INFECTIONS IN HEMODIALYSIS PATIENTS: NAVIGATING HBV, HCV, AND COVID-19

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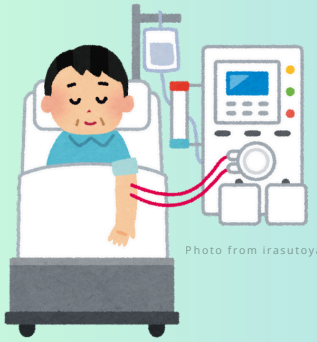

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HBV AND HCV MANAGEMENT AMONG HD PATIENTS

The first section of this newsletter will focus on Hepatitis B Virus (HBV) and Hepatitis C Virus (HCV) infections among hemodialysis (HD) patients, covering the transmission risks, outcomes, and guidelines implemented thus far.

COVID-19 IN HD PATIENTS

The second section will discuss the impacts of the COVID-19 pandemic among HD patients, briefly covering disease risks, as well as control and prevention strategies implemented at the time.

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HBV AND HCV MANAGEMENT AMONG HD PATIENTS

Chronic kidney disease (CKD) has a high global burden, with 1 in 10 people affected by it globally (1). Progression occurs in five stages, with the final stage (CKD-5) manifesting as end-stage kidney disease (ESKD) (2), where kidney function drops to ≤15 mL/min/1.73 m², and kidney replacement therapies (KRT) become necessary to support the patient. Based on the most recent global estimates, 0.1% of CKD patients suffer from CKD-5 (1). Hepatits, the inflammation of the liver, is one of the comorbid factors in ESKD, and is caused by five major viral types: A, B, C, D, and E (3). Of these, chronic HBV and HCV cause high disease burden and are more prevalent among HD patients compared to the general population (GP) (4).

HBV/HCV Transmission and Outcomes

	HBV	HCV
Prevalence (HD)	7.32%[5]	21%[6]
Surface Viability	at least 7 days[11]	up to 6 weeks[14]

Table 1. Differences between HBV and HCV.

HBV and HCV are transmitted via contact with infected blood or surfaces (4). HBV can remain infectious in the environment for around 7 days, while HCV can live in dried spots from days to weeks (Table 1). Contaminated medical equipment, such as scissors and clamps, serve as channels for patients to contract disease through direct contact or indirect transmission via medical staff. Blood transfusion remains the primary risk factor for HBV/HCV infections (5), while HD duration is also crucial for HCV (7). Compromised immune systems makes HD patients vulnerable to developing chronic HBV/HCV infections and associated comorbidities, such as liver cancer, causing higher all-cause mortality risk compared to the GP (5-6). HBV patients have twice higher risk for liver-related mortality compared to HCV (7), owing to the virus' genetic makeup. A DNA virus, HBV directly integrates itself to the patient liver DNA, causing mutations that promote cancer (8). Whereas HCV, composed of RNA, only causes cancers from chronic inflammation. Compared to the GP, HCV has a 3.82 higher risk of causing liver cancers in HD patients (4). There are other risk factors as well: all-cause mortality (1.35) and CVD (1.26). Chronic HBV/HCV do not present symptoms, but acute cases may report vomiting and diarrhea, as shown in an HCV outbreak of 18 patients from 2012-13, where 3 cases (17%) showed symptoms (9).

Recommended Guidelines

KDIGO has established a set of guidelines for HCV control in HD centers (10). The US Centers for Disease Control and Prevention (CDC) has also published guidelines for HCV/HBV management in similar contexts (11). Specific details are listed in Table 2. Strict adherence to guidelines, stringent disinfection measures, and further research for potential medical measures, such as HCV vaccines, should be considered for better control of HBV and HCV in HD settings.

	HBV	HCV
Screening	Pre-HD screening with immunoassay tests for HBV and HCV, along with routine follow-ups, must be done.[10,11] For HCV, a nucleic acid test should also be performed for antigen-positive samples.	
Vaccination	Patients and staff are recommended to take HBV vaccines before treatment initiation.[11]	No vaccine available for HCV.[10]
Disinfection	Bleach or a combination of citric, malic, and lactic acids must be used to internally disinfect HD machines.[12] The former is used weekly, or if blood leaks occur. The latter is used after every HD session, or for daily machine cleaning. External disinfection for 12 minutes should be done with FDA-approved disinfectants.[13] Staff must also practice personal hygiene practices, including handwashing, change of protective equipment between patients, and thorough sanitation of high-contact surfaces and equipment.	
Isolation	Isolate HBV patients and use dedicated machines.[11]	Isolation not required for HCV patients.[11]

Table 2. Summary of guidelines for HCV and HBV in HD settings.

