INTERNATIONAL JOURNAL OF PHARMACEUTICAL, CHEMICAL AND BIOLOGICAL SCIENCES

Available online at www.ijpcbs.com

Review Article

HERPES ZOSTER (HZ): A FATAL VIRAL DISEASE: A COMPERHENSIVE REVIEW

Rishikesh Deshmukh*, Amol Raut, Sharad Sonone, Sachin Pawar, Nilesh Bharude, Arvind Umarkar, Girish Laddha and Rahul Shimpi

Shree Sureshdada Jain Institute of Pharmaceutical Education & Research
Jamner, Maharashtra, India.

ABSTRACT

Herpes zoster (HZ) is an viral disease. It also known as shingles. Zoster is a localized, generally painful cutaneous eruption that occurs most frequently among older adults and immunocompromised persons. It is caused by reactivation of latent varicella zoster virus (VZV) decades after initial VZV infection is established. Approximately one in three persons will develop zoster during their lifetime, if the same persone suffer two times by herpes zoster (HZ) that time lots of chances are accured the persone will be a HIV positive. Typically, the rash runs its course in a matter of 4-5 weeks. Herpes zoster can occur anywhere in the body but is Unfortunately common on the face and in and around the eye. Some serious complications can occur., The pain of herpis zoster however, may persist months, even years, after the skin heals. This phenomenon is known as post herpetic neuralgia (PHN).

The aim of this review article is that to give the knowledge to the people about this beauty damaged herpes zoster disease . and how to take the prevention from this disease.

Key words: Herpes zoster(HZ) , varicella zoster virus (VZV).

INTRODUCTION

Herpes zoster (HZ) is the reactivated form of the Varicella zoster virus (VZV), the same virus responsible for chickenpox. HZ is more commonly known as shingles, from the Latin cingulum, for “girdle.” This is because a common presentation of HZ involves a unilateral rash that can wrap around the waist or torso like a girdle. Similarly, the name zoster is derived from classical Greek, referring to a beltlike binding (known as a zoster) used by warriors to secure armor. Annually, over 500,000 people in the United States experience a shingles outbreak.[1] Over 90 percent of the adult population in the United States has serological evidence of a prior VZV infection and thus are at risk for developing shingles.[2] There is no way to predict who will develop HZ, when the latent virus may reactivate, or what may trigger its reactivation. However, the elderly and those with compromised immunity – such as those who have undergone organ transplantation or recent chemotherapy for cancer, or

individuals with HIV/AIDS – are at greater risk for developing HZ. Between 10-20 percent of normal (immunocompetent) adults will get shingles during their lifetime.[1,3,4] This figure increases dramatically to 50 percent for those over age 85 years[5].

History

Herpes zoster has a long recorded history, although historical accounts fail to distinguish the blistering caused by VZV and those caused by smallpox,[6]ergotism, and erysipelas. It was only in the late eighteenth century that William Heberden established a way to differentiate between herpes zoster and smallpox,[7]and only in the late nineteenth century that herpes zoster was differentiated from erysipelas. In 1831, Richard Bright hypothesized that the disease arose from the dorsal root ganglion, and this was confirmed in an 1861 paper by Felix von Bärunsprung[8].

The first indications that chickenpox and herpes zoster were caused by the same virus were noticed at the beginning of the 20th century. Physicians began to report that cases of herpes zoster were often followed by chickenpox in the younger people who lived with the shingles patients. The idea of an association between the two diseases gained strength when it was shown that lymph from a sufferer of herpes zoster could induce chickenpox in young volunteers. This was finally proved by the first isolation of the virus in cell cultures, by the Nobel laureate Thomas Huckle Weller, in 1953[9].

Until the 1940s, the disease was considered benign, and serious complications were thought to be very rare[10]. However, by 1942, it was recognized that herpes zoster was a more serious disease in adults than in children, and that it increased in frequency with advancing age. Further studies during the 1950s on immunosuppressed individuals showed that the disease was not as benign as once thought, and the search for various therapeutic and preventive measures began.[11]y the mid-1960s, several studies identified the gradual reduction in cellular immunity in old age, observing that in a cohort of 1,000 people who lived to the age of 85, approximately 500 (i.e., 50%) would have at least one attack of herpes zoster, and 10 (i.e., 1%) would have at least two attacks[12].

