Epidemiology of Herpes Zoster in Children and Adolescents: A Five-Year Review

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ABSTRACT

Introduction: Reactivation of latent varicella zoster virus results in herpes zoster. It is more common in the elderly. Studies of herpes zoster in children are limited.

Objective: The primary objective of this study is to establish the epidemiological profile of herpes zoster in children (0-9 years old) and adolescents (10-19 years old) diagnosed at the Santo Tomas University Hospital Dermatology department from January 2007-December 2011.

Method: Clinical records of patients aged 0-19 years old, clinically diagnosed as herpes zoster, were retrieved. The incidence, clinical presentation, history of primary varicella infection and/or varicella vaccination, and co-morbidities or possible predisposing factors were reviewed and analyzed.

Result: A total of 75 patients were included in this retrospective study. The incidence among children and adolescents ages 0-19 in this study was computed at 4.82 per 1000. The highest number of cases belonged to the adolescent group (81.33%). There was male predilection (61.33%). The dermatomes of the thoracic ganglia were most commonly affected (64%). No history of varicella vaccination was recorded. Most had a history of varicella infection (62.67%). Possible predisposing factors were respiratory diseases, including asthma, primary complex or pulmonary tuberculosis and respiratory tract infection.

Conclusion: Primary varicella infection is a prerequisite for herpes zoster. Even healthy children were affected and a small percentage did not have any history of varicella infection. The two known risk factors of herpes zoster in children namely: maternal varicella infection and varicella at first year of life were rarely found in this study. Some had underlying diseases, mostly respiratory in nature.

INTRODUCTION

Herpes zoster, commonly known as shingles, results from the reactivation of latent varicella zoster virus (VZV). Primary varicella is a prerequisite for herpes zoster. In general, herpes zoster is more common in the adult population. The incidence increases dramatically, from a low 1.1 and 2.9 per 1000 person-years in people younger than 50 years to 4.6 and 6.9 per 1000 person-years, respectively, in the age groups 50 to 59 and 60 to 69 years. The age groups 70 to 79 and 80 years or older have the highest incidence, with 9.5 and 10.9 per 1000 person-years, respectively.[1] It is associated with a decline in cell-mediated immunity due to aging, immunosuppressive illness or treatment.[1] It is rare in childhood with a reported incidence of 0.74 per 1000 in a group under 9 years of age and 1.1 per 1000 in children younger than 14 years old.[2] It usually occurs in children who are immunocompromised.[1,2] Maternal varicella during pregnancy and varicella occurring in the first year of life are two recognized risk factors for childhood herpes zoster. [1,2,3]

Clinical findings of herpes zoster include a prodrome of pain and paresthesia followed by eruption of vesicles, unilateral in distribution limited to one to three adjacent dermatomes. New vesicles may appear over a period of 3-7 days. These dry and crust in 7-10 days. The eruption is less severe and of shorter duration in children than in adults.[3,4] Zoster associated pain, encompassing prodromal, concomitant, and post-herpetic pain is exceptional in children.[3] Because of its rarity in children, clinical studies of herpes zoster in this age group are limited.

OBJECTIVES

The primary objective of this study is to establish the epidemiological profile of herpes zoster in children (0-9 years old) and adolescents (10-19 years old) diagnosed at Santo Tomas University Hospital Dermatology department from January 2007-December 2011.

The secondary objectives of this study are 1) To determine the incidence of herpes zoster in children and adolescents. 2) To describe the clinical presentation of the disease in this age group. 3) To determine history of primary varicella infection or varicella vaccination if present and 4) To identify possible precipitating factors and/or underlying diseases among those with the disease.

METHOD

The clinical records of patients, aged 0-19 years old, diagnosed and treated as herpes zoster at the Dermatology Department of Santo Tomas University Hospital from January 2007-December 2011 were retrieved and individually analyzed. Data gathered included: sex; age; history of varicella infection; interval between primary varicella and herpes zoster infection; location, particularly laterality and dermatomal distribution; as well as associated illnesses. Results were then tabulated and analyzed.

