



# Management of Hepatitis C in Dialysis

## Hepatitis C and Dialysis

- Higher prevalence than in the general and non-dialysis CKD populations<sup>1</sup>
- Associated with higher risk of death, hospitalization, and worse quality-of-life scores among hemodialysis patients<sup>2,3</sup>

## Symptoms

- The majority of people with HCV infection are asymptomatic. In advanced stages, HCV may cause abdominal pain, gastrointestinal bleeding, bloating, nausea, fatigue, fever, loss of appetite, weight loss, or jaundice.
- Because HCV is asymptomatic in most cases, detection usually requires screening patients with risk factors and confirming viremia with HCV RNA testing in seropositive patients.

## Prevention

Important parts of a successful prevention program include<sup>4,5</sup>

- HCV surveillance through periodic testing of alanine aminotransferase (ALT) and Hepatitis C viral (HCV) enzyme immunoassay (EIA) or HCV RNA
- Engaging hemodialysis personnel into preventing transmission of blood-borne pathogens. Activities to help reduce the risk of infection include:
  - Preparing single-use medications for patients in a clean area separate from dialysis stations
  - Avoidance of using common medication carts to deliver medications to patients
  - Cleaning and disinfecting stations between patients, and appropriate use of hand hygiene before and after patient contact

## Interpretation of Results of Tests for HCV Infection and Further Actions<sup>5,6</sup>

Test Outcome	Interpretation	Further Actions
HCV antibody nonreactive	No HCV antibody detected	Sample can be reported as nonreactive for HCV antibody. No further action required. If recent exposure in person tested is suspected, test for HCV RNA.*
HCV antibody reactive	Presumptive HCV infection	A repeatedly reactive result is consistent with current HCV infection, or past HCV infection that has resolved, or biologic false positivity for HCV antibody. Test for HCV RNA to identify current infection.
HCV antibody reactive, HCV RNA detected	Current HCV infection	Provide person tested with appropriate counseling and link person tested to care and treatment.†
HCV RNA detected, HCV RNA not detected	No current HCV infection, past infection that has cleared	No further action required in most cases. If distinction between true positivity and biologic false positivity for HCV antibody is desired, and if sample is repeatedly reactive in the initial test, test with another HCV antibody assay. In certain situations,‡ follow up with HCV RNA testing and appropriate counseling. Future screening for HCV infection should be with HCV RNA testing, since the HCV antibody will remain positive for life.

Modified from CDC. *MMWR Morb. Mortal. Wkly Rep.* 2001;50(RR-5):1-43.

\* If HCV RNA testing is not feasible and person tested is not immuno-compromised, do follow-up testing for HCV antibody to demonstrate seroconversion. If the person tested is immunocompromised, consider testing for HCV RNA to detect infection.

† It is recommended before initiating antiviral therapy to retest for HCV RNA in a subsequent blood sample to confirm HCV RNA positivity.

‡ If the person tested is suspected of having HCV exposure within the past 6 months, or has clinical evidence of HCV disease, or if there is concern regarding the handling or storage of the test specimen.

## HCV Treatment Goal

Sustained virologic response (SVR), defined as undetectable HCV RNA 12 weeks after finishing antiviral treatment.

## Direct Acting Antivirals (DAAs)

DAAs have been the focus of clinical research in recent years for their improved efficacy (90-100% SVR in most cases) and better tolerability compared to interferon-based therapy.<sup>7</sup> Recent clinical trial studies have supported the safe and effective use of DAAs in HCV-infected patients receiving hemodialysis.<sup>8,9</sup> Typically, multiple DAA classes are used in combination (NS5A or NS5B inhibitor with a protease inhibitor) to target different aspects of the HCV genome.

