

Transmission of hepatitis C by blood splash into conjunctiva in a nurse

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The risk of transmission of hepatitis C virus (HCV) infection is an important problem for the health care worker. HCV transmission by blood splashing into eyes is very rare. In a hemodialyses department, a 23-year-old female nurse splashed blood from a patient who was anti-HCV positive into her eyes. She washed her eyes with water immediately and reported to the infection control department. She had never used intravenous drugs nor received transfusions. At the time of exposure, there was no abnormality in her laboratory tests. Her anti-HCV and HCV-RNA tests produced negative results. She was followed up for anti-HCV and alanine aminotransferase activity. After 6 months, she presented with sore throat, nausea, vomiting, fatigue, and weight loss. She had icterus and hepatomegalia. In laboratory tests, alanine aminotransferase level was 504 U/L, aspartate aminotransferase level was 388 U/L, and anti-HCV and HCV-RNA tests produced positive findings. She was treated with interferon alfa-2a for a 1-year period. After treatment, an HCV-RNA test produced negative results and transaminase levels were normal. In conclusion, splashing blood from patients who are HCV positive into the face or eyes is a risk for health care workers. They should be educated to prevent a nosocomial acquisition of bloodborne infection and they should observe protective precautions. (*Am J Infect Control* 2003; 31:502-4.)

Approximately 1% to 3% of the world population has chronic hepatitis C virus (HCV) infection and the anti-HCV positive rate in healthy blood donors is 0.5% to 4% worldwide.^{1,2} This percentage is 4-fold of the number of HIV cases. HCV causes 20% of acute hepatitis infections and 70% of chronic hepatitis infections in the world. In Turkey, prevalence of anti-HCV among the healthy population is between 0.5% and 1.5%.³ The average incidence of anti-HCV seroconversion after accidental percutaneous exposure from an HCV-positive source is 1.8% (range: 0%–7%), with 1 study indicating that transmission occurred only from hollow-bore needles compared with other sharps.⁴

The health care worker (HCW) has long been recognized to be at risk for hepatitis C infection through occupational exposure to blood and blood-contaminated objects. There is an important risk for

HCWs when caring for patients who are HCV positive. Hemodialysis departments are important places for nosocomial transmission risks.^{5,6} The prevalence of anti-HCV positivity is high among patients undergoing hemodialysis.⁵⁻⁸ Different studies show that if a HCW has continuous skin contact and needlestick accidents, anti-HCV prevalence is higher than that in the healthy population.^{8,9} HCV may spread not only by broken skin, but also by mucous contact such as conjunctiva.¹⁰ There is a special occupational hazard for dentists, surgeons, and other HCWs. To our knowledge, we present the third case in the English-language literature of HCV transmission by eye splash.

CASE REPORT

In the hemodialysis department at Dicle University Hospital, Diyarbakir, Turkey, a 23-year-old female nurse splashed blood from a patient positive for anti-HCV and HCV-RNA into her face and eyes. When she was exposed, she was taking blood from a peripheral vein in a patient with chronic renal disease. She washed her eyes and face with water immediately. She reported the accident to hospital management and the hospital infection control department. She had been completely healthy and had never used intravenous drugs nor received transfusion. She had not had a tattoo, needlestick accident, or any other risky contact in the last 6 months. Anti-HCV seropositivity by enzyme-linked immunosorbent assay and HCV-RNA by polymerase chain reaction

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0196-6553/2003/\$30.00 + 0

doi:10.1016/j.ajic.2003.03.005

both produced negative results. She had normal levels of aspartate aminotransferase and alanine aminotransferase (ALT). Anti-HCV and HCV-RNA tests were positive in the source patient. All of the laboratory findings of the nurse were found normal after 1 week, 1 month, and 2 months. After 6 months, the nurse presented with sore throat, nausea, vomiting, fatigue, and weight loss, which had started approximately 45 days earlier and worsened. She had icterus on her conjunctiva. There was hepatomegalia in her physical and sonographic examination. In laboratory tests, her ALT level was 504 U/L, aspartate aminotransferase level was 388 U/L, total bilirubin was 2.3 g/dL, direct bilirubin was 0.8 g/dL, and anti-HCV and HCV-RNA tests produced positive findings. She was hospitalized for monitoring.

