



AUSTRALIAN
H E R P E S
M A N A G E M E N T
F O R U M

GUIDELINES FOR CLINICIANS

Overview of Varicella *Zoster Virus*

Varicella Zoster Virus Infections

Varicella zoster virus (VZV) is a unique member of the Herpesviridae family, as it can infect both skin and nerves and develop latent infection within the dorsal root and trigeminal ganglia. Infection with this virus is common and causes a wide range of clinical syndromes. Although this virus infects healthy children and adults, disease is more severe and extensive in the immunocompromised.

For more information on herpes zoster (shingles) and post herpetic neuralgia please refer to AHMF clinical guidelines and patient resources.

Pathogenesis and epidemiology

Varicella zoster virus (VZV) is spread by the respiratory route and disseminates to lymph nodes and then via lymphocytes back to the skin, resulting in the rash of chickenpox. Like Herpes Simplex Virus types 1 and 2 (HSV1 and HSV2), VZV infects the neurones of the dorsal root ganglia, where it causes lifelong latency. However, VZV reactivates much less often than HSV - in association with waning T-cell immunity - usually causing only one lifetime episode of herpes zoster (shingles). Nevertheless, VZV causes more severe damage to the nerve and dorsal root ganglia than HSV, leading to pain and often neural dysfunction. Prolonged pain may result from scarring of neural tissue.¹

Most people in developed countries are infected with VZV in childhood, with 90% seropositive by adulthood. Herpes zoster can develop at any age, but the highest incidence is after 60 years. Overall, it occurs in 20% of the population, with more than one recurrence in 4%.¹

Clinical features

Chickenpox

Chickenpox is usually a mild disease in healthy children, but more severe in adults. It is often heralded by posterior cervical lymphadenopathy and fever, after an incubation period of two weeks. The rash is centripetal, being concentrated on the body rather than the limbs, and the lesions evolve through papular, vesicular and crusting stages, with lesions at different stages of evolution evident.

Complications include haemorrhagic lesions, cerebellitis, pneumonitis, arthritis and secondary infection (usually staphylococcal or streptococcal). Complications are rare



Figure 1: Pneumonitis caused by varicella zoster virus

in immunocompetent children, but about 50 times more common in adults (especially pneumonitis and hepatitis; Figure 1). Visceral spread to lungs and liver occurs in 30%-50% of children with T-cell deficiency, with a mortality rate as high as 15%,² compared with 0.1%-0.4% in healthy children.

A congenital varicella syndrome occurs after maternal chickenpox during pregnancy, at rates of 2%, if infection occurs during weeks 13-20 of gestation, and 0.4% if infection occurs before 13 weeks.³ Features of fetal infection include limb hypoplasia, dermatomal skin scarring and ocular and brain abnormalities.³ Severe neonatal infection can follow maternal chickenpox around the time of delivery.

Diagnosis

Primary varicella infection is usually diagnosed clinically. Laboratory diagnosis is recommended when the clinical picture is atypical or complicated, and to determine immune status to VZV in high-risk people.

Like HSV, VZV is detected in lesions by culture, antigen or genome detection, or by the antibody response to infection. However, VZV is more closely associated with cells than HSV, so a swab must scrape infected cells from the base of the lesion. Direct antigen detection by immunofluorescence can be performed within two hours,⁵ while genome detection by PCR is highly sensitive.

Antibody testing for VZV IgM and IgG can detect either acute infection or previous exposure. Measurement of VZV IgG can determine immunity to varicella, which is useful in determining if patients need zoster immunoglobulin after varicella exposure, or varicella vaccination. VZV IgM is seen in acute chickenpox and in about 70% of individuals with herpes zoster.

Management

Chickenpox

Antiviral treatment is not usually recommended for uncomplicated chickenpox, but should be considered for children with severe, complicated disease, neonates, adults and immunocompromised people. Treatment should begin within 24-48 hours of onset. Children with chickenpox are usually excluded from school until all lesions have crusted and they have recovered. Hospital patients with chickenpox require respiratory isolation (eg, nursing in a single room with negative pressure, if available, and use of masks) to prevent nosocomial infection.

Prevention

Zoster immunoglobulin is indicated within 96 hours of significant exposure (eg, household or classroom contact) in people who are immunocompromised, susceptible pregnant women, neonates who are premature (less than 28 weeks' gestation or weight less than 1000g) or whose mothers are susceptible to varicella or develop chickenpox within seven days before or after delivery.⁶

Prevention

Zoster immunoglobulin is indicated within 96 hours of significant exposure (eg, household or classroom contact) in people who are immunocompromised, susceptible pregnant women, neonates who are premature (less than 28 weeks' gestation or weight less than 1000g) or whose mothers are susceptible to varicella or develop chickenpox within seven days before or after delivery.⁶

An effective live attenuated varicella vaccine is available and is highly effective against moderately severe and severe disease.⁷ It is given as a single dose to children aged 12 months to 12 years, and as two doses one to two months apart to people over 13 years or those who are immunocompromised. In Australia, as of November 2005, the Varicella vaccine is available free of charge to 18 month old children as part of the vaccination schedule. The vaccine is also indicated for non-immune people in the following categories: workers in high-risk occupations, women before pregnancy, parents of young children, and contacts of immunocompromised people.⁶

References

1. Cunningham AL, Dworkin RH. The management of post-herpetic neuralgia. *BMJ* 2000; 321: 778-779.
2. Arvin AM. Management of varicella-zoster virus infections in children. *Adv Exp Med Biol* 1999; 458: 167-174.
3. Enders G, Miller E, Cradock-Watson J, et al. Consequences of varicella and herpes zoster in pregnancy: prospective study of 1739 cases. *Lancet* 1994; 342: 1548-1551.
4. Cohen JI, Brunell PA, Straus SE, Krause PR. Recent advances in varicella-zoster virus infection. *Ann Intern Med* 1999; 130: 922-932.
5. Rawlinson WD, Dwyer DE, Gibbons VL, Cunningham AL. Rapid diagnosis of varicella-zoster virus infection with a monoclonal antibody based direct immunofluorescence technique. *J Virol Methods* 1989; 23: 13-18.
6. National Health and Medical Research Council. The Australian immunisation handbook. 7th ed. Canberra: AGPS, 2000.
7. Vazquez M, LaRussa PE, Gershon A, et al. The effectiveness of the varicella vaccine in clinical practice. *N Engl J Med* 2001; 344: 955-960.
8. Diaz-Mitoma F, Sibbald RG, Shafran SD, et al. Oral famciclovir for the suppression of recurrent genital herpes. A randomized controlled trial. *JAMA* 1998; 280: 887-892.

Updated May 2009.

Disclaimer

The AHMF have made considerable efforts to ensure the information upon which this guideline is based reproduces the evidence as accurately as possible. Users of this guideline are strongly recommended to confirm that the information contained within it, especially drug indications, is correct by way of independent sources, as this guideline does not indicate an exclusive course of action or serve as a standard of medical care. The AHMF accepts no responsibility for any inaccuracies, information perceived as misleading, or success of any treatment regime detailed in this guideline.