Multi-Class Combination Direct Acting Antivirals		
Name	Genotype†	Primary Metabolic Pathway
Elbasvir-Grazoprevir	HCV GT 1 or 4	- Elbasvir: Hepatic    - Grazoprevir: Hepatic
Glecaprevir-Pibrentasvir	HCV GT 1-6	- Glecaprevir: Hepatic    - Pibrentasvir: Hepatic
Ombitasvir-Paritaprevir-Ritonavir and Dasabuvir	HCV GT 1	- Ombitasvir: Hepatic    - Paritaprevir: Hepatic - Ritonavir: Hepatic    - Dasabuvir: Hepatic
Ombitasvir-Paritaprevir-Ritonavir	HCV GT 4	- Ombitasvir: Hepatic    - Paritaprevir: Hepatic - Ritonavir: Hepatic
Ledipasvir-Sofosbuvir*	HCV GT 1,4,5, or 6	- Ledipasvir: Hepatic    - Sofosbuvir: Renal
Sofosbuvir-Velpatasvir*	HCV GT 1-6	- Sofosbuvir: Renal    - Velpatasvir: Hepatic
Sofosbuvir-Velpatasvir-Voxilaprevir*	HCV GT 1-6	- Sofosbuvir: Renal    - Velpatasvir: Hepatic - Voxilaprevir: Hepatic

\* Sofosbuvir has significant renal elimination. Sofosbuvir-containing regimens not licensed for use in patients with a GFR <30 mL/min/1.73m<sup>2</sup>. Other currently approved DAAs are not eliminated by the kidneys.<sup>7</sup>

† Consult Package Insert for specific indications<sup>10</sup>

**Disclaimer:** Information contained in this National Kidney Foundation educational resource is based upon current data available at the time of publication. Information is intended to help clinicians become aware of new scientific findings and developments. This educational resource is not intended to set out a preferred standard of care and should not be construed as one. Neither should the information be interpreted as prescribing an exclusive course of management.

## References

- Kalantar-Zadeh K, Miller L, Daar E. Diagnostic discordance for Hepatitis C virus infection in hemodialysis patients. *Am J Kidney Dis.* 2005;46:290-300.
- Kalantar-Zadeh K, Kilpatrick R, McAllister C, et al. Hepatitis C virus and death risk in hemodialysis patients. *J Am Soc Nephrol.* 2007;18:1584-1593.
- Goodkin D, Bieber B, Jadoul M, et al. Mortality, hospitalization, and quality of life among patients with Hepatitis C infection on hemodialysis. *Clin J Am Soc Nephrol.* 2017;12:287-297.
- Kallen A, Arduino M, Patel P. Preventing infections in patients undergoing hemodialysis. *Expert Rev Anti Infect Ther.* 2010;8:643-655.
- Centers for Disease Control and Prevention. Recommendations for preventing transmission of infections among chronic hemodialysis patients. *MMWR Morb Mortal Wkly Rep.* 2001;50(RR-5):1-43.
- Centers for Disease Control and Prevention (CDC). Testing for HCV infection: An update of guidance for clinicians and laboratorians. *MMWR Morb Mortal Wkly Rep.* 2013;62:362-365.
- Jadoul M, Martin P. Hepatitis C treatment in chronic kidney disease patients: The Kidney Disease Improving Global Outcomes Perspective. *Blood Purif.* 2017;43:206-209.
- Gane E, Lawitz E, Pugatch D, et al. EXPEDITION-4: Efficacy and safety of glecaprevir/pibrentasvir (ABT-493/ABT-530) in patients with renal impairment and chronic Hepatitis C virus genotype 1-6 infection. American Association for the Study of Liver Diseases (AASLD). The Liver Meeting. Boston, MA. November 2016.
- Roth D, Nelson D, Bruchfeld A, et al. Grazoprevir plus elbasvir in treatment-naïve and treatment-experienced patients with Hepatitis C virus genotype 1 infection and stage 4-5 chronic kidney disease (the C-SURFER study): a combination phase 3 study. *Lancet.* 2015;386:1537-1545.
- Package Inserts: Elbasvir-Grazoprevir (Zepatier), Glecaprevir-Pibrentasvir (Mavyret), Ledipasvir-Sofosbuvir (Harvoni), Ombitasvir-Paritaprevir-Ritonavir and Dasabuvir (Viekira Pak), Ombitasvir-Paritaprevir-Ritonavir (Technivie), Sofosbuvir-Velpatasvir (Epclusa), Sofosbuvir-Velpatasvir-Voxilaprevir (Vosevi). Accessed January 30, 2019.

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