Int J Clin Exp Med 2015;8(7):11020-11025
www.ijcem.com /ISSN:1940-5901/IJCEM0010160

Original Article

Zoster duplex: a clinical report and etiologic analysis

Feng Zhang[1], Jin Zhou[2]

[1]*Department of Dermatology, The First Affiliated Hospital of Harbin Medical University, Harbin 150001, China;*
[2]*Department of Hematology, The First Affiliated Hospital of Harbin Medical University, Harbin 150001, China*

Received May 12, 2015; Accepted June 26, 2015; Epub July 15, 2015; Published July 30, 2015

Abstract: Objective: Herpes zoster (HZ) duplex is a rare disease presentation. The mechanisms of varicella zoster virus (VZV) reactivation in multiple dermal regions are unknown. To present a HZ duplex case occurring in an immunocompetent woman and to analyze the possible underlying causes of HZ duplex. Methods: We present a HZ duplex case in an immunocompetent woman and analyzed the possible contributing factors in 36 HZ duplex cases. Continuously distributed variables were categorized by numbers and percentages. Results: In our study, 24 cases (66.7%) were from Asia, 16 cases (44.4%) were in individuals ≥ 50 years of age, and 17 cases (47.2%) occurred in immunocompromised patients. Of the 36 cases, 23 involved women (63.9%) and 13 involved men. Eighteen patients suffering from HZ duplex, 13 of which were women (72.2%), did not suffer from any chronic systemic disease or have a long history of taking drugs. Conclusion: HZ duplex is a rare event that can occur in both immunocompetent and immunosuppressed individuals. HZ duplex might be associated with the Asia region, advanced age, immunosuppression, and being female.

Keywords: Herpes zoster duplex, clinical report, etiology analysis

Introduction

Herpes zoster (HZ) is a relatively common disease in regions of the world where the detection rate of serum varicella zoster virus (VZV) IgG in healthy individuals is 40-100% [1]. One million new episodes of HZ are estimated to occur yearly in the United States [2]. Following varicella infection, VZV typically remains latent in the dorsal root ganglia of patients, as demonstrated by autopsy studies [3]. After reactivation, viral replication produces typical unilateral HZ lesions, usually restricted to one-half of the body [4]. However, sometimes the virus affects more than one dermatome, a condition referred to as multidermatomal HZ. HZ occurring in two, noncontiguous, widely separated dermatomes, referred to as HZ duplex unilateralis or bilateralis [5], is very rare, with an incidence of less than 0.1% of all HZ cases [6]. The mechanism of VZV reactivation in multiple dermal regions is unknown. In the past, HZ duplex was reportedly most common in immunocompromised patients, but HZ duplex also occurs in immunocompetent hosts. We present a case of HZ duplex bilateralis in an immunocompetent patient that occurred on both sides of abdomen and back with a relatively symmetrical distribution. Moreover, we analyzed literature pertaining to 36 HZ duplex cases to clarify their underlying cause.

Case report

A 49-year-old woman presented with a 5-d history of pain on the left side of her chest and abdomen. After onset of the pain, grouped, vesicular eruptions developed along the left side of her chest and abdomen. Three days after the onset of pain, the same symptoms developed along the right side of the chest and abdomen. She had no personal or family history of HZ, she had not received the Zostavax vaccine, and did not recall having chicken pox. She was afebrile, as the severe pain led to poor sleep and dietary habits. Previously, the patient was healthy, did not display similar rashes, erythema, or blisters on the trunk, and she had not suffer from any chronic systemic diseases in recent years and was not taking any medication. Before HZ duplex, psycho-social stress and overnight working did not exist. The patient had no headache and no other systemic complaints. Cutaneous examination revealed bilateral multiple grouped vesicles and erosions

Figure 1. Cutaneous examination revealed bilateral multiple grouped vesicles and erosions over an erythematous base on the anterior side, corresponding to the left T10 and right T9 dermatomes.

