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A clinical study of the pattern of herpes zoster in children at the tertiary care centre of eastern Rajasthan

[1]Dr. Savita Arya, [2]Dr. Bajrang Soni, [3]Dr. Himanshu Goyal

[1]Assistant Professor, Department of Skin & VD, Government Medical College, Bharatpur, Rajasthan, India
[2]Assistant Professor, Department of Skin & VD, Pandit Deendayal Upadhyay Medical College, Churu, Rajasthan, India
[3]Assistant Professor, Department of Pediatrics, Government Medical College, Bharatpur, Rajasthan, India

Corresponding Author:
Dr. Himanshu Goyal (himanshugoyalsms@gmail.com)

Abstract

Background: Varicella-zoster virus (VZV) is known for causing two highly infectious diseases-Varicella (chickenpox) and Herpes Zoster (shingles). The reactivation of the varicella-zoster virus causes Herpes zoster, also called as shingles. In the contrast, Herpes zoster usually arises in adults or the elderly. This virus reactivates mainly due to failure of the immune defense system to control the latent replication of the virus.
Objective: To study the epidemiological and clinical features of herpes zoster taking place in kids below 12 years of age.
Methodology: This was an observational, descriptive and cross-sectional study. A total of 50 patients with herpes zoster were selected for the study. The study was conducted from April 2018 to March 2022 in department of dermatology and venereology at Government Medical College, Bharatpur in Rajasthan. The children till 12 years of age infected with herpes zoster were included in the study.
Results: A total of 50 patients were identified with herpes zoster were enrolled for the study. There were 28 (56.1%) boys and 22 (44.0%) girls. The ages range was one month to 12 years, the smallest subject being 1 month of age. Most of the subjects i.e. 42 (84%) exhibited no evidence of immuno-suppression on prior records, examination, and clinical investigations. Four subjects were anti-HCV positive, 2 were diagnosed with pulmonary tuberculosis, one subject was on medication of systemic corticosteroids for a chronic bullous illness of babyhood, and one patient was recently spotted with leukaemia disease.
Total 21 (42%) subjects showed thoracic dermatomal involvement, 14 (28%) subjects of cervical, 8(16%) of cranial (ophthalmic), and 6(12%) subjects of lumbar dermatomal involvement were found. Only one subject (2%) was found with dissemination.
Conclusion: The advent of Herpes zoster in children is not a cutaneous indicator for immunodeficiency or underlying malignancy. Sign of postherpetic neuralgia, as described in the

adult inhabitants, was not present in our study.

Keywords: Varicella, Herpes Zoster, shingles, and thoracic dermatome.

Introduction

Varicella (chickenpox) and Herpes Zoster (Shingles) are the two highly infectious diseases which are caused by Varicella-zoster virus (VZV). VZV is a vastly transmittable agent, and human beings are the solitary host of the virus until now.

Chickenpox infection typically reveals in children, a seasonal viremia that has a tendency to occur in epidemics. The key symptoms of chickenpox are rashes that take up as maculopapular lesions and headway to vesicles that expand to the extremes. Fever is also present with the rashes [1]. Initially, it is contagious but after scab formation of the vesicles, the decrease in the transmissibility of the infection is found. Reason may be that lesions stop liberating the virus after scab formation [2]. Children tend to be less seriously ill than adults and they go through fewer complications [3]. Above than 90% of Americans had chickenpox under the age of 20, before the use of paediatric vaccines in the U.S. [2] Immunity develops after a VZV infection resolution, but the concealed virus perseveres in the dorsal root ganglia [4].

The reactivation of the varicella-zoster virus causes Herpes zoster, also known as shingles. In the contrast, Herpes zoster usually arises in adults or the elderly. Main reason behind the reactivation of virus is the failure of the immune defense system to control the latent replication of the virus [5]. The commonness of herpes zoster is strongly connected to the immune status. People who have a strong immunity power hardly develop shingles. It is not a benign infection and can exist in many ways. Even after herpes zoster resolves, many patients complain to suffer from postherpetic neuralgia. The virus causes local inflammation and blistering in the skin. The inflammation of affected nerves due to the virus cause pain [6, 7]. Other than it varicella has other complications as follows:

1.1 Pulmonary complications: These complications are spotted in immunocompromised subjects and pregnant ladies with high number and severity. Pneumonitis is infrequent in healthy subjects [8, 9, 10]. The main symptoms are cough, shortness of breath, occasionally hemoptysis and rashes [9, 11].

