

# Chicken pox outbreak in the Intensive Care Unit of a tertiary care hospital: Lessons learnt the hard way

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## Abstract

Varicella-zoster virus (VZV) causes 2 clinically and epidemiologically distinct forms of diseases. Chickenpox (varicella) is the disease that results from primary infection with the VZV. Herpes zoster (HZ) results from the reactivation of VZV latently infecting the dorsal root ganglia. We are reporting an outbreak of varicella infection among the health care workers (HCWs) in the Intensive Care Unit (ICU) of a tertiary care hospital. We found transmission of varicella among eight HCWs of pulmonary ICU. They had a history of contact with a patient having HZ infection. Investigation of the outbreak was conducted as per guidelines. Better dissemination of information on disease transmission, isolation of infected patients inside the hospital, and adequate protection (including vaccination) for susceptible employees are important to prevent such outbreaks.

**Keywords:** Chickenpox, herpes zoster, vaccination, varicella, varicella-zoster virus

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## Introduction

Chickenpox (varicella) is a highly contagious rash illness that is transmitted from patients with either varicella or herpes zoster (HZ) by direct contact or airborne spread.<sup>[1,2]</sup> HZ results from the reactivation of varicella-zoster virus (VZV), latently infecting the dorsal root ganglia. Persons with HZ are infectious during the vesicular stages of rash. Localized HZ is approximately one-fifth as infectious as Chicken Pox or disseminated HZ.<sup>[1]</sup> Reports have indicated the rare occurrence of airborne transmission of VZV from HZ case-patients in healthcare settings.<sup>[3]</sup> HZ case-patients have also been identified as the index case in the outbreaks of varicella.<sup>[4]</sup> Here, we are reporting an outbreak of varicella in the Intensive Care Unit (ICU) of a tertiary care hospital.

## Case Report

A nursing student reported in the outpatient department on 18<sup>th</sup> March with history of fever for

2 days followed by vesicular lesions on face, chest, and back, which later spread to the whole body. From her history and clinical examination of the lesions, she was suspected to have varicella infection. She denied being in contact with a chicken pox infected case at home or in the hospital, but revealed that she had been attending a patient with HZ infection in the pulmonary ICU (PICU) during the last week of February. She was not immune to varicella infection, i.e., she was neither vaccinated nor had been infected with varicella virus previously. Fluid from the blisters was sent for serological examination which later confirmed the diagnosis of VZV infection. Two days later, two staff nurses and a medicine resident doctor, also posted in the PICU, reported with similar history and clinical manifestations. Four more health care workers (HCWs) (nurses) from PICU reported with fever and vesicular lesions within 1 week of the

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first case. All the HCWs were started on treatment and granted leave from duty and the matter was reported to infection control committee and the administration. Investigation of the outbreak was conducted, and the probable index case was 60-year-old male admitted on February 10<sup>th</sup> 2015 with road side accident, blunt trauma chest, rib fractures with right intercostal drain *in situ* with right lower zone pneumonia, renal failure, and left ventricular dysfunction. The patient went into septic shock despite antibiotic cover and resuscitative measures. Skin lesions in right L2, 3, 4 dermatome noticed on February 28<sup>th</sup> 2015. Skin consultation was taken and lesions identified as localized HZ, and the patient was started on tab acyclovir 800 mg tds for 7 days and T-bact ointment dressings. The patient succumbed to septic shock and multiorgan failure on March 14<sup>th</sup> 2015. The patient had expired before we had first report of chicken pox infection in HCW. A total of eight HCWs were infected with VZ virus in 3<sup>rd</sup> and 4<sup>th</sup> week of March. All the infected HCWs were directly or indirectly involved in care of the index case. The rest of the susceptible staff (medical and paramedical) of PICU was vaccinated with chickenpox vaccine. All the old and new patients admitted to the PICU during this period were screened and tracked for about 2 months and did not develop any such lesions. On follow-up, no new VZV infection among HCWs or patients was reported.

## Discussion

Chickenpox is highly contagious and the average incubation period is 14 days (10–21 days). Persons with varicella are considered infectious from 1 to 2 days before the rash appears and until all lesions are crusted over.<sup>[5,6]</sup> An outbreak of varicella is defined as the occurrence of five or more cases in a specific setting that are epidemiologically linked. Cases should be considered part of an outbreak if they occur within at least one incubation period (10–21 days) of the previous case-patient, and surveillance should continue through two full incubation periods (42 days) after the rash onset of the last identified case-patient to ensure that the outbreak has ended.<sup>[7]</sup>

Reactivation of latent VZV results in HZ infection (shingles). Patients with zoster have been found to be contagious to those who have no immunity to VZV. The route of transmission is via direct contact of the skin or exposure to dressings or clothing soiled with blister fluid from such individuals. Therefore, HZ is considered far less contagious than its varicella counterpart because the virus is believed to be localized to the skin and does not involve the respiratory tract.<sup>[6]</sup> Current guidelines for

prevention of varicella spread from a HZ patient state that in all cases, standard infection-control precautions should be followed. They recommend the covering of HZ lesions as a means of preventing nosocomial spread and do not recommend the isolation of all affected patients.<sup>[8]</sup> Whereas we are stressing the fact that even localized HZ infection can lead to chickenpox outbreak, so probably only contact precautions may not suffice. Studies have now shown that airborne transmission may occur in both varicella and zoster. Strategies for managing zoster patients may have to incorporate the same precautions of airborne transmission as with varicella patients to reduce the risk for transmission.<sup>[9]</sup>

Vaccination for chickenpox is not included in National Immunization schedule, but is recommended by Indian Academy of Pediatrics. Chickenpox in adults is more severe than in children, so it is better to get the children vaccinated. Unvaccinated VZV exposed healthcare personnel without evidence of VZV immunity should receive postexposure vaccination as soon as possible. Vaccination within 3–5 days of exposure to rash may modify the disease if infection occurred. Vaccination 6 or more days after exposure is still indicated because it induces protection against subsequent exposures. A second dose is given 4–6 weeks after the first dose. For unvaccinated VZV-susceptible healthcare personnel at risk for severe disease and for whom varicella vaccination is contraindicated (e.g., pregnant healthcare personnel), varicella-zoster immune globulin after exposure is recommended.<sup>[8]</sup>

In the present scenario, a breach in infection control precautions may have caused varicella outbreak in our ICU. Now, we have made certain changes in our hospital policy to prevent a future outbreak. Healthcare personnel would be alerted to the risks of possible infection and offered 2 doses of varicella vaccine when they begin employment. Stringent airborne and contact precautions will be ensured not only in patients suffering from varicella, but also in patients with HZ infection in future.

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## Conflicts of interest

There are no conflicts of interest.

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