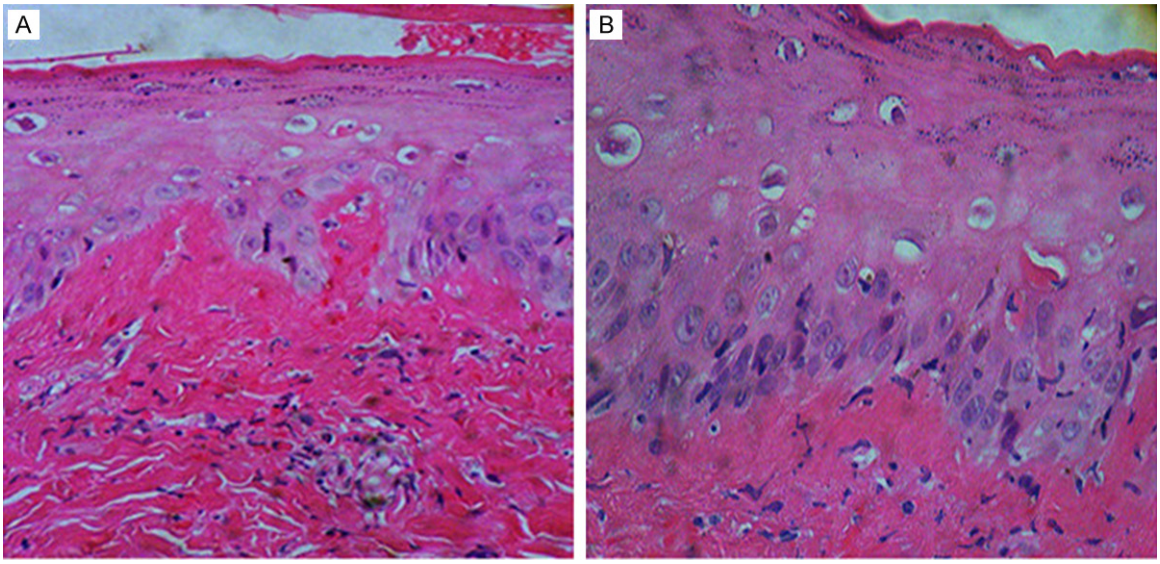

Figure 2. Skin biopsy of an early vesicular lesion revealed intracellular and intercellular edema, as well as ballooning degeneration in the epidermis and lymphocytes and other inflammatory cell infiltration in the superficial dermis (A-left sidedness, B-right sidedness. HE stain, original magnification × 400).

over an erythematous base on the anterior side, corresponding to the left T10 and right T9 dermatomes (**Figure 1**). Systemic examination did not reveal any abnormality. The following laboratory tests were all normal: blood cells, liver function, renal function, blood sugar, blood lipids, complement (C3, C4), immunoglobulin, syphilis, HIV, chest radiograph, and ultrasonography of the liver, kidneys, spleen, pancreas, and gallbladder. Skin biopsy of an early vesicular lesion revealed intracellular and intercellular edema, as well as ballooning degeneration in the epidermis and lymphocytes and other inflammatory cell infiltration in the superficial dermis, **Figure 2A**-left sidedness, **Figure 2B**-right sidedness (**Figure 2**). Electron microscopy showed multiple annular VZV particles in the superior part of the epidermis, **Figure 3A**-left sidedness, **Figure 3B**-right sidedness (**Figure 3**). This study was conducted in accordance with the declaration of Helsinki. This study was conducted with approval from the Ethics Committee of Harbin Medical University. Written informed consent was obtained from this participant.

Treatment was as follows: oral famciclovir, vitamin B, E, topical Lightyellow Sophora Root herpes tincture, and infusion of foscarnet sodium injection. Significant improvement was observed after 1 week and the lesions resolved completely within 2 weeks. However, at a follow-up visit 1 month later, the patient reported persistent pain, for which she took orally gabapentin capsules.