1.2 Neurologic complications: Unusual immune responses are the main cause of acute varicella infection in central nervous system. Cerebellar ataxia and encephalitis are two major neurological diseases [12, 13]. On the other hand, transverse myelitis, aseptic meningitis, and Guillain-Barré syndrome are rare and infrequent [14, 15] .

1.3 Cutaneous complications: Some bacteria like Staphylococcus aureus *or* Streptococcus pyogenes cause skin infection in patient and make varicella infection more complicated. To avoid this situation, use of antibacterial soaps and fingernails trimming of the patient is advisable. [16] Sever infection of staphylococcal and streptococcal can result toxic shock syndromes [17, 18]. Immunocompromised children shows some cutaneous complications such as bullous or hemorrhagic varicella or purpura fulminans, which is concomitant with thrombocytopenia and disseminated intravascular coagulation.

A strains of group a β-hemolytic streptococcus can cause necrotizing soft tissue infection further which can cause extensive local tissue destruction by intricate exotoxins [19].

The incident of Herpes zoster in children is rare except that in children with acquired cellular immune deficiency as in patients on chemotherapy or with HIV and in immunocompetent children [20]. But the recent reports show an upsurge in cases in healthy children also [21]. The current study was started to study the epidemiological and clinical features of herpes zoster taking place in kids below 12 years of age presenting at a tertiary care unit.

Objectives

To study the epidemiological and clinical features of herpes zoster taking place in kids below 12 years of age.

Materials and Methods

Study design

- An Observational, descriptive and cross-sectional study.

Study population

A total of 50 patients with herpes zoster were selected for the study. The study was conducted from April 2018 to March 2022 in department of Skin & VD at GMC, Bharatpur, Rajasthan. A duly filled consent form was collected with each patient. Approval for study was obtained from Institutional Ethics Committee.

Diagnosis was made by history and clinical examination. A detailed history of past chickenpox of the patient and another family member was also added in the form. A past record of herpes zoster and chickenpox occurrences in mother, while she was pregnant, were also documented.

Inclusion criteria

The children till 12 years of age infected with herpes zoster were included in the study.

Exclusion criteria

Children/patients>12 years of age and children with known immunodeficiency disorders were excluded from the study.

- **Data collection and Examination:** Clinical diagnosis was done in the patients. Conversely, in a few suspicious cases, a Tzanck smear for viral giant cells was conducted. Some examinations such as complete blood count, ESR, liver function tests, HBsAg, anti-HCV antibodies, and renal function tests were recorded for all patients. Patients with a history of chronic cough were tested by Chest X-rays with expectoration. Abdominal ultrasonography examination was done in 3 patients with positive anti-HCV antibodies.

Results

A total of 50 patients were identified with herpes zoster were enrolled for study with the age group of fewer than 12 years over the study duration of 4 years. There were 28 (56.1%) boys and 22 (44.0%) girls. The ages range was one month to 12 years, the smallest subject being 1 month of age. The mean age of the study group was 9.2±3.1 years. The maximum number of the patients have their place in the age group of 6 to 12 years followed by the age group 1 to 6 years.

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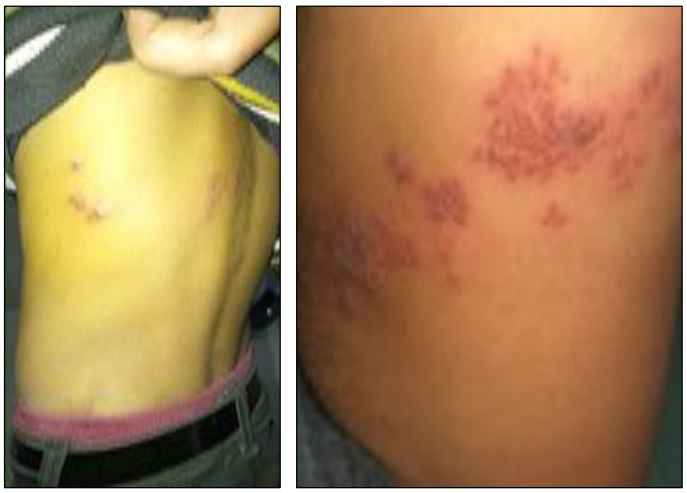
Most of the subjects i.e. 42 (84%) exhibited no evidence of immunosuppression on prior records, examination and clinical investigations. Four subjects were anti-HCV positive, 2 were diagnosed with pulmonary tuberculosis, one subject was on medication of systemic corticosteroids for a chronic bullous illness of babyhood. One patient was recently diagnosed with leukaemia but chemotherapy had not yet been started.