In historical shingles studies, shingles incidence generally increased with age. However, in his 1965 paper, Dr. Hope-Simpson was first to suggest, “The peculiar age distribution of zoster may in part reflect the frequency with which the different age groups encounter cases of varicella and because of the ensuing boost to their antibody protection have their attacks of zoster postponed.”[13]ending support to this hypothesis that contact with children with chickenpox boosts adult cell-mediated immunity to help postpone or suppress shingles, is the study by Thomas et al., which reported that adults in households with children had lower rates of shingles than households without children.[14] Also, the study by Terada et al. indicated that pediatricians reflected incidence rates from 1/2 to 1/8 that of the general population their age[15].

Signs and symptoms

The most common symptoms of herpes zoster, which include migrain headache, fever, and malaise, are nonspecific, and may result in an incorrect diagnosis[16,17]. These symptoms are commonly followed by sensations of burning pain, itching, hyperesthesia (oversensitivity), or paresthesia ("pins and needles": tingling, pricking, or numbness).[18] The pain may be mild to extreme in the affected dermatome, with sensations that are often described as stinging, tingling, aching, numbing or throbbing, and can be interspersed with quick stabs of agonizing pain[19].Herpes zoster in children is often painless, but older people are more likely to get zoster as they get older, and the disease tends to be more severe[20].

In most cases after 1–2 days, but sometimes as long as 3 weeks, the initial phase is followed by the appearance of the characteristic skin rash. The pain and rash most commonly occurs on the torso, but can

appear on the face, eyes or other parts of the body. At first the rash appears similar to the first appearance of hives; however, unlike hives, herpes zoster causes skin changes limited to a dermatome, normally resulting in a stripe or belt-like pattern that is limited to one side of the body and does not cross the midline.[18] Zoster sine herpete ("zoster without herpes") describes a patient who has all of the symptoms of herpes zoster except this characteristic rash.[21] Later the rash becomes vesicular, forming small blisters filled with a serous exudate, as the fever and general malaise continue. The painful vesicles eventually become cloudy or darkened as they fill with blood, crust over within seven to ten days; usually the crusts fall off and the skin heals, but sometimes, after severe blistering, scarring and discolored skin remain[18].

Herpes zoster may have additional symptoms, depending on the dermatome involved. Herpes zoster ophthalmicus involves the orbit of the eye and occurs in approximately 10–25% of cases. It is caused by the virus reactivating in the ophthalmic division of the trigeminal nerve. In a few patients, symptoms may include conjunctivitis, keratitis, uveitis, and optic nerve palsies that can sometimes cause chronic ocular inflammation, loss of vision, and debilitating pain.[22] zoster oticus, also known as Ramsay Hunt syndrome type II, involves the ear. It is thought to result from the virus spreading from the facial nerve to the vestibulocochlear nerve. Symptoms include hearing loss and vertigo (rotational dizziness)[23].