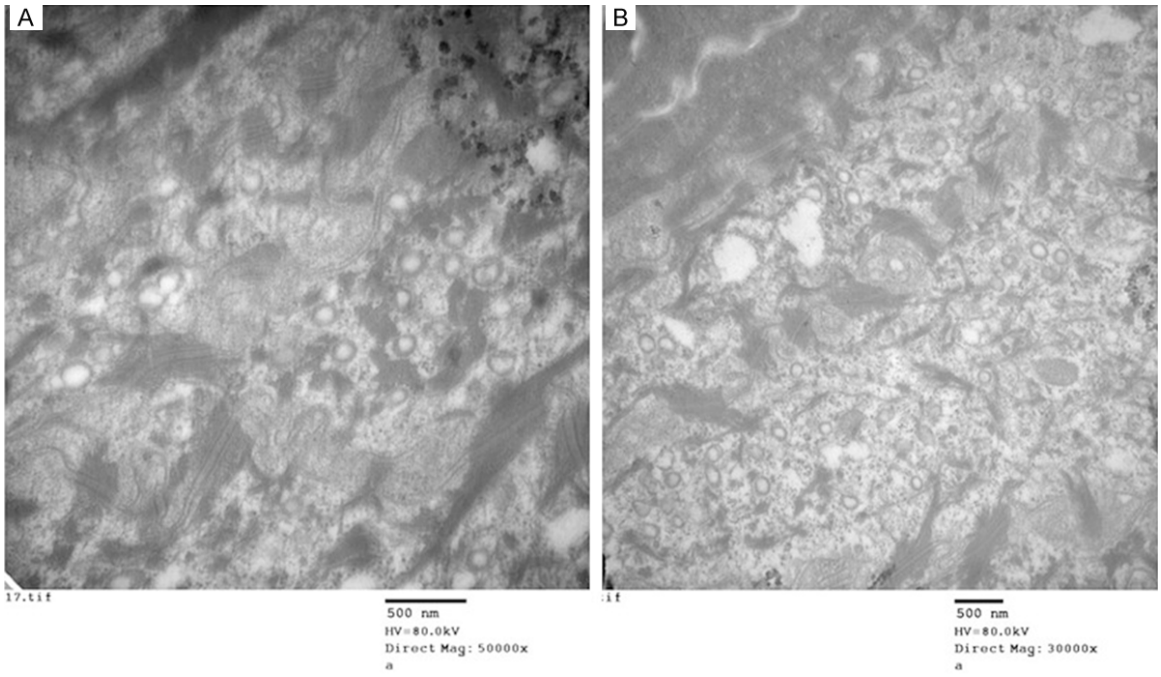

Figure 3. Electron microscopy showed multiple annular VZV particles in the superior part of the epidermis (A-left sidedness, B-right sidedness).

Discussion

We reported a case of HZ duplex in an immunocompetent female patient. Nearly symmetrical rashes are very rare, with only 36 cases (including this case) of HZ duplex unilateralis or bilateralis having been reported to date. The age, sex, involved dermatomes, ethnicities, medications taken, and underlying illnesses are summarized in **Table 1** [7-40, 43, 44]. We analyzed the possible underlying causes of HZ duplex.

HZ duplex was observed in all ethnic groups. In our study, 24 cases (66.7%) were from Asia. Almuneef et al., (2004) reported that Asian individuals are more susceptible to VZV, while East Asians are more susceptible to other viruses including Epstein-Barr virus and hepatitis B [41]. The VZV-IgG detection rate was lower in the sera of healthy Asian individuals than of those residing in other regions [1]. The highest number of HZ duplex patients was observed in Asia, suggesting a genetic susceptibility for developing HZ duplex.

HZ predominantly affects the elderly. HZ increases with age and as VZV-specific T cell-mediated immunity declines, VZV-specific memory of CD4 T cells decreases [2]. Seroprevalence of VZV-IgG increased with age [1, 45]. Approximately 50% of HZ cases occur in individuals aged 50 years or older in the United States each year [42]. In our study, the mean age of the patients was 40.1 years (age range 3-80 years) and 16 cases (44.4%) were in individuals ≥ 50 years of age. HZ duplex incidence increased with age.

Multiple dermatome involvement and bilateral asymmetrical distribution of HZ have been reported in the past, with the majority of the cases being in immunosuppressed adults and children. In our study, 17 HZ duplex cases (47.2%) occurred in immunocompromised patients, including those affected by HIV, cancer, and other diseases, or those taking long-term medications including immunosuppressive agents, chemotherapeutic agents, and corticosteroids. HZ is caused by the reactivation of a neurotropic virus, VZV, lying in a dormant state in sensory dorsal root ganglia. Decreased immunity may be the cause of viral reactivation.

