CASE REPORT

Chickenpox ARDS in a health care worker following occupational exposure

A. Knaggs,* J. Gallagher† and G. D. Shorten*

*Department of Anaesthesia and Intensive Care Medicine, Cork University Hospital, Wilton, Cork, Ireland; †Occupational Health Department, Cork University Hospital, Wilton, Cork, Ireland

A case is described of chickenpox acute respiratory distress syndrome (ARDS) in an ambulance driver following occupational exposure. This case illustrates that screening for, and vaccination of health care workers against, chickenpox warrants further attention.

Key words: ARDS; chickenpox; health care worker; occupational exposure; varicella vaccine.

INTRODUCTION

A live attenuated varicella vaccine was licensed by the Food and Drug Administration (FDA) in March 1995 for use in adults. This vaccine will soon be licensed in the United Kingdom and Ireland. In this paper, a case is described of chickenpox acute respiratory distress syndrome (ARDS) in an ambulance driver following occupational exposure. This case illustrates that screening for, and vaccination of health care workers against, chickenpox warrants further attention.

SUBJECT

A case is described of a 42-year-old ambulance driver who developed chickenpox 13 days after participating in an inter-hospital transfer of a pregnant patient, at 35 weeks gestation, who was known to have chickenpox pneumonia. The 26-year-old patient had been admitted to a maternity hospital with an antepartum haemorrhage. On admission, she was found to be tachypnoeic and cyanosed. She had the typical vesicular rash of chickenpox. She was transferred to a general hospital for intensive care management. The ambulance driver was in close contact with the patient during the entire transfer but he wore no specific personal protective equipment. Shortly after arrival, she delivered a stillborn baby. Subsequently, her trachea was intubated and she required 33 days of ventilatory support. Eighteen days after this transfer, the ambulance driver was admitted to our hospital in severe respiratory distress (respiratory rate 40/min) and hypoxic. Five days prior to this, his general practitioner had initiated treatment with acyclovir as the driver presented with the typical rash of varicella. After a brief trial of continuous positive airway pressure, tracheal intubation was necessary. Bilateral diffuse patchy consolidation was visible on chest radiograph. Ventilatory support was required for 13 days. Pulmonary capillary wedge pressure was normal (12 mmHg). A diagnosis of chickenpox ARDS was made. He developed a gram positive septicaemia and secondary thrombocytopenia (the lowest platelet count was 53,000 µL⁻¹). Treatment comprised inotropic support and administration of immunoglobulin, acyclovir and erythromycin.

Of note, the patient had undergone splenectomy following a road traffic accident 20 years previously and had a 20 pack-year smoking history. He had no recollection of having had chickenpox and his antibody status had not been determined prior to this exposure.
DISCUSSION

Between five and 10 per cent of adults are non-immune to chickenpox.¹ Recent data indicates that the prevalence of adult disease in the UK has increased.² This may result in an increase in infection rate amongst health care workers (HCWs) and more frequent nosocomial spread.² Immigrant adults from tropical countries are more susceptible because the heat-sensitive varicella virus does not seem to spread as successfully among children there.³

The case-fatality rate from chickenpox is higher for adults than for those aged 1–14 years (25.2 cases per 100,000 for those aged 30–49 years and 0.75 cases per 100,000 for those aged 1–14 years).⁴ Viral pneumonitis following chickenpox occurs in 16–50% of adults⁵ and smokers are more likely to develop pulmonary consolidation.⁶ Varicella zoster virus (VZV) has the potential to cause disseminated infection of the lungs, liver, central nervous system and other organs if the host immune response is inadequate to terminate cell-associated viremia.⁷ Immunosuppression secondary to splenectomy and a significant smoking history may have accounted for the severity of the pulmonary manifestations in this case.

The Centre for Disease Control (CDC) recommends that all health care workers should ensure that they are immune to varicella.⁴ In one study, using a latex agglutination assay, 4.8% of those who thought they had had chickenpox were non-immune.⁵ A VZV screening programme would enable the pool of susceptible HCWs to be identified and appropriate risk management procedures to be instituted.⁶ These would include the use of personal protective equipment and the administration of varicella zoster immune globulin (VZIG). Screening for chickenpox antibodies could be carried out most efficiently at the same time as hepatitis and rubella titres.

Chickenpox is highly contagious, with transmission rates of 80–90%.¹ The index case is infectious for 24 to 48 hours before the exanthem begins.⁷ The recommendation by the American Academy of Pediatrics, for varicella-susceptible HCWs who are exposed to VZV, is that they should be excused from patient contact from days 8 to 21 after the onset of the rash in the index case.⁸ Similar recommendations have been issued by the CDC.⁸ The policy of routine exclusion of susceptible HCWs from patient contact after exposure to varicella is disruptive and inadequate for preventing spread of infection in the hospital setting.⁸ In one study, four out of five paediatric residents contracted chickenpox without a recognizable source.⁸

The cost of infection control measures adopted during cases of suspected transmission from HCWs to patients can be high, especially if the adult concerned is involved in the care of immunocompromised patients. In one such case, the total cost of infection control measures adopted, amounted to £5,435.² These measures included the use of VZIG, prophylactic acyclovir and the follow-up of staff and patients. The cost of VZIG is approximately £1,000 per adult recipient.² The policy of relocation for varicella-susceptible HCWs exposed to VZV will have financial implications when locums are employed. Estimation of the total costs should include litigation-related damages and increased insurance premiums.

A live attenuated varicella vaccine was licensed by the FDA in March 1995 for use in individuals 12 months or older who have not had varicella.¹ It has recently been approved for the immunization of healthy children in Germany.⁹ It is neither licensed in the UK or in Ireland, but is available on a named patient basis. Although a varicella vaccine was not available when the subject of this report was infected, he was neither isolated nor was VZIG administered after the exposure.

Varicella virus vaccine is recommended by the CDC for all susceptible hospital personnel.⁴ Waning immunity may be detected necessitating a booster vaccination.¹⁰ Widespread use of the vaccine will limit the cost of infection control measures.⁴

The case described supports the contention that all HCWs should be screened by serology for immunity to chickenpox, before patient contact occurs. The present procedures for protecting HCWs from chickenpox are both expensive and incompletely effective. We conclude that the vaccination of HCWs against chickenpox requires further consideration.

REFERENCES