Acknowledgments. The opinions, results, and conclusions reported are those of the authors. No endorsement by Northwestern Medicine or any of its funders or partners is intended or should be inferred.

Financial support. This work was supported by the Northwestern University Clinical and Translational Sciences Institute (grant no. UL1TR001422), the Northwestern Memorial Foundation, and the Peter G. Peterson Foundation Fund.

Conflicts of interest. All authors report no conflicts of interest relevant to this article.

References

1. Wilkins JT, Hirschhorn LR, Gray EL, *et al.* Serologic status and SARS-CoV-2 infection over 6 months of follow up in healthcare workers in Chicago: a cohort study. *Infect Control Hosp Epidemiol* 2022;43:1207–1215.
2. Wilkins JT, Gray EL, Wallia A, *et al.* Seroprevalence and correlates of SARS-CoV-2 antibodies in healthcare workers in Chicago. *Open Forum Infect Dis* 2020;8(1):ofaa582.
3. Evans CT, DeYoung BJ, Gray EL, *et al.* Coronavirus disease 2019 (COVID-19) vaccine intentions and uptake in a tertiary-care healthcare system: a longitudinal study. *Infect Control Hosp Epidemiol* 2021. doi: 10.1017/ice.2021.523.
4. Gu M, Taylor B, Pollack HA, Schneider JA, Zaller N. A pilot study on COVID-19 vaccine hesitancy among healthcare workers in the US. *PLoS One* 2022;17:e0269320.
5. CDC COVID data tracker. Centers for Disease Control and Prevention website. https://covid.cdc.gov/covid-data-tracker/#vaccinations_vacc-total-admin-rate-total. Accessed August 23, 2022.
6. Razzaghi H, Srivastav A, de Perio MA, Laney AS, Black CL. Influenza and COVID-19 vaccination coverage among healthcare personnel—United States, 2021–2022. *Morb Mortal Wkly Rep* 2022;71:1319–1326.
7. COVID-19 vaccine coverage. Chicago Department of Public Health website. https://www.chicago.gov/city/en/sites/covid19-vaccine/home/covid-19-vaccine-coverage.html. Accessed November 23, 2022.
8. Huang Q, Gilkey MB, Thompson P, Grabert BK, Dailey SA, Brewer NT. Explaining higher COVID-19 vaccination among some US primary-care professionals. *Soc Sci Med* 2022;301:114935.
9. Dhanani LY, Franz B. A meta-analysis of COVID-19 vaccine attitudes and demographic characteristics in the United States. *Public Health* 2022; 207:31–38.

Hepatitis A virus transmission in a dental clinic setting

Adi Vinograd MD[1], Debby Ben-David MD[2,3], Yael Gozlan PhD[4], Orna Mor PhD[3,4], Zohar Mor MD[5,6], Rivka Sheffer MD[1] and Michal Savion MD[1]

[1]Tel Aviv Department of Health, Israel Ministry of Health, Tel Aviv, Israel, [2]National Center for Infection Control, Israel Ministry of Health, Tel Aviv, Israel, [3]Sackler Faculty of Medicine, Tel-Aviv University, Tel Aviv, Israel, [4]Central Virology Laboratory, Ministry of Health, Sheba Medical Center, Ramat-Gan, Israel, [5]Central Department of Health, Israel Ministry of Health, Ramle, Israel and [6]School of Health Sciences, Ashkelon Academic College, Ashkelon, Israel

To the Editor—Hepatitis A virus (HAV) is a major cause of acute hepatitis, transmitted by the fecal–oral route.[1,2] Nosocomial HAV outbreaks usually involve undiagnosed disease of an index patient and poor hygiene practices of healthcare personnel (HCP).[3]

In this report, we describe the results of a contact investigation of a distinctive HAV transmission route in a dental clinic.

Methods

In 2021, the epidemiology department of the Tel-Aviv district of the Israel Ministry of Health (MOH) received a report of a case of hepatitis A. An investigation was initiated. The reported case and 2 additional patients were interviewed using a standardized questionnaire, and their medical records were reviewed. The MOH conducted a site investigation of a dental practice based on the questionnaire findings to assess knowledge and implementation of infection control practices.

Serum specimens from the 3 cases were tested for anti-HAV IgM antibodies and HAV RNA by real-time PCR technology. All HAV RNA-positive samples were sequenced to determine the viral genotype as previously described.[4]

This research was exempted from the institutional ethics committee review requirements.

Author for correspondence: Dr. Adi Vinograd, E-mail: Adigold12@gmail.com

Cite this article: Vinograd A, *et al.* (2023). Hepatitis A virus transmission in a dental clinic setting. *Infection Control & Hospital Epidemiology*, 44: 692–693, https://doi.org/10.1017/ice.2023.16

Results

Case descriptions of infected patients

A 64-year-old woman was admitted to a hospital with fever, weakness, anorexia, and painless jaundice. She was diagnosed with acute hepatitis A and the case was reported to the MOH. The epidemiological investigation revealed that the patient had had a superficial routine dental exam including exposure to sterile instruments and the dentist's hands a month before her admission. A few days after this procedure, her dentist informed her that he had been diagnosed with acute hepatitis A. Because all cases of HAV must be reported to the MOH with a subsequent epidemiological investigation, his case was known to local health authorities. Nevertheless, his work as a dentist was not known to the MOH until the patient's case was reported. The epidemiologic investigation of the dentist found that his spouse had been diagnosed with HAV 54 days prior to the report of the dental patient's HAV infection. The dentist had not been vaccinated against HAV in the past, and after a serological test found him negative for IgM antibodies, he was given a dose of HAV vaccine as post-exposure prophylaxis (PEP) 8 days after the spouse was diagnosed with HAV. Nevertheless, he became symptomatic and was diagnosed with HAV 3 weeks after receiving the HAV vaccine. As a result, he stopped working and immediately informed his colleagues and patients who had had procedures the week before his symptoms began. Other than the 64-year-old patient, no other cases of HAV among his patients were reported to the MOH. The dentist's spouse had been diagnosed in a hospital while she was