Reflecting the susceptibility of woman to HZ duplex, 23 women (63.9%) and 13 men were included in our study. Eighteen HZ duplex patients, 13 of which were women (72.2%), did

Table 1. Basic conditions of 36 patients

Num/Ref	Age/Sex	Dermatomes	Drug	Underlying disease	Regions
1/[7]	30/M	L: T10; R: T10		HIV	Indian
2/[8]	24/F	L: Eye; R: Tigh	-	-	Indian
3/[9]	10/M	L: L2-4; R: C4-6		HIV; Haemophilia	Indian
4/[9]	50/M	L: C3-5; L: T7-9	Immunosuppressive drugs	Renal transplant	Indian
5/[10]	50/F	L: T3, 4; R: T3, 4	-	-	Indian
6/[11]	45/M	L: Maxillary; R: T9	-	-	Indian
7/[12]	67/F	L: T7, 8; R: L4, 5		Hypertension; Osteoporosis	Korean
8/[13]	49/F	L: T4; R: T4	5-fuorouracil methotrexate adriamycin	Breast cancer	Korean
9/[14]	5/F	L: T2; R: T5	-	-	Korean
10/[15]	22/F	L: S3; R: T7	Chemotherapy	Leukemia	Korean
11/[16]	47/F	L: L3, 4; R: T7	-	-	Korean
12/[17]	50/F	L: T2; L: T8	-	Breast cancer (9 years ago, no metastasis)	Korean
13/[18]	21/M	L: T10; R: T9, 10	Prednisone	Ulcerative colitis	Korean
33/[36]	4/F	L: T5; R: T7-8	-	-	Korean
14/[19]	52/F	L: T8; R:T2, 3	Glucocorticoid	Systemic lupus	Chinese
15/[20]	52/F	L: T6-8; R: T6-10	-	-	Chinese
16/This paper	49/F	L: T10; R: T9	-	-	Chinese
17/[21]	80/F	L: C3; R: L3, 4	-	-	Taiwan
18/[22]	72/F	L: Facial paresis R: Peroneal paresis		Diabetes	Japanese
19/[23]	3/F	L: T2-4; R: T2-4	Chemotherapy	Lymphocytic leukemia	Japanese
20/[24]	77/M	L: S3, 4; R: T6-8	?	Gastric cancer	Japanese
21/[6]	61/M	L: T2, 3; R: C5	-	-	Japanese
22/[25]	64/F	L: T8; R: L4	Prednisone	Polymyositis; Diabetes	Arabic
23/[26]	24/M	L: T8; R: T8	-	-	Pakistanian
24/[27]	67/M	L: V1, 2; R: V3	Oral steroids	-	Caucasian
25/[28]	16/F	L: T4-7; R: V2	-	-	Caucasian
26/[29]	69/M	R: T5-7, 10, 12, L3-4 L: T4-6, 12, L3-5	Cyclosporine prednisone mycophenolate	Renal allograft	American
27/[30]	51/F	L: S1; R: T!0	-	-	American
28/[31]	10/M	L: T2; R: V, T4	Steroids, chemotherapy	Non-Hodgkin's lymphoma	American
29/[32]	37/F	L: T11; R: T3	Oral steroids	Asthma	American
32/[35]	14/M	L: L1; R: V1	-	-	American
30/[33]	73/F	L: T9, 10; R: L2, 3, S3	-	-	Germany
31/[34]	70/F	L: L1, 2; R: C4, T2	Chlorambucil, methylprednisolone	Chronic lymphocytic leukemia	Belgium
34/[37]	10/M	L: V1; R: C7-8	-	-	South African
35/[38]	6/F	R: T10-12	-	-	Egyptian
36/[39]	11/F	R: T11-12, L3–5	-	-	Egyptian

Explanation: '-' means 'did not medication' in the fourth column. 'ref'=reference.

not suffer from any chronic systemic disease or have a long history of taking drugs. Women are more likely to spend time with children than are men, and children are susceptible to varicella [43]. A higher seroprevalence of VZV was observed in women than in men [42]. These data are an extension of observations reported in several studies showing women have higher incidence of HZ [46, 47]. A study by Hernandez et al., suggested that a genetic predisposition to HZ is more frequently inherited along maternal lines. Perhaps being female is an independent risk factor for rare presentations of HZ duplex.

Conclusion

HZ duplex is a rare event that can occur in both immunocompetent and immunosuppressed individuals. HZ duplex might be associated with the Asia region, advanced age, immunosuppression, and being female.

Disclosure of conflict of interest

None.

