LETTERS TO THE EDITOR

Prolonged Rhinovirus Shedding in a Patient with Hodgkin Disease

To the Editor—Respiratory viral pathogens (RVPs) have been increasingly identified as a serious concern in immunocompromised patients. In this population, RVPs cause more lower-respiratory tract infections (LRIs), leading to increased mortality and morbidity.[1] Prolonged viral shedding of RVP can become an infection control problem and has been implicated in at least 1 hospital outbreak.[2]

With respect to the hematopoietic stem cell transplant (HSCT) population, most publications have studied more virulent RVPs,[1–3] whereas data on the nontransplant immunocompromised population with less virulent RVP are lacking altogether. Compared with other RVPs, rhinoviruses (RVs) cause proportionately fewer LRIs in the healthy population, but RVs are more prevalent than other RVPs and infect 22.3% of HSCT recipients within 100 days of transplantation.[4] In a small retrospective study of immunocompromised patients and without inferring causation, RVs were associated with the same mortality as the 2009 H1N1 influenza.[5]

We report a patient with relapsed Hodgkin's Disease (HD) without a transplant who was found to have prolonged RV shedding of 96 days with LRI. Our patient was a 37-year-old man with prior lung injury from acute respiratory distress syndrome, CD4 lymphopenia with recurrent pneumonia, and relapsed HD after treatment with bleomycin, adriamycin, vinblastine, and dacarbazine, treated with brentuximab. He experienced intermittent fever beginning in September 2014 and presented in late October 2014 with progressive dyspnea, continuing intermittent fever, and a nonproductive cough. He was hypoxemic on admission. Chest CT showed bilateral ground-glass opacities. Bronchoalveolar lavage (BAL) performed on October 29, 2014, was RT-PCR positive for RV/enterovirus (EV). Other infectious disease testing was negative. Intravenous immunoglobulin was given with tapering prednisone for bronchospasm. He improved and was discharged a few days later. He remained afebrile with continued dry cough and dyspnea during November and December. In January, he began having afternoon fevers (38.9–39.5°C [102–103°F]), dyspnea, productive cough of whitish to yellow sputum, weight loss, drenching night sweats, and lymphadenopathy. He was readmitted in late January 2015 with severe sepsis and hypoxemia. Another chest CT showed progression of interstitial and airspace opacities. A nasopharyngeal swab was collected on January 31, 2015, and BAL was performed on February 2, 2015; both were RT-PCR positive for RV/EV; adenovirus PCR was also positive on the BAL. The patient was transitioned to comfort care after a repeat biopsy showed progression of HD, and he died February 5, 2015. Sanger-sequencing and bioinformatic analyses of clinical specimens from October 29, 2014, January 31, 2015, and February 2, 2015, identified RV-A51.

Prolonged viral shedding, seen in immunocompromised patients, is dependent on the host's immune status, virus species and strain, lung injury, and other risk factors, all of which are still poorly understood. This patient had at least 96 days of RV-A51 shedding, but because his symptoms started in September, viral shedding possibly started earlier than documented.

Rhinovirus, which causes common cold, is a common etiology of respiratory infections. The normal host clears the infection in a short period, limiting the duration of infection and viral shedding. In a study of hospitalized patients with respiratory complaints, the mean duration of RV shedding was 10.1 days in adults with no known immunocompromising condition.[6] In the HSCT population, the median duration of shedding was 3 weeks (range, 0–49 weeks),[4] and in patients with hypogammaglobulinemia, the median duration of shedding was 40.9 days (range, 26.4–55.4 days).[6] Due to this variability and our inability to predict the duration of viral shedding in immunocompromised patients, it may be necessary to test for RV or other RVP negativity before isolation precautions are removed. The incidence of RV LRI is unclear. In a prospective study of 215 HSCT recipients followed for 100 days, the incidence was 4% among the RV-infected recipients.[4] However, in a retrospective chart review of HSCT recipients with RV infection, 43% subsequently had proven or possible RV-associated pneumonia, but more than half (60%) had at least 1 additional respiratory pathogen detected, confounding the attribution of the pneumonia.[7] On his second admission, our patient was coinfected with adenovirus, which possibly aggravated the patient's pulmonary condition either by itself or in combination with the recurrent HD.

Whether a primary pathogen or a copathogen, RV infection has the potential to negatively affect the survival of immunocompromised patients. Establishing duration of viral shedding defines the course of infection, infectivity, and need for preventive strategies. Unfortunately, factors that predict duration of viral shedding have not been determined. Patient isolation and precautions for infection control should probably be maintained until RVP testing becomes negative to avoid hospital transmission.

ACKNOWLEDGMENTS

We gratefully acknowledge the assistance of W. Allan Nix and the Picornavirus Laboratory, Polio and Picornavirus Laboratory Branch, Division of Viral Diseases, Centers for Disease Control and Prevention, in performing Sanger-sequencing and bioinformatic analyses to identify HRV-A51 persistence.