Diagnosis

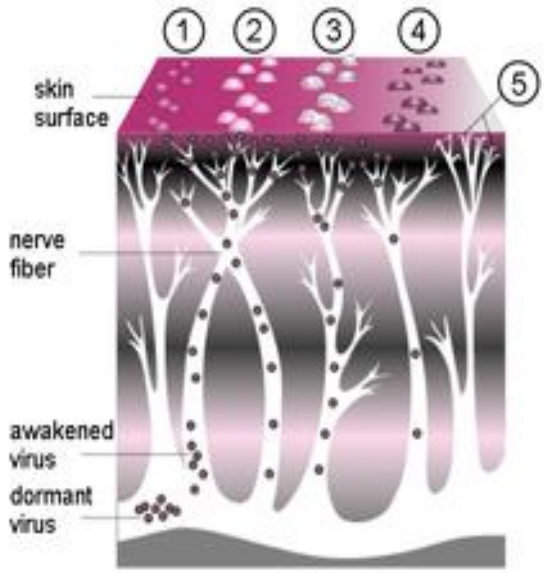
Zoster diagnosis might not be possible in the absence of rash (e.g., before rash or in cases of zoster sine herpete). Patients with localized pain or altered skin sensations might undergo evaluation for kidney stones, gallstones, or coronary artery disease until the zoster rash appears and the correct diagnosis is made[24]. In its classical manifestation, the signs and symptoms of zoster are usually distinctive enough to make an accurate clinical diagnosis once the rash has appeared[25]. Occasionally, zoster might be confused with impetigo, contact dermatitis, folliculitis, scabies, insect bites, papular urticaria, candidal infection, dermatitis herpetiformis, or drug eruptions. More frequently, zoster is confused with the rash of herpes simplex virus (HSV), including eczema herpeticum[26-30]. The accuracy of diagnosis is lower for children and younger adults inwhom zoster incidence is lower and its symptoms less often classic.

In some cases, particularly in immunosuppressed persons, the location of rash appearance might be atypical, or a neurologic complication might occur well after resolution of the rash. In these instances, laboratory testing might clarify the diagnosis[31–35]. Tzanck smears are inexpensive and can be used at the bedside to detect multinucleated giant cells in lesion specimens, but they do not distinguish between infections with VZV and HSV. VZV obtained from lesions can be identified using tissue culture, but this can take several days and false negative results occur because viable virus is difficult to recover from cutaneous lesions. Direct fluorescent antibody (DFA) staining of VZV-infected cells in a scraping of cells from the base of the lesion is rapid and sensitive. DFA and other antigen-detection methods also can be used on biopsy material, and eosinophilic nuclear inclusions (Cowdry type A) are observed on histopathology. Polymerase chain reaction (PCR) techniques performed in an experienced laboratory also can be used to detect VZV DNA rapidly and sensitively in properly-collected lesion material, although VZV PCR testing is not available in all settings. A modification of PCR diagnostic techniques has been used at a few laboratories to distinguish wild-type VZV from the Oka/ Merck strain used in the licensed varicella and zoster vaccines.

In immunocompromised persons, even when VZV is detected by laboratory methods in lesion specimens, distinguishing chickenpox

from disseminated zoster might not be possible by physical examination [36] or serologically[37–39]. In these instances, a history of VZV exposure, a history that the rash began with a dermatomal pattern, and results of VZV antibody testing at or before the time of rash onset might help guide the diagnosis.

Pathophysiology



Progression of herpes zoster: A cluster of small bumps (1) turns into blisters (2). The blisters fill with lymph, break open (3), crust over (4), and finally disappear. Postherpetic neuralgia can sometimes occur due to nerve damage (5),

The causative agent for herpes zoster is varicella zoster virus (VZV), a double-stranded DNA virus related to the Herpes simplex virus group. Most people are infected with this virus as children, and suffer from an episode of chickenpox. The immune system eventually eliminates the virus from most locations, but it remains dormant (or latent) in the ganglia adjacent to the spinal cord (called the dorsal root ganglion) or the ganglion semilunare (ganglion Gasseri) in the base of the skull.[30]epeated attacks of herpes zoster are rare, [31] and it is extremely rare for patients to suffer more than three recurrences.[40]

Herpes zoster occurs only in people who have been previously infected with VZV; although it can occur at any age, approximately half of the cases in the USA occur in those aged 50 years or older.[42] The disease results from the virus reactivating in a single sensory ganglion.[43]n contrast to Herpes simplex virus, the latency of VZV is poorly understood. The virus has not been recovered from human nerve cells by cell culture and the location and structure of the viral DNA is not known. Virus-specific proteins continue to be made by the infected cells during the latent period, so true latency, as opposed to a chronic low-level infection, has not been proven.[44,45] VZV has been detected in autopsies of nervous tissue,[46]there are no methods to find dormant virus in the ganglia in living people.

