Journal of Pakistan Association of Dermatologists. 2019; **29(3)**: 278-285.

Original Article

A comparative study of herpes zoster: adult versus paediatric patients

Avijit Mondal, Piyush Kumar*, Swathi G, Subhash Dasarathan

Department of Dermatology, College of Medicine & JNM Hospital, Kalyani, W.B, India.
* Department of Dermatology, Katihar Medical College and Hospital, Katihar, Bihar, India.

Abstract

Background Herpes zoster (HZ) is thought to be a disease of older population and if it presents in younger population, it is usually associated with immunosuppressive conditions like leukemia, lymphoma, organ transplantation, HIV infection and chemotherapy.

Aims The aims of this study were to find out the relative prevalence of paediatric (less than 18 years) herpes zoster among HZ patients and to compare the demographic and clinical profiles of adult and the paediatric patients suffering from HZ.

Patients and Methods The study was carried out over a period of twelve months at Dermatology outpatient department of two tertiary care centres of East India and a total of ninety cases of HZ were recruited for the study. The diagnosis was made clinically and the details of history, examination and relevant investigations were recorded in case record form, after getting consent from patient (or guardian in case of paediatric patients).

Results Ninety herpes zoster (HZ) patients were recruited from Dermatology out-patient departments during study period. The relative prevalence of HZ among OPD population was found to be 2.8/1000 population. Paediatric patients (n=21) contributed 23.33% of total HZ cases. The mean age of presentation was 29.62±17.52 years. The most frequently affected site was chest (42.66%) followed by abdomen (31.11 %). Ocular involvement was noted in 5.55% cases. All cases and mothers of paediatric cases were tested for human immunodeficiency virus (HIV) infection, and it came out negative in all patients. Of note, one 11-year-old girl developed HZ three weeks after starting on oral mini-pulse therapy with betamethasone for progressive vitiligo vulgaris and another 6 year old boy, diagnosed as a case of nephrotic syndrome was on oral corticosteroid when presented with HZ.

Conclusion As opposed to the long standing belief, herpes zoster in younger age does not appears to be a rare entity. Herpes zoster is a relatively mild disease in children in contrast to adults. Also, routine HIV testing in paediatric patients presenting with HZ appears to be unnecessary.

Key words
Herpes zoster, paediatric herpes zoster, immunosuppression.

Introduction

Herpes zoster manifests as a result of reactivation of Varicella Zoster virus (VZV) which remains dormant in the sensory ganglion following a clinical or a subclinical exposure to varicella virus infection.[1,2]

The initial symptoms are prodromal sensory phenomenon along one or more dermatomes lasting for an average 48 hours. This usually manifests as itching, pain, burning sensation or paraesthesia.[3] Following the prodromal

Address for correspondence
Dr. Avijit Mondal, MD
Asst. Professor, Department of Dermatology,
College of Medicine & JNM Hospital Kalyani,
Nadia W.B, India.
Email: docavijit@gmail.com

symptoms, grouped herpetiform vesicles develop over an erythematous base. The most common complication of herpes zoster is "zoster associated pain" or post-herpetic neuralgia, which is quite common in the elderly age group. In childhood, the complications are mild in nature.

HZ is more common in adult population and mean age of onset of herpes zoster in one large study was found to be 51.7±19.0 years.[4] Less than 10% of herpes zoster patients are younger than 20 years and only 5% are younger than 15 years. HZ in childhood is rather unusual, though it has been noted as early as 1st week of life.[5] Herpes zoster although thought to be a disease of the elderly, the incidence is now increasing among the younger age groups.[6] It is widely accepted that herpes zoster, especially in younger population, develops in the setting of profound immunosuppression like leukemia, lymphoma, transplantation, HIV infection and chemotherapy.[7] This concept is now being negated by various reports of the disease in mild immunosuppression and even in immunocompetent individuals. In a case report by Yoon et al. a case of disseminated herpes zoster infection in an immunocompetent elderly individual was described. Various tests were performed in order to find out the cause of reactivation of varicella zoster virus, if any, but no abnormalities in the immune system were observed.[8]

Methods

An institution based, cross sectional, observational study was undertaken at Dermatology out-patient departments of two tertiary care centres of East India over a period of twelve months. The study was approved by the Ethics Committee of the institutes concerned. All new clinically diagnosed paediatric (less than 18 years) and adult cases of herpes zoster were recruited into our study and those who were unwilling to participate in the study were excluded.

