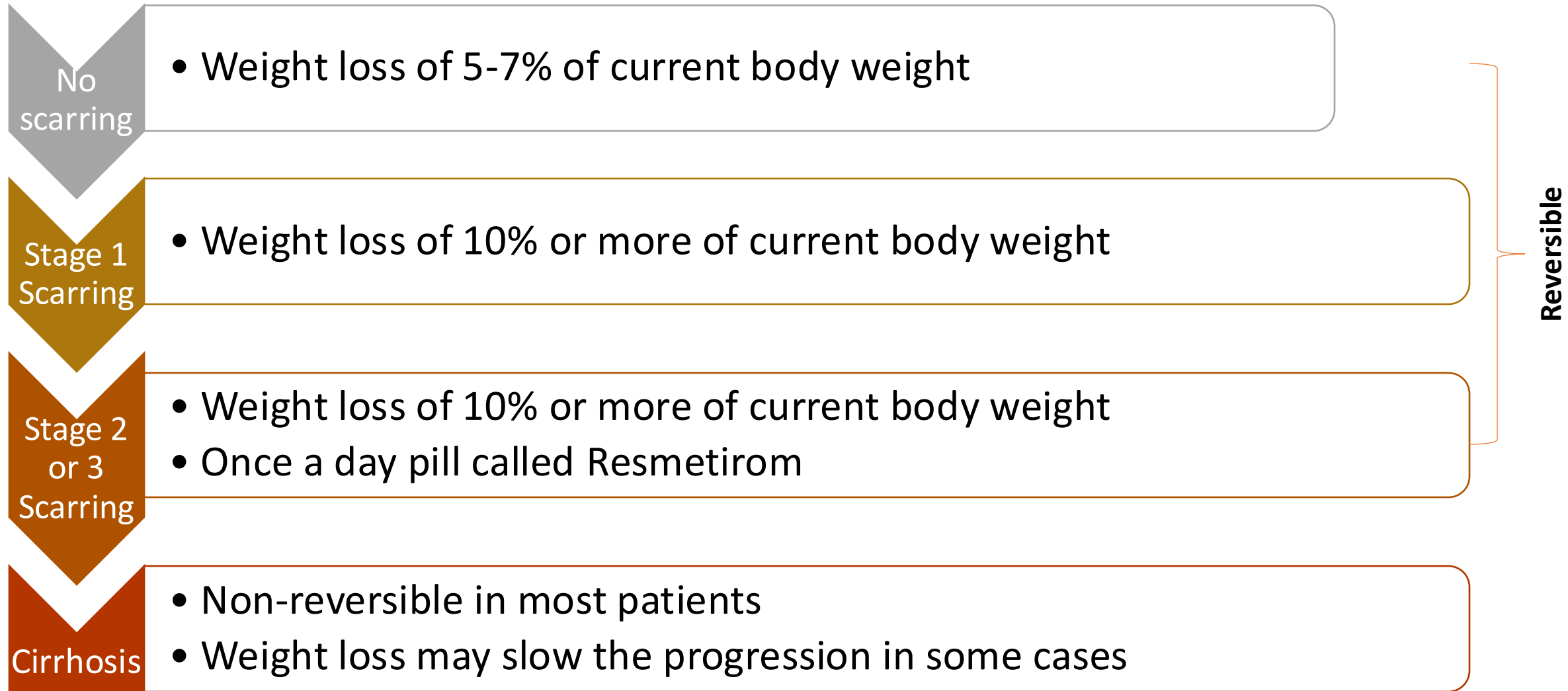
- Hemochromatosis

Metabolic Dysfunction Associated Steatotic Liver Disease: MASLD

- **Disease Burden:**
 - Affects 25-40% of the United States
- **Risk factors:**
 - Metabolic derangements such as diabetes, high blood pressure, high cholesterol, and overweight
- **Diagnosis:**
 - Elevated liver enzymes (not always the case) and fat on liver imaging
- **Treatment:**
 - It depends on the stage of liver scarring assessed by special blood testing or special imaging (elastography)



Treatment of MASLD



Hemochromatosis

- **Mechanism:**

- Iron build-up in the liver cells, causing injury and scarring

- **Risk factors:**

- Repetitive blood transfusion

- **Diagnosis:**

- Elevated liver enzymes and/or altered appearance of the liver on MRI

- **Treatment:**

- Minimize blood transfusion, if possible, and medication to remove the excess iron (deferoxamine)

Hepatitis Viruses

	Hepatitis A	Hepatitis E	Hepatitis B	Hepatitis C
Route(s) of Transmission	Oral-Fecal		Blood, sexual intercourse	
Risk factors	Undercooked food Contaminated water Close contact with infected individuals Poor sanitation	Handling raw pork, raw deer meat	Injecting drugs Snorting drugs Sharing nail clippers/razors/toothbrushes Tattoos Intercourse with infected individuals	
Chronicity (i.e., permanent infection)	None	Rarely, if immunosuppressed	Always	It depends
Available Vaccine	Yes	No	Yes	No
Treatment	Not needed	Minimize immunosuppression Ribavirin	If active, reactivated by immunosuppression , or starting high immunosuppression Tenofovir	Direct acting antivirals
Outcome	Self-limited, rarely life-threatening hepatitis	Self limited unless immunosuppressed	Remains inside the liver forever	75%, chronic but curable 25% self-limited

Cytomegalovirus (CMV)

- **Mechanism:**
 - Though body fluids (including saliva)
- **Risk factors** for clinical infection:
 - Immunosuppression
- **Diagnosis**
 - Elevated liver enzymes
 - High viral load in the blood (also CMV PCR testing)

Prevention and Treatment:

- Antiviral medication (also known as Valcyte)

Keeping the Liver Healthy Post-BMT

- Maintain a healthy diet and regular exercise (i.e., try to avoid being overweight)
- Be up to date with immunizations for hepatitis A and B
- Practice good hygiene
- Avoid undercooked meat
- Maintain the scheduled checkups with your providers
- Avoid supplements/"alternative medicine" (not recommended by your providers) (e.g., green tea extract, ashwagandha, turmeric)



References

- Dezan, M. G. F., Cavalcante, L. N., Cotrim, H. P., & Lyra, A. C. (2023). Hepatobiliary disease after bone marrow transplant. *Expert Review of Gastroenterology & Hepatology*, 17(2), 129–143
- Chronic liver disease after allogeneic hematopoietic cell transplantation. Randhawa, Baljit et al. *Cytotherapy*, Volume 26, Issue 12, 1514 – 1521
- Chen VL, Morgan TR, Rotman Y, Patton HM, Cusi K, Kanwal F, Kim WR. Resmetirom therapy for metabolic dysfunction-associated steatotic liver disease: October 2024 updates to AASLD Practice Guidance. *Hepatology*. 2025 Jan 1;81(1):312-320. doi: 10.1097/HEP.0000000000001112.

Questions?



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