

From Seroprevalence Data to Clinical Action: Enhancing HCV Micro-Elimination Protocols in Hemodialysis Units through Molecular Surveillance

Rounaq Rasool

Pacific Medical College & Hospital, Udaipur, Rajasthan, India

Dr. Ritu Bhatnagar

Pacific Medical College & Hospital, Udaipur, Rajasthan, India

Abstract

Background: Hepatitis C virus (HCV) infection remains a major nosocomial concern in hemodialysis (HD) units, particularly in low- and middle-income settings. Patients on long-term hemodialysis are at increased risk due to repeated vascular access, blood transfusions, and prolonged healthcare exposure. Achieving HCV micro-elimination in HD units requires integration of serological screening with molecular surveillance to enable early detection and timely clinical intervention.

Objectives: To determine the seroprevalence of HCV infection, assess HCV RNA positivity and genotype distribution, and translate these findings into actionable strategies for strengthening HCV micro-elimination protocols in hemodialysis units.

Materials and Methods: This cross-sectional observational study was conducted among chronic hemodialysis patients at a tertiary care hospital in Udaipur, Rajasthan. Patients were screened for anti-HCV antibodies using third-generation ELISA, with periodic follow-up for seroconversion. All antibody-positive samples and pooled antibody-negative samples were subjected to real-time RT-PCR for HCV RNA detection and genotyping. Demographic data, dialysis duration, comorbidities, transfusion history, and infection-control practices were analyzed.

Results: Anti-HCV antibodies were detected in **35.86%** of patients, while **22.07%** were confirmed HCV RNA-positive, highlighting a significant discrepancy between serological and molecular detection. Prolonged duration of hemodialysis showed a strong association with both seropositivity and RNA positivity ($p < 0.01$). Genotype analysis revealed **HCV subtype 1a as the predominant strain (87.5%)**, followed by genotype 3b. These findings indicate ongoing silent transmission within dialysis settings and emphasize the limitations of antibody-only screening strategies.

Conclusion: The study underscores the critical role of **molecular surveillance alongside routine serology** for early identification of active HCV infection in hemodialysis units. Incorporation of RT-PCR-based screening, strict infection-control adherence, and genotype-guided antiviral therapy can significantly enhance **HCV micro-elimination efforts**. Translating seroprevalence data into targeted clinical action is essential to achieving sustained HCV elimination in high-risk dialysis populations.