Address correspondence to: Dr. Jin Zhou, Department of Hematology, The First Affiliated Hospital of

Harbin Medical University, Harbin 150001, China. Tel: +86 451 85555799; Fax: +86 451 86412528; E-mail: jinzhoudoc@yeah.net

References

[1] Lee BW. Review of varicella zoster seroepidemiology in India and Southeast Asia. Trop Med Int Health 1998; 3: 886-890.

[2] Yawn BP, Gilden D. The global epidemiology of herpes zoster. Neurology 2013; 81: 928-930.

[3] Kennedy PG, Cohrs RJ. Varicella-zoster virus human ganglionic latency: a current summary. J Neurovirol 2010; 16: 411-418.

[4] Gershon AA, Gershon MD, Breuer J, Levin MJ, Oaklander AL, Griffiths PD. Advances in the understanding of the pathogenesis and epidemiology of herpes zoster. J Clin Virol 2010; 48: S2-7.

[5] Thomas SL, Hall AJ. What does epidemiology tell us about risk factors for herpes zoster? Lancet Infect Dis 2004; 4: 26-33.

[6] Takaoka Y, Miyachi Y, Yoshikawa Y, Tanioka M, Fujisawa A, Endo Y. Bilateral disseminated herpes zoster in an immunocompetent host. Dermatol Online J 2013; 19: 13.

[7] Lewis RJ, Mitchell JC. Systemic lupus erythematosus, miliary tuberculosis, and bilateral herpes zoster occurring in a Chinese woman. Arch Dermatol 1971; 104: 562

[8] Feldman S, Novak R, Malone W. Case report-herpes zoster affecting three noncontiguous dermatomes in a child with cancer. J Tenn Med Assoc 1979; 72: 664-666

[9] Hill PA, Lamey PJ. Oral herpes zoster with contralateral skin involvement. Br Dent J 1986; 161: 217-218.

[10] Takayama M, Takayama N, Hachimori K, Minamitani M. Restriction endonuclease analysis of viral DNA from a patient with bilateral herpes zoster lesions. J Infect Dis 1988; 157: 392-393.

[11] Yoshida M, Hondo R. A case of herpes zoster duplex with generalized eruption. Study of the pathogenesis of the eruptions (Japan). Nihon Hifuka Gakkai Zasshi 1989; 99: 457-461.

[12] Moorhead RG, Tyllis M. An unusual presentation of herpes zoster. Med J Aust 1990; 153: 562.

[13] Lee SY, Choi YS, Yu HJ, Son SJ. A case of bilateral herpes zoster. Korean J Dermatol 1994; 32: 1119-1122.

[14] Kolalapudi S. Herpes zoster at two different sites in the same individual. Indian J Dermatol Venereal Leprol 1995; 61: 155-156.

[15] Vu AQ, Radonich MA, Heald PW. Herpes zoster in seven disparate dermatomes (zoster multiplex): report of a case and review of the literature. J Am Acad Dermatol 1999; 40: 868-869.

[16] Bloss G, Ebisch MA, Kunz M, Gross G. Bilateral asymmetric herpes zoster in adolescence. Hautarzt 2001; 52: 335-338.

[17] Csontos Z, Sebök B, Karg E, Schneider I. Bilateraler asymmetrischer herpes zoster (herpes zoster duplex asymmetricus). Hautarzt 2001; 52: 817-819.

[18] Brar BK, Gupta RR, Saghni SS. Bilateral herpes zoster of widely seperated dermatomes in a non-immunocompromised female. Indian J Dermatol Venereol Leprol 2002; 68: 48-49.

[19] Shin BJ, Shim JH, Seo SJ, Hong CK. A case of zoster duplex bilateralis. Ann Dermatol 2002; 14: 59-61.

[20] Arfan-ul-Bari, Iftikhar N, ber Rahman S. Bilateral symmetrical herpes zoster in an immunocompetent patient (Herpes zoster duplex symmetricus). J Coll Physicians Surg Pak 2003; 13: 524-525.

[21] Shan H. A case of herpes zoster duplex. Chinese Journal of Dermatology and Venereology 2003; 17: 350.

[22] Kim SJ, Kang JD, Yoon NH, Park SD. A case of herpes zoster duplex bilateralis. Korean J Dermatol 2004; 42:367-369.