Unless the immune system is compromised, it suppresses reactivation of the virus and prevents herpes zoster. Why this suppression sometimes fails is poorly understood,[47]ut herpes zoster is more likely to occur in people whose immune system is impaired due to aging, immunosuppressive therapy, psychological stress, or other factors.[48]pon reactivation, the virus replicates in the nerve cells, and virions are shed from the cells and carried down the axons to the area of skin served by that ganglion. In the skin, the virus causes local inflammation and blisters. The short- and long-term pain caused by herpes zoster comes from the widespread growth of the virus in the infected nerves, which causes inflammation[49]. As with chickenpox and/or other forms of herpes, direct contact with an active rash can spread VZV to a person who has no immunity to the virus. This newly infected individual may then develop chickenpox, but will not immediately develop shingles. Until the rash has developed crusts, a person is extremely contagious. A person is also not infectious before blisters appear, or during postherpetic neuralgia (pain after the rash is gone)[41].

Table 1: Impact of acute herpes zoster

LIFE FACTOR	IMPACT
physical	Chronic fatigue Aanorexia & weight loss, physical inactivity Iiinsomnia
psychology	Aanxiety, Difficulty concentrating Depression,
social	Ffewer social gathering changes in social role
functional	I interfere with activities of daily living (e.g. Eeating,bathing, travel , and cooking

Zoster Transmission

Zoster lesions contain high concentrations of VZV that can be spread, presumably by the airborne route (*50,51)* cause primary varicella in exposed susceptible persons (*51,52-53)* Localized zoster is only contagious after the rash erupts and until the lesions crust. Zoster is less contagious than varicella (54) In one study of VZV transmission from zoster, varicella occurred among 15.5% of susceptible household contacts *52*

In contrast, following household exposure to varicella, a more recent study demonstrated VZV transmission among 71.5% of susceptible contacts *58*In hospital settings, transmission has been documented between patients or from patients to health-care personnel, but transmission from health-care personnel to patients has not been documented. Persons with localized zoster are less likely to transmit VZV to susceptible persons in household or occupational settings if their lesions are covered *55.*

REFERENCES

1. National Institute of Allergy and Infectious Disease, 2003. http://content.nhiondemand.com/psv/HC2. May 8,2006].
2. Gnann JW Jr, Whitley RJ. Clinical practice. Herpes zoster. N Engl J Med 2002; 347:340-346.
3. National Institute of Neurological Disorders and Stroke (NINDS), 1999. http://content. nhiondemand.com/psv/HC2.asp?objID=100635&c Type=hc [Accessed May 8, 2006]
4. Hope-Simpson RE. The nature of herpes zoster: a long term study and a new hypothesis. Proc R Soc Med 1965;58:9-20.
5. Katz J, Cooper EM, Walther RR, et al. Acute pain in herpes zoster and its impact on health-related quality of life. Clin Infect Dis 2004;39:342-348.
6. Weinberg JM (2007). "Herpes zoster: epidemiology, natural history, and common complications". J Am Acad Dermatol 57 (6 Suppl): S130–5.
7. Weller TH (2000). "Chapter 1. Historical perspective". In Arvin AM, Gershon AA. Varicella-Zoster Virus: Virology and Clinical Management. Cambridge University Press.
8. Oaklander AL (October 1999). "The pathology of shingles: Head and Campbell's 1900 monograph". Arch. Neurol. 56 (10): 1292–4.
9. Weller TH (1953). "Serial propagation in vitro of agents producing inclusion bodies derived from varicella and herpes zoster". Proc. Soc. Exp. Biol. Med. 83 (2): 340–6.
10. Holt LE, McIntosh R (1936). Holt's Diseases of Infancy and Childhood. D Appleton Century Company. pp. 931–3.
11. Weller TH (1997). "Varicella-herpes zoster virus". In Evans AS, Kaslow RA. Viral Infections of Humans: Epidemiology and Control. Plenum Press. pp. 865–92.