A comprehensive history was recorded in the case record form with reference to their demographic parameters like age, sex, religion, occupation, residence; alongwith the clinical profile including the prodromal symptoms, distribution of lesions and any complication.

A history of blood transfusion, drug addiction associated diseases like tuberculosis, cancer or any other chronic ailments were recorded.

A meticulous drug history was taken to rule out any iatrogenic immunosuppression. Past history and family history of herpes zoster and chicken pox too were noted, if any.

Diagnosis was mainly on clinical basis; however, in doubtful cases Tzanck smear was done. Routine investigations including the serum biochemistry panel were carried out. HIV status was checked in each and every patient.

Data was tabulated and analysed at the end of the study using MedCalc version 10.2.

Results

Total 90 herpes zoster (HZ) patients were recruited during study period from dermatology out-patient departments (OPD). The relative prevalence of HZ among OPD population was 2.8/1000 population. The mean age of presentation was 29.62±17.52 years with range being 8 months to 75 years. Among 90 diagnosed HZ patients 21 were in the paediatric age group (less than 18 years) and it constituted 23.33% of total HZ cases. Males outnumbered females (Male: Female ratio 1.87:1) in our study.

Table 1 Clinical profile of Herpes zoster patients

Parameter	*Herpes zoster (over all)*	*Adult herpes (n=69)*	*Paediatric herpes (n=21)*
Site			
Chest	46.66%	47.82%	42.85%
Abdomen	31.11%	33.33%	19.04%
Head & neck	14.44%	13.04%	23.80%
Extremities (Upper/ lower)	7.77%	5.79%	14.28%
Morphology			
Vesicles	90%	91.30%	85.71%
Bullae	20%	20.28%	9.52%
Ulcer	11.11%	11.59%	9.52%
Ocular Involvement	5.55%	5.79%	4.76%

Table 2 Clinical profile of Herpes zoster patients

Parameter	*Herpes zoster (over all)*	*Adult herpes (n=69)*	*Paediatric herpes (n=21)*
Duration (Days)			
Mean±S.D	5.26±4.76	4.82±4.27	5.68±2.05
Range	1-10	1-10	2-6
Pain			
Mild	17.77%	14.49%	28.57%
Moderate	38.88%	46.37%	14.28%
Severe	31.11%	33.33%	23.80%
Absent	12.22%	5.79%	23.80%
Itching			
Mild	24.44%	21.73%	33.33%
Moderate	18.88%	17.39%	23.80%
Severe	2.22%	NIL	9.52%
Absent	54.44%	60.86%	33.33%
Fever	44.44%	50.72%	23.80%
Myalgia	27.77%	34.78%	4.76%
History of chicken pox			
Present	61.11%	65.21%	47.61%

The most frequently affected site were thoracic dermatomes (42.66%) and same trend was noted in both adult and paediatric patients (47.82% and 42.85% respectively). Abdomen (31.11%) was second most affected site overall and in adult patients, but it was the third most commonly affected site in paediatric age group, followed by head-neck (14.44%) and buttock and lower extremities (7.77%).

The mean duration of disease before presentation was found to be 5.26±4.76 days, and was comparable in adult and paediatric HZ patients (4.82±4.27 and 5.68±2.05 days respectively).

Pain was the most common presenting symptom (87.78% cases, 79 out of 90 patients). Two babies were excluded from these calculations. It was moderate to severe (on visual analog scale) in 69.99% of HZ patients overall. Patients in paediatric age group (38.08%) presented with moderate to severe pain, mainly due to irritant contact dermatitis following application of home remedies and adult HZ group (79.71%) patients presented with moderate to severe pain.

Other common presenting symptom was itching (66.65%) in paediatric cases, but it was relatively less frequent in adult (39.12%).

Clinical manifestations were vesicular, vesico-

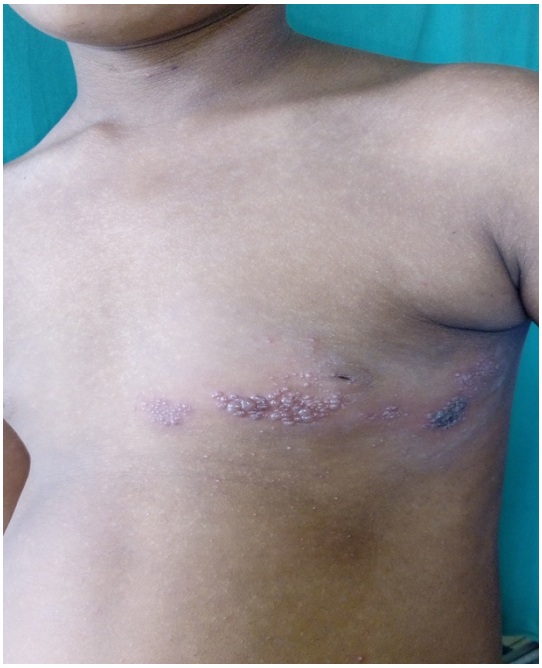

Figure 1 Multiple grouped vesicles on an erythematous base involving left T5 dermatome in a 10 year old child. Few lesions coalesced to form bullae and few lesions show crusting