RESULTS

A total of 99 cases of childhood and adolescent herpes zoster were diagnosed at Santo Tomas University Hospital from January 2007 to December 2011. The incidence was 4.82 per 1000. There were 60 males and 39 females with male to female ratio of 1:1.5.

Of the 99 cases, only 75 charts were available for review. There were 46 males and 29 females, again with male to female ratio of 1:1.5. One case (1.33%) was seen in the infantile group, ages 0-1, 14 cases (18.67%) fell in the childhood group ages 2-9 years old and the adolescent group, ages 10-19 years old had the most cases at 60 (80%).

Table 1: Gender and age of patients

	N(%)
Gender:	
Male	46 (61.33%)
Female	29 (38.67%)
Age:	
Infantile (0-1 years old)	1(1.33%)
Childhood (2-9 years old)	14(18.67%)
Adolescent (10-19 years old)	60 (80%)

History of varicella infection was seen in 47 (62.67%) while 12 (16%) had no history of varicella infection. Seven cases (9.33%) had unknown and or unrecalled varicella infection and in nine cases (12%) a history of varicella infection was not recorded in the chart.

Table 2: History of varicella infection

With History of varicella	47 (62.67%)
No history of varicella	12 (16%)
Unrecalled and or unknown	7 (9.33%)
Not in the chart	9 (12%)

No history of varicella vaccination was retrieved. Interval history from varicella infection to development of herpes zoster ranged from 1-16 years with an average interval of 7.3 $\pm$ 1.2 years. Only 1 patient showed a one-year interval and had no predisposing factor.

Right and left involvement occurred with equal frequency. The most common areas involved were the thoracic dermatomes accounting for 48 cases (64%), followed by lumbar 10 cases (13.33%), cervical 9 cases (12%), and sacral 3 cases (4%). Three cases had 2 adjacent areas involved, 2 (2.67%) cervicothoracic and 1 (1.33%) thoracolumbar. The trigeminal nerve was involved in five cases (6.66%), with one case (1.33%) of herpes zoster ophthalmicus and one case (1.33%) of Ramsay Hunt syndrome.

Table 3: Dermatomal distribution

Dermatome Level	N (%)
Cranial (Trigeminal)	5 (6.67%)
Cervical	9 (12%)
Thoracic	48(64%)
Lumbar	10 (13.33%)
Sacral	3 (4%)
Cervicothoracic(dermatome overlap)	2 (2.67%)
Thoracolumbar(dermatome overlap)	1 (1.33%)
Total	75

Of all the patients, only six (8%) had the recognized risk factor for herpes zoster infection in children: a 3-year-old boy whose mother had varicella at eight months age of gestation, three cases (4%) had varicella infection at 1 year of age: a 3-year-old and a 2-year-old boy, and a 14-year-old girl with diffuse non-toxic goiter and two cases (2.67%), an eight-year-old boy and a nine-year-old boy had it at less than 1 year of age.

Twenty-four (32%) patients had respiratory diseases, five (6.67%) had upper respiratory tract infection, eleven (14.67%) had history of asthma (one was in acute exacerbation), seven (9.33%) had history of primary complex (6 treated and 1 on isoniazid therapy) and one (1.33%) had pulmonary tuberculosis on quadruple therapy.

Table 4: Other diseases

Disease	N(%)
Upper Respiratory Tract Infection	5 (6.67%)
Bronchial Asthma	11 (14.67%)
Pulmonary Tuberculosis/ History of primary complex	8 (10.67%)
Diffuse Non-Toxic Goiter	1 (1.33%)
Post-Traumatic Stress Disorder	1 (1.33%)