12. Hope-Simpson RE (1965). "The nature of herpes zoster; a long-term study and a new hypothesis". 2000,654-657.
13. Hope-Simpson RE (1965). "The nature of herpes zoster: a long-term study and a new hypothesis". Proc R Soc Med 58: 9–20.
14. Thomas SL, Wheeler JG, Hall AJ (2002). "Contacts with varicella or with children and protection against herpes zoster in adults: a case-control study". Lancet 360 (9334): 678–682.
15. Terada K, Hiraga Y, Kawano S, Kataoka N (1995). "Incidence of herpes zoster in pediatricians and history of reexposure to varicella-zoster virus in patients with herpes zoster". Kansenshogaku Zasshi 69 (8): 908–912.
16. Dworkin RH, Johnson RW, Breuer J et al. (2007). "Recommendations for the management of herpes zoster". Clin. Infect. Dis;2001:234-237.
17. Stankus SJ, Dlugopolski M, Packer D (2000). "Management of herpes zoster (shingles) and postherpetic neuralgia". Am Fam Physician 61 (8): 2437–44,
18. Hope-Simpson RE (1965). "The nature of herpes zoster: a long-term study and a new hypothesis". Proc R Soc Med 58: 19–20.
19. Furuta Y, Ohtani F, Mesuda Y, Fukuda S, Inuyama Y (2000). "Early diagnosis of zoster sine herpete and antiviral therapy for the treatment of facial palsy". Neurology 55 (5): 708–10.
20. Shaikh S, Ta CN (2002). "Evaluation and management of herpes zoster ophthalmicus". Am Fam Physician 66 (9): 1723–1730.
21. Johnson, RW & Dworkin, RH (2003). "Clinical review: Treatment of herpes zoster and postherpetic neuralgia". BMJ 326 (7392): 748.
22. Yawn BP, Saddier S, Wollan P, Sauver JS, Kurland M, Sy L. A population-based study of the incidence and complications of herpes zoster before zoster vaccine introduction. Mayo Clin Proc 2007;82:1341–9.
23. Opstelten W, van Loon AM, Schuller M, et al. Clinical diagnosis of herpes zoster in family practice. Ann Fam Med 2007;5:305–9.
24. Oxman MN, Levin MJ, Johnson GR, et al. A vaccine to prevent herpes zoster and postherpetic neuralgia in older adults. N Engl J Med 2005;352:2271–84.
25. Dworkin RH, Johnson RW, Breuer J, et al. Recommendations for the management of herpes zoster. Clin Infect Dis 2007;44 (Suppl 1):S1–26.
26. Rubben A, Baron JM, Grussendorf-Conen EI. Routine detection of herpes simplex virus and varicella zoster virus by polymerase chain reaction reveals that initial herpes zoster is frequently misdiagnosed as herpes simplex. Br J Dermatol 1997;137:259–61.
27. Kalman CM, Laskin OL. Herpes zoster and zosteriform herpes simplex virus infections in immunocompetent adults. Am J Med 1986;81:775–8.
28. Birch CJ, Druce JD, Catton MC, MacGregor L, Read T. Detection of varicella zoster virus in genital specimens using a multiplex polymerase chain reaction. Sex Transm Infect 2003;79:298–300.
29. Nahass GT, Goldstein BA, Zhu WY, Serfling U, Penneys NS, Leonardi CL. Comparison of Tzanck smear, viral culture, and DNA diagnostic methods in detection of herpes simplex and varicella-zoster infection. JAMA 1992; 268:2541–4.
30. Solomon AR, Rasmussen JE, Weiss JS. A comparison of the Tzanck smear and viral isolation in varicella and herpes zoster. Arch Dermatol 1986; 122:282–5.
31. Gnann JW Jr, Whitley RJ. Clinical practice: herpes zoster. N Engl J Med 2002;347:340–6.