Figure 2 Herpes Zoster involving the ophthalmic division of right trigeminal nerve in a 13 year old child

bullous & ulcerated lesions over an erythematous base. Most common cutaneous manifestation was vesicles (90%) in majority of cases, both in adults and paediatric patients (91.30% and 85.71% respectively). Bullae and ulcer were more frequently seen in adults (20.28% & 11.59% respectively) than in paediatric cases (9.52% each).

Around one-third patients (33.33%) had preceding symptoms before eruption of the lesions, manifested as pain and burning sensation over the affected site.

Ocular involvement was found in 5.55% cases. However, in HZ involving head and neck region, the ocular involvement was higher (38.46%). No case with ocular involvement had any long term sequelae, in terms of vision.

Regarding systemic features fever and myalgia were the most common symptoms, among both adults (50.72% & 23.80% respectively) and younger age (34.78% & 4.76% respectively). Overall, fever was noted in 44.44 % cases at presentation, followed by myalgia in 27.77% cases.

When inquired about prior history of chicken pox, majority of cases (61.52%) gave positive history of chicken pox. Mother of our youngest case, an 8-month-old baby, had history of varicella in her last trimester.

Secondary infection was the most common complication in 18 (20%) patients at the time of presentation and post herpetic neuralgia (PHN) was the long term sequelae in (14.49%) adult cases. Post inflammatory hyperpigmentation was the other long term complication. Paediatric cases did not come back with PHN.

Most of the adult cases showed complete healing of lesions in 2-3 weeks and all paediatric cases recovered in 1-2 weeks.

All cases and mothers of paediatric cases were tested for human immunodeficiency virus (HIV) infection at Integrated Counselling and Testing Centre (ICTC) of respective institutes, it was negative in all cases. Blood sugar both fasting and postprandial were within normal limit in 85.51% adult cases and only 10 adult patients had high sugar level. Clinical examination too did not reveal any signs of underlying immunosuppression in any of the cases.

Two child were on long term oral corticosteroid, one had generalized vitiligo vulgaris and the other one, nephrotic syndrome.

Discussion

Herpes Zoster occurs due to reactivation of the varicella virus lying dormant in the dorsal root ganglia. It mostly occurs in older age. Age, immunosuppressive drugs, lymphoma, fatigue, emotional upsets, mechanical trauma, immunotoxins and radiation therapy have been implicated in reactivation.

Childhood herpes zoster is believed to be rare, though recent studies suggest increasing incidence among children and even in immunocompetent individuals.[6-8]

Throughout the world, the incidence of herpes zoster ranges from 1.2 to 3.4 cases per 1000 healthy individuals per year. The incidence increases to 3.9–11.8 per year per 1000 individuals among those older than 65 years.[9-11] In our study, the relative prevalence was 2.8/1000 population.

Herpes zoster generally has not been considered to have a sex predilection. However, one study reported a higher prevalence in women than in men[12] and another study from India reported male predominance.[13] In our study, we have found a male predominance (male: female ratio of 1.87:1).

It was believed that HZ is a rare disease in children, but in our study, 21 out of 90 cases (23.33%) were of the paediatric age group. There are quite a few reports of childhood HZ in medical literature, including one previous report by us.[14-16] Our case was an 8-month-old infant who presented with grouped vesicles on an erythematous base over right leg, dorsum of right foot and sole, distributed in the L5 and S1 dermatomes. There was history of maternal varicella infection during third month of pregnancy. It was seen that in most of the infantile HZ cases, the mother had suffered from varicella infection during pregnancy.[17]

It is a well known fact that there is a strong relationship with increasing age which is attributable to the fact that cellular immunity declines as people grow older.[18]

Though the diagnosis of HZ is mainly clinical, possible differentials like zosteriform herpes simplex, bullous impetigo and bullous insect bite reaction can be differentiated mainly with Tzanck smear (multinucleated giant cell) and also by direct fluorescent monoclonal antibody test, specific serum IgM by indirect fluorescent antibody method and viral cultures.[19] Apart from Tzanck smear, other investigations were not done due to lack of resources in our centre.