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

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

Andrew T. Dysangco, MD;[1]
Amy B. Kressel, MD, MS;[1]
Stephanie M. Dearth, MS;[2]
Reema P. Patel, MPH;[2]
Shawn M. Richards, BS[2]

Affiliations: 1. Indiana University School of Medicine, Indianapolis, Indiana; 2. Indiana State Department of Health, Indianapolis, Indiana.

Address correspondence to Andrew T. Dysangco, MD, 545 Barnhill Dr. Emerson Hall, Suite 421, Indianapolis, IN 46202-5124 (andysang@iupui.edu).

PREVIOUS PRESENTATION: These findings were presented as a poster in the SHEA Spring Conference, May 19, 2016, in Atlanta, Georgia.

Infect Control Hosp Epidemiol 2017;38:500–501
 0899-823X/2017/3804-0023. DOI: 10.1017/ice.2016.338

REFERENCES

1. Srinivasan A, Wang C, Yang J, et al. Symptomatic parainfluenza virus infections in children undergoing hematopoietic stem cell transplantation. *Biol Blood Marrow Transpl* 2011;17:1520–1527.
2. Jalal H, Bibby DF, Bennett J, et al. Molecular investigations of an outbreak of parainfluenza virus type 3 and respiratory syncytial virus infections in a hematology unit. *J Clin Microbiol* 2007;45:1690–1696.
3. Lehners N, Tabatabai J, Prifert C, et al. Long-term shedding of influenza virus, parainfluenza virus, respiratory syncytial virus and nosocomial epidemiology in patients with hematological disorders. *PloS One* 2016;11:e0148258.
4. Milano F, Campbell AP, Guthrie KA, et al. Human rhinovirus and coronavirus detection among allogeneic hematopoietic stem cell transplantation recipients. *Blood* 2010;115:2088–2094.
5. Kraft CS, Jacob JT, Sears MH, et al. Severity of human rhinovirus infection in immunocompromised adults is similar to that of 2009 H1N1 influenza. *J Clin Microbiol* 2012;50:1061–1063.
6. Peltola V, Waris M, Kainulainen L, et al. Virus shedding after human rhinovirus infection in children, adults and patients with hypogammaglobulinaemia. *Clin Microbiol Infect* 2013;19:E322–E327.
7. Jacobs SE, Soave R, Shore TB, et al. Human rhinovirus infections of the lower respiratory tract in hematopoietic stem cell transplant recipients. *Transpl Infect Dis* 2013;15:474–486.

Challenging Residual Contamination of Instruments for Robotic Surgery in Japan

To the Editor—Infectious complications after surgery are drivers of both costs and morbidity. We therefore read with considerable interest the recent paper "Challenging Residual Contamination of Instruments for Robotic Surgery in Japan" by Saito et al.[1] In their study, the authors assess residual protein concentration on reusable surgical instruments both immediately following surgery and after standard hospital cleaning. They found that, compared to traditional open instruments, robotic surgical instruments retained significantly more residual protein both immediately after surgery and after routine cleaning.

Robot-assisted surgery is an approach that has grown in popularity over the past decade. It has now become the most widely used approach for many common operations in the developed world.[2] In robotic surgery, instruments and cameras are inserted through small laparoscopic port sides and the surgeon sits at a console and manipulates the surgical instruments under direct video control. These robotic instruments contain miniaturized mechanical and electronic components that may be more difficult to clean than traditional surgical instruments.

Saito et al placed both robotic and open instruments in an ultrasonic sink and used sterile water flushes in combination with ultrasonication and protein assays to infer the amount of protein on instruments after surgery and after routine cleaning. They found that robotic surgical instruments had both higher residual protein concentration compared with open surgical instruments and a slower rate of decline in protein concentration.

These results make sense; instruments with complex miniaturized mechanical components have an exponentially larger surface area and probably should retain more protein compared to open surgical instruments, many of which are simple metal grasping tools like scissors or forceps. There are, however, some key questions that this paper does not address.

First, the authors did not control for size or surface area of instruments: robotic surgical instruments have a vastly greater length and surface area. In addition, the largest part of the robotic surgical instrument never enters the patient and is purely used to attach the instrument to the surgical robot. Another study of cleaning methods for robotic surgical devices showed false-positive results after cleaning robotic instruments because it was not clear whether the protein or substances were obtained from the distal working part or from the shaft.[3]

Second, the total number of instruments used during the operation was not assessed. For example, robot-assisted prostatectomy may be performed with a total of only 5 robotic instruments (2 needle drivers, a grasper, bipolar forceps, scissors, and large grasping forceps), whereas open surgery may require a larger number of individual instruments. A typical open prostatectomy may require multiple pairs of long and short forceps, both toothed and smooth, as well as many instruments that are obsolete in robotic surgery such as retractors, sponge sticks, or scalpels. Comparing the aggregate protein remaining on all instruments used in an operation may be more relevant than the per-instrument concentration.

Another methodological point relates to the measurement of protein remaining on the instruments. With the exception of rare entities like prion diseases, protein itself does not