Total 21 (42%) subjects showed thoracic dermatomal involvement, 14 (28%) subjects of cervical, 8(16%) of cranial (ophthalmic) and 6(12%) subjects of lumbar dermatomal involvement were found. Only one subject (2%) was found with dissemination. One dermatome involvement was exhibited in 70 % of subjects and 27.6% was found with two dermatomes involvement. Only 1 (2%) subject displayed more than two dermatomes involvement. The right-sided involvement was presented in 24 subjects and left-sided involvement in 26 patients respectively. The majority of subjects indicated mild to moderate pruritus i.e. 53%. Complaints about pain were recorded in 13 % of subjects which was mild in 4.3%, moderate in 3.5% and severe in 6% of the subjects. Subjects above two years of age were measured with the presence or absence of symptoms. At the time of presentation 12 (24%) subjects had secondary bacterial infections.

35 (70%) subjects out of the total 50 subjects provided no history of chickenpox or herpes zoster in subject or family member. Out of 35 only 7 (20%), subjects provided a positive history of chickenpox in the mother during pregnancy (carrying the same subject). No history of herpes zoster comes across during pregnancy. Out of the remaining 15 subjects who were previously exposed to varicella, 9 (60%) of them were below 2 years of age. History of immunization against varicella did not get by any of them.

Discussion

Primary varicella is known as a disease of childhood, but in adults, its reactivation occurs which causes herpes zoster. Only 0.45 per 1000 children shows the incidence of herpes zoster below 14 years of age. However, 1.2 to 3.4 cases per 1000 healthy individuals noticed incidence of herpes zoster which are increasing to 3.9–11.8 per year amongst those grown-up than 65 years [22, 23, 24]. The main cause of herpes zoster in the mature subjects are related with loss of varicella-zoster virus (VZV)-specific cellular immunity, while in chemotherapy, suppression of cellular immunity occurs. HIV-infected individuals go through with viral destruction of T

cells [25]. According to Bhushan *et al*., primary varicella infection *in utero* or in infancy is responsible for an increase in herpes zoster cases in healthy children, because at that time immunity of body is not fully developed. At the time of primary infection immunological status of the patient plays an important role in childhood herpes zoster. Level of natural killer (NK) cells, lymphocytes, cytokines, and virus-specific immunoglobulins are low in children resulting in incapability to maintain the dormancy of VZV. This causes an early presence of zoster in children [26]. These findings support our results where 50 patients were identified with herpes zoster in which 28 (56.1%) boys and 22 (44.0%) girls with male dominance. The mean age of the study group was 9.2±3.1 years, which is also common in these studies. The maximum number of the patients have their place in the age group of 6 to 12 years followed by the age group of 1 to 6 years.

Federer and Hoss stated that the incidence of herpes zoster increases with an increase in age, although the risk of developing herpes zoster increases in children who have had varicella during the first year of life (or *in utero*) [27]. Our result also matches with them as it shows subjects who were previously exposed to varicella, 60% of them were below 2 years of age.

Studies shows that 69% of infantile herpes zoster cases are caused by maternal varicella during pregnancy [28, 29]. As per our study 70% of subjects gave no exposure to varicella in the past and 20% provide a history of maternal vesicular eruption possible to be chickenpox in pregnancy. This difference may be result due to unconsidered subclinical infections in our population.