The earliest prodromal symptoms of herpes zoster include headache, fever and malaise. These symptoms are commonly followed by sensations of burning pain, may be mild to severe in the affected dermatome, with sensation that are often described as stinging, tingling, aching, numbing or throbbing.[20] Pain can mimic a myocardial infarction, toothache or surgical abdomen. Other features are itching, hyperesthesia or paraesthesia. In our study, fever and myalgia were the most common systemic

symptoms, among the adults (50.72% & 23.80% respectively) and children (34.78% & 4.76% respectively).

In general, the course of the disease is milder in children as evidenced by less frequency of bullous and ulcerative lesions and no PHN. Our study findings are along the same lines as well. Also, pain at presentation was noted in fewer cases and severity of pain was less among paediatric cases. The lesions were moderately painful in 46.37%, severe painful in 33.33% and mild painful in 14.49% adult cases. But in children moderate to severely painful cases were less (38.08%). Itching was a major presenting symptom in children; mild itching in 33.33% and moderate to severe itching in (33.32%) cases.

Most patients develop painful eruption of grouped vesicles on an erythematous base in a dermatomal distribution; the lesions can involve more than one contiguous dermatome and rarely cross the midline. The thoracic (53%), cervical (20%), trigeminal including ophthalmic (15%) and lumbosacral (11%) dermatomes are most commonly involved in all ages, but the relative frequency of ophthalmic zoster increases in old age.[21] In our study, the lesions were mostly distributed over chest (46.66% cases) & abdomen (31.11% cases). Head and neck involvement was seen in (14.44%) cases.

Coming to the natural history of HZ, the acute eruptive phase is marked by the emergence of vesicles. Lesions begin as erythematous macules and papules that quickly develop into vesicles. New lesions tend to form over a period of 3-5 days, sometimes coalescing to form bullae. After they form vesicles, lesions progress through stages in which they rupture, release their contents, ulcerate, and finally crust over and become dry. Mucous membranes within the affected dermatomes are also involved. In our study, the lesions in case of adults were mostly vesicular (90%), followed by bullous (20%) and ulcerated (11.11%) lesions. In paediatric HZ, vesicles were noted in (85.71%) cases, with bullous and ulcerated lesions in 9.52% cases, each.

Herpes zoster usually resolves without sequelae in immunocompetent children and young adults and the usual recovery is within 2-3 weeks in children and 3-4 weeks in elderly patients. However the complications of herpes zoster become more severe with increasing age and immunosuppression. The commonest and most intractable sequel of HZ is post herpetic neuralgia, it occurs in about 30% of patients over 40 years of age and is most frequent when the trigeminal nerve is involved.

Herpes zoster in healthy children may be attributable to intrauterine varicella infection or in infancy in the background of an immature immune status. Vaccination with live attenuated varicella zoster virus may be another contributing factor. But, none of our patients had received vaccination prior to HZ. History of exposure to varicella was present in 65.21% of the adult cases and 47.61% of the childhood cases. History of maternal chicken pox during pregnancy was present in the mother of an infant included in our study. Literature shows that the initial event could be traced to maternal varicella during pregnancy in 69% of infantile herpes zoster cases.[22] This can be explained by the fact that a substantial proportion of subclinical infections go unnoticed in our population.

Paediatric HZ has been traditionally associated with immunosuppression which in the past, has led to numerous and rather unnecessary investigations and treatments resulting in financial, physical and psychological stress. This long standing view is now being challenged as there are many case reports of HZ in

immunocompetent individuals and also with the identification of new predisposing factors such as, use of topical tacrolimus in treatment of atopic dermatitis causing extensive Varicella,[23] use of topical pimecrolimus in treatment of subacute cutaneous lupus erythematosus causing HZ[24].

It is reasonable to conclude that in a country like India, HZ precipitated by the transient "fall" in immune status due to the wide use of steroids and immunomodulators could be more common than previously believed. Hence, it is our opinion that subjecting all the patients of HZ especially of the paediatric age group to routine HIV testing is no more advisable unless clinically indicated i.e. presenting with bilateral or multi-dermatomal or disseminated involvement, verrucous lesions, extensive ulcerations and prolonged course of HZ.

