ADA CE Program ARTICLE 3

Transmission of blood-borne pathogens in US dental health care settings

2016 update

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Transmissions of blood-borne pathogens (BBPs) in a dental health care setting have rarely been reported, particularly since routine hepatitis B virus (HBV) vaccination of dental health care personnel (DHCP) and universal precautions were recommended (1982 and 1987, respectively).[1-5] BBPs of primary concern include HBV, hepatitis C virus (HCV), and human immunodeficiency virus (HIV). In 1996, the Centers for Disease Control and Prevention (CDC) expanded the concept of universal precautions and changed the term to "standard precautions."[6] Standard precautions integrate and expand the elements of universal precautions into a standard of care designed to protect health care personnel (HCP) and patients from pathogens that can be spread by means of blood or any other body fluid, excretion, or secretion, except sweat and tears. The Occupational Safety and Health Administration standard regarding BBPs focuses

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ABSTRACT

Background. During the past decade, investigators have reported transmissions of blood-borne pathogens (BBPs) in dental settings. In this article, the authors describe these transmissions and examine the lapses in infection prevention on the basis of available information.

Methods. The authors reviewed the literature from 2003 through 2015 to identify reports of the transmission of BBPs in dental settings and related lapses in infection prevention efforts, as well as to identify reports of known or suspected health care–associated BBP infections submitted by state health departments to the Centers for Disease Control and Prevention.

Results. The authors identified 3 published reports whose investigators described the transmission of hepatitis B virus and hepatitis C virus. In 2 of these reports, the investigators described single-transmission events (from 1 patient to another) in outpatient oral surgery practices. The authors of the third report described the possible transmission of hepatitis B virus to 3 patients and 2 dental health care personnel in a large temporary dental clinic. The authors identified lapses in infection prevention practices that occurred during 2 of the investigations; however, the investigators were not always able to link a specific lapse to a transmission event. Examples of lapses included the failure to heat-sterilize handpieces between patients, a lack of training for volunteers on BBPs, and the use of a combination of unsafe injection practices.

Conclusions. The authors found that reports describing the transmission of BBPs in dental settings since 2003 were rare. Failure to adhere to Centers for Disease Control and Prevention recommendations for infection control in dental settings likely led to disease transmission in these cases.

Practical Implications. The existence of these reports emphasizes the need to improve dental health care personnel's understanding of the basic principles and implementation of standard precautions through the use of checklists, policies, and practices.

Key Words. Infection control; infection prevention; dentistry; blood-borne pathogens; hepatitis B virus; hepatitis C virus; human immunodeficiency virus; health care–associated infection; standard precautions.

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on protecting HCP from BBPs and retains the term "universal precautions."[7]

We identified 3 reports describing transmissions of HBV and HCV in dental settings,[8-10] all of which were published after the release of the CDC's *Guidelines for Infection Control in Dental Health-Care Settings—2003*.[3] We examined these reports and noted the lapses in infection prevention on the basis of the available information. We considered whether the transmissions had resulted from the failure to adequately implement existing CDC recommendations for infection prevention and control and whether additional recommendations were needed.

METHODS

In 2012, the authors (J.L.C., S.K.G., J.A.H.) began a literature review to identify published reports of confirmed transmissions of BBPs in US dental settings since 2003. We defined transmissions as those situations for which the results of the epidemiologic investigation confirmed or identified a strong epidemiologic and molecular link between cases; we defined cases as people with acute viral hepatitis who visited the same dental clinic as other people who had acute or chronic viral hepatitis infection.[11,12] We conducted literature searches using Ovid MEDLINE, Web of Science, Cochrane Library, and the National Guideline Clearinghouse. Search terms included "disease transmission," "surveillance," "dental," "dentistry," "oral health," "infection control," "infection prevention," "blood-borne pathogens," "hepatitis B virus" or "HBV," "hepatitis C virus" or "HCV," "human immunodeficiency virus" or "HIV," "occupational exposure," "breaches," "health care-associated infections" or "HAIs," and "compliance." We limited searches to articles published in English from January 2003 through November 2015, and we excluded editorials, expert opinions, and general reviews.

In addition, we reviewed published summaries from CDC's Division of Viral Hepatitis, which is part of the National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention, of suspected health care–associated hepatitis transmissions reported by state and local health departments from 1998 to 2014.[11,12] HBV and HCV infections are reportable conditions in all states. Surveillance case report forms for viral hepatitis infections request information about potential behavioral risks, such as sexual contact and injection drug use, a history of working in a health care setting, and a history of receiving medical and dental treatment during the likely exposure period. State and local health departments investigate patients who do not report behavioral risk factors to determine potential sources of transmission. Although it is not mandatory for health departments to report suspected health care–associated hepatitis cases to the CDC, health departments can request that the CDC provide consultation and laboratory assistance to complete these investigations.

RESULTS

By searching the literature and reviewing reports to the CDC of transmission events from 2003 to 2015, we identified 3 episodes of BBP transmission in US dental settings (Table 1[8-10]). In 2 episodes,[8,10] investigators confirmed a single instance of patient-to-patient transmission of either HBV or HCV. Both single-transmission episodes of BBPs occurred in outpatient oral surgery practices. In a third episode,[9] investigators identified acute HBV infection in 3 patients and 2 DHCP who were volunteers and not involved directly in the delivery of clinical care (Box 1[3]). We did not identify any transmissions of HIV among dental patients or DHCP during our search.

In 2002, a state health department conducted an epidemiologic investigation of a person who had an acute HBV infection (Table 1).[8] This index patient (that is, the first case or instance of a patient who came to the attention of health authorities) had no identified risk of developing infection, but the patient reported having recently had oral surgery involving intravenous (IV) sedation and undergone the extraction of 7 teeth. A retrospective investigation of the treating oral surgery practice revealed that another patient (the source patient), who had been seen earlier on the same day as the index patient, was listed on the state's reportable disease registry for HBV. Documentation showed that at the time the source patient had 3 teeth extracted under IV general anesthesia, she also had chronic hepatitis B and had tested positive for hepatitis e antigen with a high viral load. The findings of molecular genetic testing confirmed the transmission of HBV between this source patient and the index patient. During the investigation, office staff members reported that they had followed standard infection prevention and control practices. All staff members had been vaccinated, and none of them had HBV. The investigators only could speculate that the virus had been spread via an environmental surface that remained contaminated with blood, despite the staff members' reportedly good cleaning practices. Furthermore, the fact that a substantial prevalence of previous vaccination (64%) among the patients who were treated after the source patient

ABBREVIATION KEY. **ADA:** American Dental Association. **BBPs:** Blood-borne pathogens. **CDC:** Centers for Disease Control and Prevention. **DHCP:** Dental health care personnel. **HAI:** Health care–associated infection. **HBV:** Hepatitis B virus. **HCP:** Health care personnel. **HCV:** Hepatitis C virus. **HIV:** Human immunodeficiency virus. **IV:** Intravenous. **TB:** Tuberculosis.