The course of the illness is slighter in children with a mean duration of 1-3 weeks. Acute neuropathic pain which is the symbol of herpes zoster in adults, was absent in children between the age group of 2 and 12 years. Lesioned pruritus and pain may be existing, the frequency of postherpetic neuralgia is negligible which is the most general problem of herpes zoster in adults [30]. These findings are also comparable with our study results where the majority of subjects indicated mild to moderate pruritus i.e. 53 %. Only 6 % of the subjects complained about severe pain.

As per Terada and Prabhu's outcome, our study displayed a leading thoracic (40%) dermatomal involvement [21, 31]. Only one patient was found with dissemination or else had no sign of immunosuppression. Conversely, one patient who was investigated with leukaemia appeared with more than two dermatomes involved. In childhood, postherpetic neuralgia is very rare [21, 32]. No one has reported pain after 6 weeks of the eruption in 20 subjects out of 50.

Childhood herpes zoster was connected with malignancy or immunosuppression [26]. On the contrary, studies point out malignancies in only 3% of paediatric herpes zoster cases [20, 33]. In our study group, the mainstream (84%) presented no indication of immunosuppression on history, examination, and investigations. Preferably, to rule out undetected concurrent immunosuppression lymphocyte counts, CD4/CD8 ratio, and serum immunoglobulin levels should be examined in childhood herpes zoster but these tests could not be performed due to lack of resources. However, four subjects were anti-HCV positive, 2 were diagnosed with pulmonary tuberculosis, one subject was on medication of systemic corticosteroids for a chronic bullous illness of babyhood and one patient was recently spotted with leukaemia. The previous history of exposure to varicella infection was found positive in one of these 8 patients. On clinical testing of the liver in the anti-HCV positive patients, liver functions were found to be normal. The size and texture of the liver were also normal as per the sonography report.

Many studies illustrated that antiviral drugs reduce the severity and shorten the duration of pain of herpes zoster but its use is not advisable in healthy children having ages 2 to 12 years because

their exposure is mild. On the other hand, this drug is advantageous for immunocompromised children or children with evidence of dissemination of disease [34].

Conclusion

Herpes zoster is uncommon in children as compared to chickenpox. Varicella infection in early childhood is a precursor for Herpes zoster in later years. The advent of Herpes zoster in children is not a cutaneous indicator for immunodeficiency or underlying malignancy. Sign of postherpetic neuralgia, as described in the adult inhabitants, was not present in our study. Chickenpox in kids can be marked as a subclinical infection or with uncharacteristic mild signs which can go unnoticed.

References

1. Cohen JI, Brunell PA, Straus SE, Krause PR. Recent advances in varicella-zoster virus infection. Annals of Internal Medicine. 1999;30:922-932.
2. Whitley RJ. A 70-year-old woman with shingles. Journal of the American Medical Association. 2009;301:73-79.
3. Guess HA, Broughton D, Melton LJ, Kurland LT. Population-based studies of varicella complications. Pediatrics. 1986;78(4 Part 2):723-727.
4. Gnann JW, Whitley RJ. Herpes zoster. New England Journal of Medicine. 2002;347:340-346.
5. Senderovich H, Grewal J, Mujtaba M. Herpes zoster vaccination efficacy in the long-term care facility population: a qualitative systematic review. Current Medical Research and Opinion. 2019;35(8):1451-1462.
6. Warren-Gash C, Forbes HJ, Williamson E, Breuer J, Hayward AC, Mavrodaris A, *et al*. Human herpesvirus infections, and dementia or mild cognitive impairment: a systematic review and meta-analysis. Scientific Reports. 2019;9(1):47-43.
7. Davis AR, Sheppard J. Herpes Zoster ophthalmicus Review and Prevention. Eye Contact Lens. 2019;45(5):286-291.
8. Feldman S. Varicella-zoster virus pneumonitis. Chest. 1994;106:22S-7S.
9. Gogos CA, Bassaris HP, Vagenakis AG. Varicella pneumonia in adults. A review of pulmonary manifestations, risk factors and treatment. Respiration. 1992;59:339-43.
10. Clements DA, Katz SL. Varicella in a susceptible pregnant woman. Current Clinical Topics in Infectious Diseases. 1993;13:123-30.
11. Triebwasser J, Harris R, Bryant RE, Rhoades ER. Varicella pneumonia in adults: report of seven cases and review of the literature. Medicine. 1967;46:409-20.
12. Applebaum E, Rachelson MH, Dolgopol VB. Varicella encephalitis. American Journal of Medicine. 1953;15:223-30.
13. Heppleston JD, Pearch KM, Yates PO. Varicella encephalitis. Archives of Disease in Childhood. 1959;34:318-21.
14. Johnson R, Milbourn PE. Central nervous system manifestations of chickenpox. Canadian Medical Association Journal. 1970;102:831-4.
15. Welch RG. Chickenpox and the Guillain-Barré syndrome. Archives of Disease in Childhood. 1962;37:557-9.
16. Aebi C, Ahmed A, Ramilo O. Bacterial complications of primary varicella in children. Clinical Infectious Diseases. 1996;23:698-705.

