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Outbreak of Hepatitis C Virus Infection in a Hemodialysis Unit: Potential Transmission by the Hemodialysis Machine?

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OBJECTIVE

To identify the routes of transmission during an outbreak of infection with hepatitis C virus (HCV) genotype 2a/2c in a hemodialysis unit.

DESIGN

A matched case–control study was conducted to identify risk factors for HCV seroconversion. Direct observation and staff interviews were conducted to assess infection control practices. Molecular methods were used in a comparison of HCV infecting isolates from the case-patients and from patients infected with the 2a/2c genotype before admission to the unit.

SETTING

A hemodialysis unit treating an average of 90 patients.

PATIENTS

A case-patient was defined as a patient receiving hemodialysis with a seroconversion for HCV genotype 2a/2c between January 1994 and July 1997 who had received dialysis in the unit during the 3 months before the onset of disease. For each case-patient, 3 control-patients were randomly selected among all susceptible patients treated in the unit during the presumed contamination period of the case-patient.

RESULTS

HCV seroconversion was associated with the number of hemodialysis sessions undergone on a machine shared with (odds ratio [OR] per additional session, 1.3; 95% confidence interval [CI_{95}], 0.9 to 1.8) or in the same room as (OR per additional session, 1.1; CI_{95}, 1.0 to 1.2) a patient who was anti-HCV (genotype 2a/2c) positive. We observed several breaches in infection control procedures. Wetting of transducer protectors in the external pressure tubing sets with patient blood reflux was observed, leading to a potential contamination by blood of the pressure-sensing port of the machine, which is not accessible to routine disinfection. The molecular analysis of HCV infecting isolates identified among the case-patients revealed two groups of identical isolates similar to those of two patients infected before admission to the unit.

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CONCLUSIONS

The results suggest patient-to-patient transmission of HCV by breaches in infection control practices and possible contamination of the machine. No additional cases have occurred since the reinforcement of infection control procedures and the use of a second transducer protector (*Infect Control Hosp Epidemiol* 2002;23:328-334).

AUTHORS

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June 27, 2002 - The June 2002 issue of *Infection Control and Hospital Epidemiology* has an article about the possible transmission of hepatitis C in a dialysis unit via contaminated transducer protectors.

Here is the abstract of "Outbreak of Hepatitis C Virus Infection in a Hemodialysis Unit: Potential Transmission by the Hemodialysis Machine?"

April 30, 2001 - This information about transducer protectors and bloodborne pathogens was just released by the Centers for Disease Control and Prevention (CDC) on April 27, 2001.

> **Internal Pathways of Hemodialysis Machines.** "Pressure transducer filter protectors are used primarily to prevent contamination and preserve the functioning of the pressure monitoring (i.e., arterial, venous, or both) components of the hemodialysis machine. Hemodialysis machines usually have both external (typically supplied with the blood tubing set) and internal protectors, with the internal protector serving as a backup in case the external transducer protector fails. Failure to use an external protector or to replace the protector when it becomes contaminated (i.e., wetted with saline or blood) can result in contamination of the internal transducer protector, which in turn could allow transmission of bloodborne pathogens (24). However, no epidemiologic evidence exists that contamination of the internal transducer protector caused by failure of the external transducer protector has led to either mixing of blood or the transmission of bloodborne agents."
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> **Cleaning and Disinfection.** "Venous pressure transducer protectors should be used to cover pressure monitors and should be changed between patients, not reused. If the external transducer protector becomes wet, replace immediately and inspect the protector. If fluid is visible on the side of the transducer protector that faces the machine, have qualified personnel open the machine after the treatment is completed and check for contamination. This includes inspection for possible blood contamination of the internal pressure tubing set and pressure sensing port. If contamination has occurred, the machine must be taken out of service and disinfected using either 1:100 dilution of bleach (300--600 mg/L free chlorine) or
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> a commercially available, EPA-registered tuberculocidal germicide before reuse. Frequent blood line pressure alarms or frequent adjusting of blood drip chamber levels can be an indicator of this problem. Taken separately, these incidents could be characterized as isolated malfunctions. However, the potential public health significance of the total number of incidents nationwide make it imperative that all incidents of equipment contamination be reported immediately to the FDA (800-FDA-1088)."