Conclusion

In our study, mean age of presentation (29.62±17.52years) was considerably lower than widely accepted mean age of presentation. Also, paediatric cases (23.33%) constituted a significant proportion of total HZ cases and paediatric HZ has a milder course of disease with few systemic symptoms, less severe skin involvement, faster recovery time and less incidence of post herpetic neuralgia as compared to adults. Immunosuppression does not play as big a role in occurrence of zoster in children. According to our findings, routine HIV screening of HZ patients (both adults and children) is not necessary unless otherwise indicated.

References

1. Dworkin RH, Johnson RW, Breuer J. Gnann JW, Levin MJ, Backonja M, et al. Recommendations for the management of herpes zoster. Clin Infect Dis 2007; 44: S1-26.
2. Gnann JW, Whitley RJ. Herpes zoster. N Engl J Med 2002; 347:340–6.
3. Goh CL, Khoo L. A retrospective study of the clinical presentation and outcome of herpes zoster in a tertiary dermatology outpatient referral clinic. Int J Dermatol 1997; 36: 667-72.
4. Hernandez PO, Javed S, Mendoza N, Lapolla W, Hicks LD, Tyring SK. Family history and herpes zoster risk in the era of shingles vaccination. J Clin Virol 2011; 52: 344-8.
5. Papadopoulos AJ, Birnkrant AP, Schwartz RA, Janniger CK. Childhood herpes zoster. Cutis 2001; 68: 21-3.
6. Prabhu S, Sripathi H, Gupta S, Prabhu M. Childhood herpes zoster: A clustering of ten cases. Indian J Dermatol 2009; 54: 62-4.
7. Takayama N, Yamada H, Kaku H et al. Herpes zoster in immunocompetent and immunocompromised Japanese children. Pediatr Int 2000; 42: 275-9.
8. Yoon KJ, Kim SH, Lee EH, Choi JH. Disseminated herpes zoster in an immunocompetent elderly patient. Korean J Pain 2013; 26: 195-8.
9. Lamees Mahmood Malik, Nadia Ali Azfar, Abdur Rahim Khan et al. Herpes zoster in children. J Pak Assoc Dermatol 2013; 23 (3): 267-271.
10. Donahue JG, Choo PW, Manson JE, Platt R. The incidence of herpes zoster. Arch Intern Med 1995; 155: 1605–9.
11. 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 Suppl 2: 40–4.
12. Insinga RP, Itzler RF, Pellissier JM, Saddier P, Nikas AA. The incidence of herpes zoster in a United States administrative database. J Gen Intern Med 2005; 20: 748-53.
13. Pooja Agarwal, Amit Mistry, Neela Patel. Herpes zoster in children: A clinicoepidemiological study over 4 years at a tertiary center in Gujarat. Nat J Commun Med 2016; 7(6): 536-9.
14. Bhushan P, Sardana K, Mahajan S. Dermatomal vesicular eruption in an asymptomatic infant. Dermatol Online J 2005; 11: 26.
15. Lewkonia IK, Jackson AA. Infantile herpes zoster after intrauterine exposure to varicella. BMJ 1973; 3: 149.

16. 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.
17. Mondal A, Sinha N, Kumar P. Grouped Vesicular Lesions in an Infant. Indian Pediatr 2013; 50: 1180.
18. Thomas SL, Hall AJ. What does epidemiology tell us about risk factors for herpes zoster? Lancet Infect Dis 2004; 4:26–33.
19. Solomon AR. New diagnostic tests for herpes simplex and varicella zoster infections. J Am Acad Dermatol 1988; 18: 218-21.
20. Katz J, Cooper EM, Walther RR, Sweeney EW, Dworkin RH. Acute pain in herpes zoster and its impact on health-related quality of life. Clin Infect Dis 2004; 39: 342–8.
21. Sterling JC. Virus infections. In: Christopher E. M. Griffiths, Jonathan Barker, Tanya Bleike et al. editors. Rook's Textbook of Dermatology. 9th ed. Blackwell Publishing Ltd; 2016. pp. 25.27-25.31
22. Enders G, Miller E, Cradock-Watson J, Bolley I, Ridehalgh M. Consequences of varicella and herpes zoster in pregnancy: prospective study of 1739 cases. Jonathan Barker Lancet. 1994; 343: 1548-51.
23. Bovenschen HJ, Groeneveld-Haenen CP. Topical tacrolimus induced extensive varicella zoster infection. Dermatol Online J 2011; 17: 5.
24. Tatlican S, Eren C, Atacan D, Dalgic U, Canpolat F, Eskioglu F. A case of herpes zoster during pimecrolimus use for the treatment of subacute cutaneous lupus erythematosus. J Dermatolog Treat 2010; 21: 322-3.