New Mexico Epidemiology

June 1, 2018 Volume 2018, Number 5

Varicella Outbreak Response in a Federally Operated Detention Facility

Nithal Kuwa, MS, MPH
Epidemiology and Response Division
New Mexico Department of Health

Varicella (chickenpox) is an acute infectious disease caused by Varicella Zoster Virus (VZV). Varicella is highly contagious, and transmission occurs either through direct contact, droplet spread from coughing and sneezing or airborne through aerosolized vesicular fluid.[1,3] Secondary attack rates for varicella are high among unvaccinated populations compared to those that are vaccinated.[10] In 1995, a varicella vaccine was licensed in the United States with a two-dose routine vaccination series for children one year of age and older by the Advisory Committee on Immunization Practices (ACIP).[4] In addition, vaccination is recommended to prevent the spread of disease in susceptible close contacts to a person infected with varicella.[6,10,11]

Varicella is often more severe in adults than in children.[8] Adult complications may include viral pneumonia, secondary bacterial infections of skin lesions, and central nervous system manifestations.[3,9] Age pattern distribution of varicella varies by geographic location, in the United States varicella is mostly considered a childhood disease, while in tropical warmer regions it is more common in young adults.[2,7,12]

We investigated an outbreak of varicella in a detention center in Cibola County, New Mexico among a population of foreign born detainees. The center is owned and operated by a private company with federal oversight and contracted medical services.

Methods

Outbreak Setting. In February 2017, the New Mexico Department of Health (NMDOH) was notified of 2 clinically diagnosed varicella cases among detainees at a federally operated detention facility in Cibola County, NM. The facility is owned and operated by a private company and medical services are contracted to a separate private healthcare organization. At the time of the outbreak, the facility had a capacity of 1,116 beds, with more than 600 detainees and over 300 employees. Detainees originated from 32 countries with majority of them from Central and South America. The average stay at the facility was approximately 32 days.

*Detainee Processing***.** Upon intake, detainees received a medical screening exam that included a physical exam and tuberculosis screening. No routine immunizations or immunity status checks for common vaccine preventable diseases (VPDs) are administered or performed. Detainees were placed into units, with 4 pods per unit and each pod held approximately 60 detainees. Detainee assignment into pods is based on their custody level, which is determined by history of criminal activity or other perceived threat. All detainees go through hearings before a judge and thereafter are either transferred to other US Immigration and Customs Enforcement (ICE) facilities around the country or deported to their country of origin.

Case Definition. A case of varicella was defined as a detainee or employee with an acute onset of generalized maculo-papulovesicular rash and either a polymerase chain reaction (PCR) positive clinical sample or an epidemiologic link to a confirmed case. Varicella illness was classified as mild if they had less than 50 lesions, moderate if they had between 50 to 500 lesions and severe if they had over 500 lesions.

Outbreak Response. Upon diagnosis of the initial cases of varicella, the whole unit where detainees were originally housed was placed under quarantine and varicella immunity checks were performed. Evidence of immunity was determined by the presence of immunoglobulin G (IgG) titers towards varicella. Persons without evidence of immunity were further quarantined in a separate pod and individuals who developed disease were isolated into a different unused unit. The NMDOH provided further outbreak control recommendations

that included vaccinating exposed individuals without evidence of immunity.

Results

Between February 18 to May 5, 2017, a total of 29 varicella cases were identified during the outbreak. One case was laboratory confirmed for VZV by polymerase chain reaction (PCR) and 28 cases were epidemiologically-linked (Figure 1). The index cases were two detainees that had been transferred to the facility from an out of state facility. All 29 (100%) cases were male detainees with a median age of 22 (range 18-32) years. Of the confirmed cases, countries of birth included: India (24; 82.8%), Honduras (2; 6.9%), Ecuador (1; 3.4%), Nepal (1; 3.4%) and Mexico (1; 3.4%), (Table 1).

Previous vaccination status of cases was unknown, and immunity was determined by IgG titers. An immunity check was conducted for 82.8% (24/29) of the exposed cases. Only one of 24 (4.2%) tested detainees was found to be immune. No complications, hospitalizations, or immunocompromised conditions were reported among cases. Disease severity, based on number of lesions among detainees, was moderate for 26 cases (86.2%), one case (3.5%) had severe disease and 3 cases (10.3%) presented with mild disease. The majority of the cases 24 (82.8%) were febrile with a median illness duration of 7 (range 3-10) days (Table 2).

Control measures implemented by the facility included quarantine of detainees exposed to varicella and isolation of patients who developed disease. High risk employees, including women of child bearing age were excluded from working at units where detainees were either quarantined or isolated. Varicella vaccination was not offered for outbreak control.

Conclusion

An outbreak of varicella in a federally operated facility in New Mexico was investigated. Control measures including quarantine of detainees who were exposed to a varicella case and isolation of patients who developed disease likely reduced the spread of varicella in the facility. However, the outbreak lasted almost four incubation periods and vaccination of susceptible detainee's might have shortened the length of the outbreak. Varicella is highly contagious and person-to-person transmission occurs either through direct contact, airborne or droplet spread. Owing to the confined setting of detainees, disease most likely spread through airborne or direct contact from person to person, hence the large number of varicella cases in this outbreak.