COVID-19 AMONG HD PATIENTS

Since 2020, SARS-CoV-2, also known as COVID-19, has brought another challenge for HD patients. Due to suppressed immune response and comorbid factors, ESKD patients have higher COVID-19 prevalence and fatality risks compared to non-ESKD individuals (Table 3). ESKD patients are around thrice as likely to contract COVID-19 (15). Moreover, upon hospitalization, 1 out of every 3 dialysis patients die from COVID-related complications.

	ESKD	GP
Prevalence	3.10%	0.14%
Fatality Rate	18.06%	4.98%

Table 3. COVID-19 prevalence and fatality rate between ESKD patients and GP. Adapted from (15).

Apart from immune suppression, the transmission pathway of COVID-19, coupled with the setup of HD units, further complicates disease prevalence among patients (16). COVID-19 is transmitted through airborne droplets and surface particles, making areas with poor ventilation and minimal social distance susceptible for infections. HD units are particularly vulnerable to viral transmission as patients are in close contact with other patients and staff that enhances infection likelihood (17). Along with ESKD comorbidities, such as diabetes and heart disease, HD patients tend to have more severe COVID-19 outcomes. In a retrospective study on 106 HD patients from Korea, 78.3% of COVID-19 cases showed little-to-no symptoms, 9.4% had pneumonia but regular oxygen levels (moderate COVID), and 12.3% required oxygen support (severe COVID) (18). Five cases (4.7%) died after hospitalization, but only 1 case directly died from COVID-19 complications.

Adapting to the Pandemic

Since in-center HD treatments are vital to the survival of ESKD patients, providers had to adapt to the pandemic. Figure 1 summarizes measures adopted during the COVID-19 in HD centers. Some of them include screening for COVID-19 symptoms remotely via phone calls or on-site through in-center testing in some clinics, using personal protective equipment like masks for both patients and staff during travel to and entry in HD centers, following a social distancing of two meters between HD machines, and limiting visitors and separating ill patients to a separate waiting area (17,19). Moreover, COVID-19 vaccines became a viable measure against the virus, especially for HD patients (19). The same Korean study had 81% of patients vaccinated against COVID-19.

Even though the measures have been relaxed since the pandemic ended, some practices such as testing for symptomatic elderly patients continue to be conducted in some clinics, due to their higher mortality risk (20). Use of environmental protection agency-approved disinfectants effective against the virus is still practiced in some HD centers (21). Vaccine uptake is still heavily recommended, but not mandated, for HD patients to reduce infection severity and outcomes like death.

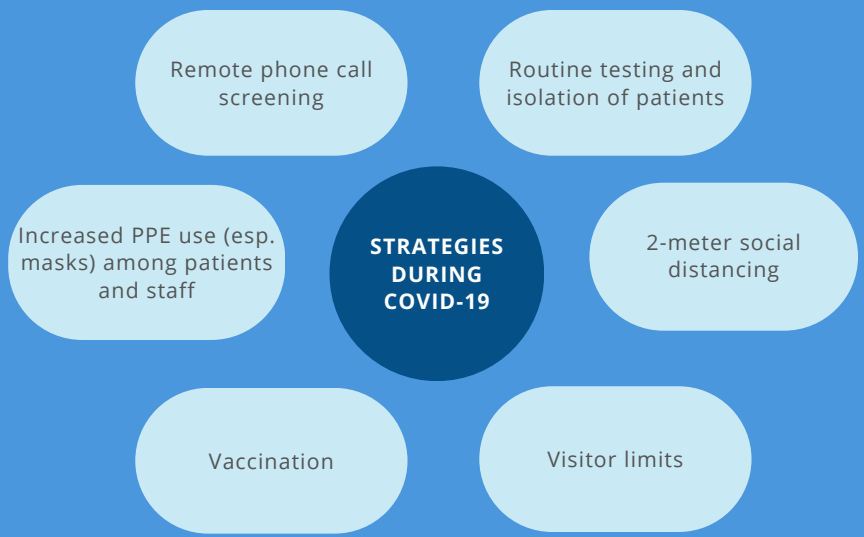

Figure 1. Strategies utilized by HD providers during the COVID-19 pandemic (17-19).

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