Correspondence

Prolonged Survival of Hepatitis C Virus in the Anesthetic Propofol

To the Editor—In the August 2010 issue of *Clinical Infectious Diseases*, Fischer et al [1] reported an outbreak of hepatitis C virus (HCV) infections among persons who had undergone procedures at an ambulatory specialty clinic. Their investigation revealed 2 separate transmissions of HCV infections that resulted in 8 patients acquiring infections. This resulted in a public health notification that advised nearly 50,000 persons of their potential exposure and their need to be screened for HCV. The long-standing practice of reusing syringes for single patients in conjunction with the use of single-use propofol vials for multiple patients led to this patient-to-patient transmission of HCV.

Viral transmission in healthcare settings is a major mode of cross-contamination worldwide. Outbreaks in healthcare settings have been consistently reported and primarily attributed to contaminated medications or equipment, or breaches in aseptic techniques [2–6]. The report by Fischer et al [1] adds to this list and is nevertheless extraordinary regarding the observed efficiency of viral transmission. At least in case of HCV, infection rates after needle-stick exposure are usually relatively low [7]. This discrepancy raised the question whether the high transmission rate in the described case was solely due to high virus load and gross contamination of the injection device or related to other factors like viral stability and infectiousness in the propofol solution. Therefore, we explored the influence of propofol on virus stability and infectivity. We incubated HCV for several weeks in either optimal cell culture medium condition with 10% fetal calf serum (FCS) or in propofol solution for up to 35 days. At different time points, virus infectivity was determined by a focus-forming unit assay (ffu/mL) [8]. As depicted in the Figure, HCV infectivity in standard cell culture medium decreased over time to undetectable levels after 4 weeks. However, in the case of the propofol emulsion, viral titers declined only slightly, and after 35 days still a high amount of infectious particles, a titer of $10^4$ ffu/mL, could be detected. These results demonstrate a prolonged survival of HCV in propofol, indicating that transmission of HCV might clearly be possible from propofol solutions intended for single-use only that are instead reused in multiple patients. Beside the active ingredient, 2,6-diisopropylphenol, propofol is an emulsion of soybean oil, glycerol, and egg lecithin. HCV is strongly associated with lipoproteins, and the highly lipid-based propofol solution could be the reason for a prolonged environmental stability of HCV in propofol. We did not observe differences in viral titers in the first hours or days of incubation in propofol. However, the observed prolonged stability over a couple of weeks demonstrates even more the optimal environment of propofol for infectious HCV.

In conclusion, we could show that the propofol emulsion provides an ideal environment for maintenance of HCV infectivity that could explain the outbreaks of HCV in healthcare settings by anesthesia. Prevention of this transmission can be achieved by the use of a sterile, single-use, disposable needle and syringe for each injection given as recommended by the Centers for Disease Control and Prevention [9].

Note

Potential conflicts of interest. All authors: No reported conflicts.

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References