She was treated with 3 million IU of interferon alfa-2a/wk for a 1-year period. One month later the transaminase levels decreased to normal values. After 1 year of treatment, her HCV-RNA test produced negative results and her transaminase levels were normal.

DISCUSSION

The risk of transmission from patient to HCW is not high, but it could be very important after hazardous contact. Follow-up studies of HCWs who sustained percutaneous exposures to blood from patients who were anti-HCV positive have found variable rates of HCV transmission.¹¹⁻¹³ Hemodialysis HCWs have a risk by small skin wounds with infective blood and other body fluids. The prevalence of anti-HCV among persons on dialysis is consistently higher than in other hospitalized patient groups. The prevalence of anti-HCV among patients undergoing dialysis ranges from 8% to 36% in the United States and from 1% to 47% worldwide.^{1,3,7,8} Despite an increased HCV infection rate among patients undergoing dialysis, staff members of hemodialysis centers in the United States have been found to have prevalence rates similar to those seen in other HCWs. Even among HCWs with high rates of exposure to blood or needlestick injuries, seroprevalence rates are similar to those among blood donors (0.5%).¹⁴

Splashing to conjunctiva is possible but very rare among HCWs. In a surveillance study of students and other workers at a dentistry department, only 1 splashing case to conjunctiva was found among 504 cutaneous hazardous contacts.⁵ Another study found that 30 minutes after surgical procedures, 44% of HCWs' face shields had blood contamination. Only in 8% of these procedures were the surgeons aware of the contamination. Macroscopic contamination was seen on the shields in 16% of the cases.⁶

Two cases similar to this one, of transmission of HCV by a conjunctival splash, have been reported in the

English-language literature.^{15,16} Sartori et al¹⁵ reported a nurse in a hemodialysis department who splashed blood from a patient into her face and eyes. About 3 months later, she had acute hepatitis. The other case was that of a sheriff who splashed blood from a penitentiary inmate into his eyes.¹⁶

To prevent HCWs from bloodborne HCV infection, a written exposure control plan should be developed and effective HCW training should be performed. These issues help HCWs adopt standard precautions in hospitals. Several investigators have attempted to assess the efficacy of standard precautions. Beekman et al¹⁷ found a significant and sustained decrease in percutaneous injuries associated with the implementation of standard precautions. For standard precautions, gloves, masks, goggles, or face shields should be used when caring for patients in hemodialyses departments. Unfortunately, in many places, HCWs may not use the preventive equipment provided by their workplace. After a suspicious contact to eyes, HCWs should wash eyes with clean water, saline, or sterile irrigants. The incident should also be reported to a supervisor immediately. Wounds and skin sites that have been in contact with blood or body fluids should be washed with soap and water; mucous membranes should be flushed with water. The use of antiseptics is not contraindicated.^{13,18}

Hospital management should establish policies and procedures for testing HCWs for HCV after percutaneous or mucosal exposures to blood, and ensure that all personnel are familiar with those policies and procedures. There is currently no effective postexposure prophylaxis for HCV infection. After an occupational HCV exposure, both the source and the person exposed should undergo baseline testing for anti-HCV and ALT activity. Follow-up testing (eg, at 4-6 months) for anti-HCV and ALT activity should also be performed. All positive anti-HCV results should be confirmed by enzyme immunoassay using supplemental anti-HCV testing.^{9,13,18}

In conclusion, blood or other body fluids from patients who are HCV positive splashing into the face and eyes is a risk for HCWs. HCWs should be educated to prevent a nosocomial acquisition of hepatitis C infection. The current case is a typical illustration of the cost-effectiveness of institutional education and precaution. The treatment of HCV infection with interferon is more expensive than the cost of education and prevention equipment. HCWs should observe the protective precautions of their workplace.

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