17. Bradley JS, Schlievert PM, Sample TG. Streptococcal toxic shock-like syndrome as a complication of varicella. The Pediatric Infectious Disease Journal. 1991;10:77-9.
18. Melish ME. Bullous varicella: its association with the staphylococcal scalded skin syndrome. The Journal of Pediatrics. 1973;83:1019-21.
19. Laupland KB, Davies HD, Low DE, Schwartz B, Green K. Invasive group a streptococcal disease in children and association with varicella-zoster virus infection. Ontario Group A Streptococcal Study Group. Pediatrics. 2000;105:E60.
20. Takayama N, Yamada H, Kaku H, Minamitani M. Herpes zoster in immunocompetent and immunocompromised Japanese children. Pediatrics International. 2000;42:275-9.
21. Terada K. Characteristics of herpes zoster in otherwise normal children. The Pediatric Infectious Disease Journal. 1993;12:960-961.
22. Dworkin RH, Johnson RW, Breuer J, Gnann JW, Levin MJ, Backonja M, *et al.* Recommendations for the management of herpes zoster. Clinical Infectious Diseases. 2007;44(1):1-26.
23. Donahue JG, Choo PW, Manson JE, Platt R. The incidence of herpes zoster. Archives of Internal Medicine. 1995;155:1605-9.
24. Araújo LQ, Macintyre CR, Vujacich C. Epidemiology and burden of herpes zoster and post-herpetic neuralgia in Australia, Asia and South America. Herpes. 2007;14(2):40A-4A.
25. Kurlan JG, Connelly BL, Lucky AW. Herpes zoster in the first year of life following postnatal exposure to Varicella-zoster virus: Four case reports and a review of infantile herpes zoster. Archives of Dermatological Research. 2004;140:1268-72.
26. Bhushan P, Sardana K, Mahajan S. Dermatomal vesicular eruption in an asymptomatic infant. Dermatology Online Journal. 2005;11:26.
27. Feder HM, Jr. Hoss DM. Herpes zoster in otherwise healthy children. The Pediatric Infectious Disease Journal. 2004;23:451-7.
28. Lewkonia IK, Jackson AA. Infantile herpes zoster after intrauterine exposure to varicella. The British Medical Journal. 1973;3:149.
29. Enders G, Miller E, Cradock-Watson J, *et al*. Consequences of varicella and herpes zoster in pregnancy: prospective study of 1739 cases. Lancet. 1994;343:1548-51.
30. Pahud BA, Glaser CA, Dekker CL, Arvin AM, Schmid DS. Varicella zoster disease of the central nervous system: Epidemiological, clinical, and laboratory features 10 years after the introduction of the varicella vaccine. Journal of the Infectious Diseases. 2011;203:316-23.
31. Prabhu S, Sripathi H, Gupta S. Prabhu Childhood herpes zoster: A clustering of ten cases. Indian Journal of Dermatology. 2009;54:62-4.
32. Baba K, Yabuuchi H, Takahashi M, Ogra PL. Increased incidence of herpes zoster in normal children infected with varicella zoster virus during infancy: community based follow-up study. The Journal of Pediatrics. 1986;108:372-7.
33. Latif R, Shope TC. Herpes zoster in normal and immunocompromised children. The American Journal of Diseases of Children. 1983;137:801-2.
34. Tyring SK. Management of herpes zoster and postherpetic neuralgia. Journal of the American Academy of Dermatology. 2007;57(6):S136-42.