The high number of detainees without evidence of immunity is similar to previous reports which is consistent with a high number of seronegative adults in tropical regions.[7,12] Even though varicella in adults can be severe,[1,3] disease severity among cases in this outbreak was moderate with no complications or hospitalizations reported. The source of the outbreak could not be determined as the detainees had been transferred

Table 1. Demographics of varicella cases at a federally operated facility, New Mexico, 2017

Characteristic	Case Patients N =29 (%)
Gender	
Male	29 (100)
Female	0 (0)
Age	
Median	22
Range	18-32
Country of Origin	
India	24 (82.8)
Honduras	2 (6.9)
Pakistan	1 (3.4)
Mexico	1 (3.4)
Nepal	1 (3.4)

from two other federal facilities in California and Arizona before they arrived in New Mexico. Their length of stay at those facilities and their arrival times into this country could not be determined. A detainee could have contracted this disease at one of the other detention facilities or they could have acquired it outside the United States.

Due to the dynamic complexity of ownership and operations of the facility, NMDOH was unable to convince the facility to vaccinate detainees who did not exhibit immunity and were exposed to a case. Vaccination of detainees that were exposed to varicella might have helped reduce the number of cases, shortened the duration of the outbreak and protected against future exposure. While control measures instituted by the facility likely reduced continued spread of varicella, regular business operations were disrupted due to quarantine of detainees and lengthy duration of the outbreak. Vaccination of susceptible detainees has been implemented in similar settings for outbreak control and has been shown to reduce the number of varicella cases.[5,13]

Furthermore, there were no organizational policies in place for healthcare employees to be vaccinated against any vaccine preventable diseases. Employee policies to mandate vaccination of healthcare employees will help prevent transmission of communicable diseases in such settings. This outbreak highlights the need to foster collaboration with federal facilities around developing a standard outbreak response approach to minimize disruption of daily operations, control spread and lessen the severity of future disease.

References

1. American Academy of Pediatrics. Committee on Infectious Diseases. Committee on the Control of Infectious Diseases. (2015). Red Book: Report of the Committee on Infectious Diseases. Elk Grove Village, IL: American Academy of Pediatrics.
2. Bock, H.L., Chup-Upprakarn, S., Hutagalung, Y., Kosuwan, P., Lolekha, S., Sornchai, P., Sutra, S., Tanthiphabha, W., Warachit, B., & Weil, J. 2001). Effect of climatic factors and population density on varicella zoster virus epidemiology within a tropical country. The American journal of tropical medicine and hygiene, 64(3-4), 131-136.
3. Centers for Disease Control and Prevention (CDC). (2015). Epidemiology and Prevention of Vaccine-Preventable Diseases. Hamborsky, J., Kroger, A., Wolfe, S. eds. 13th ed. Washington D.C.: Public Health Foundation.
4. Center for Disease Control and Prevention (CDC). (1996). Prevention of varicella: recommendations of the Advisory Committee on Immunization Practices (ACIP). *Morbidity Mortal Weekly Report (MMWR), 45*(RR-11), 1–36.
5. De Valliere, S., Cani, N., Grossenbacher, M., Puig, F., Masserey, E., & Bodenmann, P. (2011). Comparison of two strategies to prevent varicella outbreaks in housing facilities for asylum seekers. *International Journal of Infectious Diseases, 15*(10), e716-21.
6. Lee, B.R., Feaver, S.L., Miller, C.A., Hedberg, W.C., Ehresmann, K.R. (2004). An Elementary School Outbreak of Varicella Attributed to Vaccine Failure: Policy Implications. *The Journal of Infectious Disease, 190*(3). 477-483.
7. Mandal, B.K., Mukherjee P. P., Murphy, C., Mukherjee, R., Naik, T. (1998). Adult Susceptibility to Varicella in the Tropics Is a Rural Phenomenon Due to the Lack of Previous Exposure. *The Journal of Infectious Diseases, 178*(sp1), S52–S54.
8. Marin, M., Watson, T. L., Chaves, S.S., Civen, R., Watson, B.M., Zhang, J.X., Perella, D., Mascola, L., Seward, J.F. (2008). Varicella among Adults: Data from an Active Surveillance Project, 1995–2005. *The Journal of Infectious Diseases, 197*(Sp_2), S94–S100.
9. Preblud, S.R. (1981). Age-Specific Risks of Varicella Complications. *Pediatrics, 68* (1*),* 14-17.
10. Seward, J.F., Zhang, J.X., Maupin, T.J., Mascola, L., Jumaan, A.O. (2004). Contagiousness of Varicella in Vaccinated Cas-

Table 2. Characteristic of illness of varicella cases, federally operated facility outbreak, NM, 2017

Characteristic	Case Patients N =29 (%)
Fever	
Yes	24 (82.8)
No	5 (17.2)
Duration of Illness, Median (range)	7(3-10)
Rash Duration	
< 5 days	2 (6.9)
5-6 days	11(37.9)
7-10 days	16 (55.2)
No. of Vesicular Lesions	
<50	3 (10.3)
50-500	25 (86.2)
>500	1(3.5)

The New Mexico Epidemiology Report

Michael G. Landen, M.D., M.P.H.
State Epidemiologist & Editor

The New Mexico Epidemiology Report
(ISSN No. 87504642) is published monthly
by the
Epidemiology and Response Division
New Mexico Department of Health
1190 St. Francis Dr.
P.O. Box 26110, Santa Fe, NM 87502

24-Hour Emergency Number:
(505) 827-0006
www.health.state.nm.us

Figure 1. Varicella Cases at the Federally Operated Facility with Rash Onset Dates February to May 2017, New Mexico