

Occupationally Related Outbreak of Chickenpox in Hospital Staff: A Learning Experience

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ABSTRACT

Varicella (chicken pox) is a highly contagious disease which is caused by Varicella Zoster Virus (VZV), a ubiquitous human α herpes virus. Nosocomial varicella in hospital employees can be costly to the hospital and disruptive to patient care. This case report describes an occupationally related outbreak of chickenpox in hospital staff and the lessons which were learnt by the hospital during this experience.

Key words: Occupational outbreak, Chicken-pox, Hospital

CASE REPORT

The index patient was a 23-year-old male who presented to the Emergency Department of a tertiary care hospital in Jaipur, India in a state of shock. This patient was a known renal transplant recipient who was on Cyclosporine, Azathioprine and Prednisolone. A history of fever and abdominal discomfort since 4 days, with treatment at some local nursing home, was provided by his attendants. He was shifted to the hospital without any prior information and communication about his state of illness.

On admission, his vitals were found to be as follows: pulse- 150/minute, B.P- 40/20 mm Hg, Respiratory rate:-20/minute and SPO₂-84%. Since the patient's condition was critical, he was immediately shifted to the medical ICU. During his immediate resuscitation over there, he was attended by three doctors: a Consultant Nephrologist, an Intensivist and a Senior Resident (Medicine) and three nursing staff (two in the ICU and one in Emergency). The patient was intubated and ventilated. A right femoral central venous catheter and a right radial arterial line were introduced and ionotropes and antibiotics were started. Despite the emergency interventions, the patient succumbed to death two hours later. During the course of treatment, a generalized maculopapulovesicular rash was noted on the patient's body. A history of chickenpox was also elicited on enquiry from the patient's sister later.

Since, the patient was not put under isolation and as no contact or respiratory precautions had been undertaken, the Infection control team was summoned for advice and intervention. As the facility for VZV Ig G antibody testing was not available in the in-house lab, ACIP (Advisory Committee on Immunization Practices) guidelines [1] were followed for varicella vaccination as a Post-Exposure Prophylaxis (PEP). Varicella vaccine was administered (within 8 hours) as PEP to five susceptible employees among the six employees who were directly exposed to this patient; the sixth employee gave a history of a previous varicella infection. Oral Acyclovir was also administered to all those who were exposed. The exposed staff were instructed to continue working with masks on and to report back immediately in case of onset of any prodromal symptoms. The ICU was closed down for fumigation exercise and the other two patients in the ICU were moved to the High Dependency Unit (HDU).

Fourteen to sixteen days later, secondary cases were reported in 6 of the hospital staff, which included three vaccine recipient staff (two nursing and one doctor), another nursing staff who was posted in the same ICU but who was not directly involved in caring for this patient and two ward boys who were posted in the ICU area. Tertiary cases were further identified at varying intervals of days,

which ranged between 10-21 days over the next one and a half months, which involved seven other nursing staff and one ward boy. These cases had no direct contact with the index case, but they had either worked or resided (in the nurses hostel) with the secondary cases before their diagnoses had been made.

In all, 14 healthcare workers acquired chicken pox either directly or indirectly from the index case. The affected staff was furloughed from work, from start of prodrome till complete crusting of all rashes. No case of nosocomial transmission of chicken pox to patients was identified during the outbreak period.

For the purpose of investigations, the outbreak recognition or definition was taken as three cases or more from any given long term care facility, within one incubation period and chicken pox cases were defined according to CDC case classification [2]. Definition of exposure was considered as the presence in the same room of a known case, regardless of duration of time and a susceptible employee was defined as one who had never had varicella and who had never been vaccinated before being in contact with affected persons.

DISCUSSION

VZV is transmitted by direct contact, droplets or by airborne spread of vesicle fluid or secretions of the respiratory tract of patients with chicken pox or herpes zoster [3]. According to CDC classification, a confirmed case is one that is confirmed by laboratory testing or one that meets the clinical case definition and is epidemiologically linked to a confirmed or a probable case [2]. The common source of exposure in our subjects and the development of skin lesions, which are typical of chicken pox within the expected incubation period, made an alternative diagnosis unlikely. Moreover, no extra hospital sources of infection could be determined.

Since the precise health records of staff who had histories of previous VZV infections were not available, it became difficult to identify the exact number of susceptible persons. The information on transmission risk did not reach all the employees. Some of the susceptible staff continued working with the exposed staff even after the varicella contact. Many exposures occurred even before the diagnosis of outbreak was made and infection control measures were initiated. Moreover, an air borne transmission led to infection in persons who were not usually considered to be at a risk of exposure, like the nurse in ICU, who was not involved in direct index patient care and the two ward boys who were posted in ICU area. These were some of the difficulties which were encountered in the control of outbreak in our setting.

This case series emphasizes that a high index of suspicion has to be maintained during triaging. All employees should be made aware about transmission of varicella, the reasons for isolation and other preventive measures that should be undertaken for patients and Healthcare Workers (HCWs). The maintenance of strict isolation for varicella, which is spread by respiratory route as well as direct contact, should be a routine procedure.

As a learning lesson, our hospital staff have been educated after this case series, about the important role of adherence to preventive measures, for averting outbreaks. Exclusion of susceptible staff from attending to the affected patients has been implemented. Several investigators have concluded that a negative history was an unreliable indicator of a susceptibility to VZV among HCWs, but a positive history could be used as a predictor of immunity [4,5]. Based on these findings, in order to minimize healthcare transmission risk, a list of 25 healthcare workers with prior documented VZV infection was drafted for our hospital and a policy for reallocation of HCWs from this list for handling chickenpox patients was successfully employed for other cases of varicella infections, with no further reported outbreak of an occupational exposure.

Our case series points towards the need for a routine investigation of Varicella immunization status of healthcare workers. A mass one time VZ antibody screening programme of all HCWs, with a subsequent routine pre-employment screening of all new employees, can be performed. Cost-effectiveness of this screening method is not known. A universal vaccination of varicella susceptible individuals has also been suggested. This shall prevent not only a serious occupational exposure, but it will also minimize transmission of varicella to susceptible patients during the preclinical phase of primary varicella in HCWs. Although the varicella vaccine is safe and effective, its cost is a deterrent to its use in routine immunization programmes [6].

Despite being mostly benign in healthy individuals, varicella infection can result in a substantial loss of productivity. In our case series, there was a cumulative loss of 202 work days and the costs which were associated with excluding the employees with chickenpox from work was Rs 63,092/-. Additional expenses for the vaccines and drugs was Rs 7,760/- which amounted to a total of Rs 70,852/-. These costs should be considered for benefit-cost analysis of Varicella immunization of healthcare personnel.

CONCLUSION

The intention behind the reporting of this case was to emphasize the potential danger of occupational varicella in susceptible hospital staff. Awareness, alertness, systematic care and procedures guided by the hospital policy, are essential for prevention of any infection outbreak.

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