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Infection Prevention and Vaccination Strategies in the Dialysis Unit

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Patients receiving maintenance dialysis are highly vulnerable to infection, which ranks as the second leading cause of death in this population. Major infections—including respiratory, skin and soft tissue, and lower-extremity infections—collectively account for over 40% of infection-related hospitalizations, with respiratory infections alone representing approximately one quarter in recent cohort data. During the early COVID-19 pandemic, a nationwide Korean cohort showed in-hospital mortality among hemodialysis patients of 22.4%, approximately five-fold higher than that of non-CKD hospitalized patients (4.1%). Effective protection therefore requires two complementary pillars: rigorous infection control within the dialysis unit, and a stage-stratified vaccination program. This presentation synthesizes the latest international and Korean guidance, including the Korean Society of Nephrology (KSN) 2024 Dialysis Unit Infection Control Guideline, the CDC Core Interventions for bloodstream infection (BSI) prevention (March 2024 update), the 2025 ACIP Adult Immunization Schedule, the ISO 23500:2024 water-quality standards, and the 2026 AJKD review by Girndt on vaccination in CKD and after transplantation. For infection prevention, the nine-element CDC Core Intervention bundle—covering surveillance, hand-hygiene and access-care observation, staff and patient education, catheter-hub disinfection, chlorhexidine antiseptics, exit-site antimicrobial ointment, and catheter reduction—provides the implementation framework. Central venous catheter (CVC) use is the most prominent modifiable risk factor: NHSN national data show an adjusted rate ratio of approximately 6–8 for BSI versus arteriovenous fistula, with single-center cohorts reporting effect sizes as high as 17. A major recent advance is the taurolidine-heparin catheter lock solution (DefenCath®), FDA-approved in November 2023; the LOCK-IT-100 phase 3 trial demonstrated a 71% reduction in catheter-related BSI versus heparin alone ($p=0.0006$). ISO-compliant water quality (endotoxin ≤ 0.25 EU/mL standard, ≤ 0.03 EU/mL

ultrapure) and bundled standard-plus-contact precautions for multidrug-resistant organisms round out the bundle. Vaccination must account for the immune dysfunction of CKD, which reduces seroresponse. Hepatitis B vaccination achieves only 50–80% seroconversion with standard 3-dose regimens; adjuvanted vaccines (Heplisav-B with CpG 1018, Fendrix with AS04) and pre-dialysis administration improve seroprotection to approximately 80–95% in most studies. For pneumococcal prevention, ACIP now endorses a single dose of PCV20 or PCV21 (the latter covering approximately 84% of adult invasive disease serotypes), or alternatively PCV15 followed by PPSV23. Annual inactivated influenza vaccination, preferentially high-dose for those ≥ 65 , remains standard. The October 2024 ACIP update recommends a second dose of the 2024–25 COVID-19 vaccine 6 months after the first (minimum 2 months) for adults ≥ 65 and immunocompromised individuals, including dialysis patients. For RSV, ACIP recommends a single dose for adults ≥ 75 and—per the April 2025 expansion—adults ≥ 50 with risk factors for severe disease, including ESRD and dialysis. Comparison of Korean and international guidelines highlights both strengths and opportunities for further alignment. The KSN 2024 guideline excels in environmental management and emerging-infectious-disease preparedness, reflecting MERS and COVID-19 experience. Areas where international guidance has moved more rapidly include adoption of Heplisav-B, the simplified PCV20/PCV21 strategy, expanded RSV vaccination, taurolidine-based catheter lock solutions, and standardized national BSI surveillance—each representing opportunities to further reduce infection-related morbidity and mortality.

Keywords: hemodialysis , infection prevention, vaccination, blood stream infection