32. Dahl H, Marcoccia J, Linde A. Antigen detection: the method of choice in comparison with virus isolation and serology for laboratory diagnosis of herpes zoster in human immunodeficiency virus-infected patients. J Clin Microbiol 1997;35:347–9.
33. Coffin SE, Hodinka RL. Utility of direct immunofluorescence and virus culture for detection of varicella-zoster virus in skin lesions J Clin Microbiol 1995;33:2792–5.
34. Morens DM, Bregman DJ, West CM, et al. An outbreak of varicella-zoster virus infection among cancer patients. Ann Intern Med 1980;93:414–9.
35. Brunell PA, Gershon AA, Uduman SA, Steinberg S. Varicella-zoster immunoglobulins during varicella, latency, and zoster. J Infect Dis 1975;132:49–54.
36. Harper DR, Kangro HO, Heath RB. Serological responses in varicella and zoster assayed by immunoblotting. J Med Virol 1988; 25:387–98.
37. Wittek AE, Arvin AM, Koropchak CM. Serum immunoglobulin A antibody to varicella-zoster virus in subjects with primary varicella and herpes zoster infections and in immune subjects. J Clin Microbiol 1983; 18:1146–9.
38. Katz J, Cooper EM, Walther RR, Sweeney EW, Dworkin RH (2004). "Acute pain in herpes zoster and its impact on health-related quality of life". Clin. Infect. Dis 39 (3): 342–348.
39. Steiner I, Kennedy PG, Pachner AR (2007). "The neurotropic herpes viruses: herpes simplex and varicella-zoster". Lancet Neurol 6 (11): 1015–28.
40. Stankus SJ, Dlugopolski M, Packer D (2000). "Management of herpes zoster (shingles) and postherpetic neuralgia". Am Fam Physician 61 (8): 2437–44.
41. Weinberg JM (2007). "Herpes zoster: epidemiology, natural history, and common complications". J Am Acad Dermatol:2004(9),543-546.
42. Kennedy PG (2002). "Varicella-zoster virus latency in human ganglia". Rev. Med. Virol. 12 (5): 327–34.
43. PG (2002). "Key issues in varicella-zoster virus latency". J. Neurovirol 8 Suppl 2 (2): 80–4.
44. Mitchell BM, Bloom DC, Cohrs RJ, Gilden DH, Kennedy PG (2003). "Herpes simplex virus-1 and varicella-zoster virus latency in ganglia" (PDF). J. Neurovirol 9 (2): 194–204.
45. Gnann JW Jr, Whitley RJ. Clinical practice: herpes zoster. N Engl J Med 2002;347:340–6.
46. Donahue JG, Choo PW, Manson JE, Platt R (1995). "The incidence of herpes zoster". Arch. Intern. Med 155 (15): 1605–9.
47. R (2004). "Post-herpetic neuralgia case study: optimizing pain control". Eur. J. Neurol 11 Suppl 1: 3–11. reuer J, Whitley R (2007). "Varicella zoster virus: natural history and current therapies of varicella and herpes zoster" (PDF). Herpes 14 (Suppl 2): 25–9.
48. Swyer MH. Chamberlin CJ. Wu YN. Aintablian N. Wallace MR. Detection of varicella-zoster virus DNA in air samples from hospital rooms. J Infect Dis 1994;169:91–94.
49. Josephson A, Gombert ME. Airborne transmission of nosocomial varicella from localized zoster. J Infect Dis 1988; 158:238–41.
50. Siler HE. A study of herpes zoster particularly in relation to chickenpox. J Hyg 1949;47:253–62.
51. Wreghitt TG, Whipp J, Redpath C, Hollingworth W. An analysis of infection control of varicella-zoster virus infections in Addenbrooke's Hospital Cambridge over a 5-year period, 1987–92. Epidemiol Infect 1996;117:165–71.
52. Behrman A, Schmid DS, Crivaro A, Watson B. A cluster of primary

varicella cases among healthcare workers with false-positive varicella zoster virus titers. Infect Control Hosp Epidemiol 2003; 24:202–6.
53. Brunell PA, Argaw T. Chickenpox attributable to a vaccine virus contracted from a vaccinee with zoster. Pediatrics 2000; 106:28.
54. Kennedy PG (2002). "Varicella-zoster virus latency in human ganglia". Rev. Med. Virol. 12 (5): 327–34.