DISCUSSION

The diagnosis of herpes zoster is often clinical. Childhood herpes zoster accounts for less than 1% of the total zoster cases in the past; recent reports show an increase in the number of cases in apparently healthy children.[5] This study of 75 cases of herpes zoster involved immunocompetent children, aged 1-9 years old, and adolescents 10-19 years old. These findings are consistent with the progressive increase in the incidence of herpes zoster in healthy children over the past decades.[3] Herpes zoster is considered to represent a reactivated infection with varicella virus that has persisted in latent form in sensory nerve ganglia. Typically, varicella occurs in childhood; whereas zoster is most commonly seen in the elderly, a finding attributed to a decline in cell-mediated immune response with advancing age.[6] The shortened length of

time between the primary infection and re-activated infection is influenced by host-dependent factors such as immunosuppression; and, childhood zoster is often due to maternal infection with varicella during pregnancy or varicella during the first year of life.[2,3,5,6] The relative risk of varicella during the first year of life developing into childhood herpes zoster ranges from 2.8% to 20.9%.[3] Out of the 75 cases, 47 (62.67%) had a history of varicella, five patients had a history of varicella in the 1st year of life accounting to 6.67%. The time interval from primary varicella to herpes zoster ranged from 1-16 years with an average interval of 7.3 ± 1.2 years. A study by Takayama et al. of herpes zoster in normal and in those with underlying diseases but were not immunocompromised Japanese children showed that the mean interval between varicella and zoster at 6.2 ± 3.2 years.[4] The shortened time between the primary infection and the reactivation reflects the response of an immature immune system.[6] Although, the medical records of the patients in this study only mentioned 1 case of prenatal exposure to varicella, the possibility of such exposure cannot be excluded because maternal pregnancy records were not reviewed. Conclusion cannot be drawn from this study regarding the relationship between childhood zoster and prenatal exposure to varicella. The absent history of varicella in 12 of the 75 cases is only based on anamnestic recall. Although, it is unlikely that the families did not recognize full-blown varicella in the children, the occurrence of subclinical varicella cannot be totally dismissed. Subclinical varicella as a risk factor for childhood zoster is further supported by a report of childhood herpes zoster following unnoticed varicella.[3]

Among the 75 cases, herpes zoster lesions was most commonly observed in the thoracic nerve regions (64%) as described by other studies.[1,2,3,6,7,8] Historically, childhood herpes zoster was thought to be an indicator for an underlying malignancy, especially a hematologic malignancy like acute lymphocytic leukemia and other immunocompromised states.[5] Patients with chronic obstructive pulmonary disease are also at increased risk for herpes zoster compared with the general population due to chronic inflammation and immune dysregulation, and risk is greater among patients who use inhaled or oral corticosteroids.[9] Although some patients in the study had underlying diseases most especially respiratory in nature, they were not immunocompromised. The most frequent disease recorded was bronchial asthma. Only one was in acute exacerbation receiving oral steroids. The rest were not on oral or inhalational steroids. In a study of herpes zoster by Takayama et al. in immunocompetent and immunocompromised children, bronchial asthma ranked second in frequency to acute lymphocytic leukemia.[4] Other underlying diseases recorded were: pulmonary tuberculosis/primary complex which ranked second in frequency, upper respiratory tract infection, diffuse non-toxic goiter and post-traumatic stress disorder. Two local retrospective studies on herpes zoster also found pulmonary tuberculosis as an underlying disease.[7,8]

LIMITATIONS OF THE STUDY

Of the total 99 cases diagnosed with childhood herpes zoster, only 75 charts were available for review, therefore affecting the possible outcome of results. Other limitations include possible inadequacies in information gathering and documentation as seen in most retrospective studies such as: 1) analysis of data being based solely on the registration of complaints of the patient and not including pertinent negatives; 2) different clinicians diagnosing and describing the disease; and 3) incomplete charts with no data records of pertinent information regarding presence nor absence of history of previous varicella infection, maternal history of varicella and other diseases present.

CONCLUSION

This is the first retrospective study done locally that attempted to describe the epidemiology of childhood and adolescent herpes zoster. It was found to be more common in the adolescent age group although a number was also seen in childhood. There was a male predilection. Most did not present with the two known risk factors of herpes zoster namely: maternal varicella infection and varicella at first year of life. Apparently healthy children were affected and a small percentage did not have any history of varicella infection. Some had underlying diseases, which were mostly respiratory in nature.

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