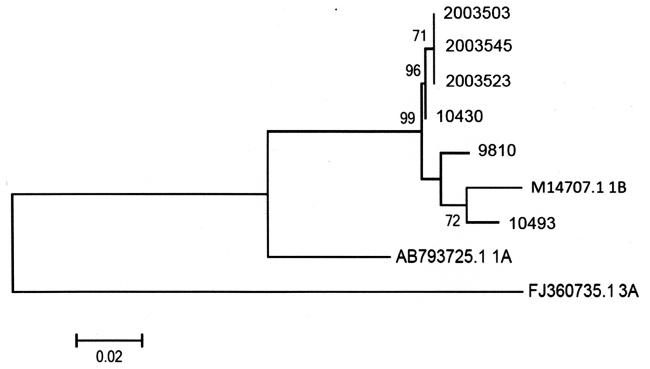

Fig. 1. Phylogenetic analysis of virus strains. Analysis of the 3 hepatitis A cases (2003503, 2003523, and 2003545), no related local isolates, and 3 reference strains (denoted by GeneBank nos. HAV 1A. HAV 1B, and HAV3A). Numbers at the nodes indicate bootstrap values.

admitted with malaise, anorexia, and painless jaundice. An epidemiologic investigation found that her only potential exposure was a seafood restaurant. The particular food item was presumed to be mussels since she was the only diner at her table that consumed them. However, a public health investigation of the restaurant did not find conclusive evidence of a foodborne outbreak, and no other cases of HAV among the restaurant patrons were reported to the MOH. All 3 cases reported no other potential exposures to HAV.

Infection control breaches

A dental clinic site investigation was performed, and mismanagement of hand hygiene techniques was found. The dentist described using nitrile gloves and changing them between patients, however, washing and application of a disinfectant were on gloved hands, instead of the dentist's hands before donning gloves as recommended by guidelines.[5] Other infection control measures, such as the use of personal protective equipment and sterilization of instruments, were consistent with guideline recommendations. Following the investigation, the dentistry staff underwent retraining on the principles of standard precautions and hand hygiene during dental practice.

Laboratory results

Serum samples from the 3 cases were found to be HAV RNA-positive. Sequencing analysis of a ~460-nt fragment located within the VP1/P2A region of the virus revealed complete identity between the 3 cases, which was demonstrated by the absence of any phylogenetic distance between the 3 HAV sequences (Fig. 1). The strains involved in the cluster are all 1B, the commonly found subtype in Israel. Unrelated subtypes were all taken from GeneBank and are representatives of 1B, 1A, and 3A subtypes that were previously identified in Israel. When these dentist-related infections were diagnosed, no other HAV cases were reported in this community or by anyone residing in the same geographic location.

Discussion

The current study reports transmission of HAV in a dental clinic assumed to be related to poor hand hygiene practices by a dentist who became infected despite receipt of HAV vaccine as PEP. To the best of our knowledge, no study to date has described similar cases.

The persistence of HAV on surfaces and the ability of the virus to adapt across biological and inanimate environments have been demonstrated, suggesting that human hands and surfaces constitute important epidemiological factors in HAV dissemination.[6] Studies have demonstrated that only a small percentage of oral health HCPs worldwide perform hygiene practices according to recommended guidelines.[7] Precise information regarding the spread of infection by contaminated HCPs as a result of poor hand hygiene is scarce. In a systematic review of outbreaks caused by HCPs, hand hygiene compliance was considered "insufficient" in 43.2% of the reports.[8]

Although proper hand hygiene of HCPs is always essential, it may be prudent to remind HCPs exposed to HAV of the importance of relevant infection control guidelines.

Acknowledgments.

Financial support. No financial support was provided relevant to this article.

Conflicts of interest. All authors report no conflicts of interest relevant to this article.

References

1. Cao G, Jing W, Liu J, Liu M. The global trends and regional differences in incidence and mortality of hepatitis A from 1990 to 2019 and implications for its prevention. *Hepatol Int* 2021;15:1068–1082.
2. Wenzel JJ, Allerberger F. Hepatitis A as a foodborne infection. *Lancet Infect Dis* 2014;14:907–908.
3. Chodick G, Ashkenazi S, Lerman Y. The risk of hepatitis A infection among healthcare workers: a review of reported outbreaks and sero-epidemiologic studies. *J Hosp Infect* 2006;62:414–420.
4. Gozlan Y, Bar-Or I, Volnowitz H, *et al.* Lessons from intensified surveillance of viral hepatitis a, Israel, 2017 and 2018. *Eurosurveillance* 2021;26:2000001.
5. Summary of infection prevention practices in dental settings: basic expectations for safe care. Centers for Disease Control and Prevention website. https://www.cdc.gov/oralhealth/infectioncontrol/pdf/safe-care2.pdf. Accessed january 3, 2023.
6. Mbithi' JN, Springthorpe VS, Boulet JR, Sattarl SA. Survival of hepatitis A virus on human hands and its transfer on contact with animate and inanimate surfaces. *J Clin Microbiol* 1992;30:757–763.
7. Oosthuysen J, Potgieter E, Fossey A. Compliance with infection prevention and control in oral healthcare facilities: a global perspective. *Int Dent J* 2014;64:297–311.
8. Danzmann L, Gastmeier P, Schwab F, Vonberg RP. Healthcare workers causing large nosocomial outbreaks: a systematic review. *BMC Infect Dis* 2013;13:98.