[23] Goo B, Cho SB, Chung KY. Sequential development of herpes zoster duplex unilateralis during oral famciclovir treatment. J Dermatol 2005; 32: 933-934.

[24] Peretz A, Nowatzky J, Steiner I. Neurological picture. Herpes zoster duplex bilateralis. J Neurol Neurosurg Psychiatry 2007; 78: 818.

[25] Takahama H, Tsukahara N, Hirayama M, Ito S, Sakuramoto C. Isolated double herpes zoster paresis involving the left facial nerve and the right peroneal nerve following disseminated herpes zoster. J Dermatol 2007; 34: 349-352.

[26] Rajashekar TS, Singh G, Shivakumar V, Okade R. Recurrent herpes zoster duplex symmetricus in HIV infection. Indian J Dermatol 2008; 53: 33-34.

[27] Shin BS, Seo HD, Na CH, Choi KC. Case of herpes zoster duplex bilateralis. J Dermatol 2009; 36: 95-97.

[28] Shin JW, Kim DH, Whang KU, Lee J, Park Y, Cho MK, Lee S, Lee SY. A case of zoster duplex bilateralis. Ann Dermatol 2009; 21: 423-425.

[29] Yoo KH, Park JH, Kim BJ, Kim MN, Song KY. Herpes zoster duplex bilateralis in a patient with breast cancer. Cancer Res Treat 2009; 41: 50-52

[30] Chilek K, Routhouska S, Tamburro J. Disseminated varicella zoster virus in an immunized child as the acquired immunodeficiency syndrome-defining illness. Pediatr Dermatol 2010; 27: 192–194.

[31] Gahalaut P, Chauhan S. Herpes zoster duplex bilateralis in an immunocompetent host. Indian Dermatol Online J 2012; 3: 31-33.

[32] Castronovo C, Nikkels AF. Chronic herpes zoster duplex bilateralis. Acta Derm Venereol 2012; 92: 148-151.
[33] Gordon R, Mays RM, Lapolla W, Tyring S. Herpes zoster duplex bilateralis in an immunocompetent woman--is gender a risk factor? Popul Health Manag 2012; 15: 398-400.
[34] Chernev I. Herpes zoster duplex bilateralis. Dermatol Online J 2013; 20.
[35] Elsaie ML, Shehu YM, Avashia N. Multisegmental herpes zoster in an immunocompetent girl. Cutis 2012; 89: 36-37.
[36] Lo CH, Chiang CP. Herpes zoster duplex bilateralis. Intern Med 2013; 52: 2841.
[37] El Naby H, Kamel M, Elsaie M. Multisegmental herpes zoster in a healthy girl. J Vaccines Vaccin 2013; 4: 180.
[38] Agrawal S, Aara N, Bumb R. Herpes zoster duplex bilateralis symmetricus in an immunocompetent subject. Int J Dermatol 2014; 53: e281-282.
[39] Yan C, Laguna BA, Marlowe LE, Keller MD, Treat JR. Herpes zoster duplex bilateralis in an immunocompetent adolescent boy: a case report and literature review. Pediatr Dermatol 2014; 31: 341-344.
[40] Leung AK, Barankin B. Bilateral symmetrical herpes zoster in an immunocompetent 15-year-old adolescent boy. Case Rep Pediatr 2015; 2015: 121549.
[41] Wee J, Nei WL, Yeoh KW, Yeo RM, Loong SL, Qian CN. Why are East Asians more susceptible to several infection-associated cancers (carcinomas of the nasopharynx, stomach, liver, adenocarcinoma of the lung, nasal NK/T-cell lymphomas)? Med Hypotheses 2012; 79: 833-842.
[42] Weinberg JM. Herpes zoster: epidemiology, natural history, and common complications. J Am Acad Dermatol 2007; 57: 130-135.
[43] Thomas SL, Wheeler JG, Hall AJ. Contacts with varicella or with children and protection against herpes zoster in adults: a case-control study. Lancet 2002; 360: 678-682.
[44] Yi A, Chernev I. The pathogenesis of herpes zoster duplex bilateralis symmetricus. Int J Dermatol 2015; 54: e89-90.
[45] Akram DS, Qureshi H, Mahmud A, Khan AA, Kundi Z, Shafi S, N-ur-Rehman, Olowokure B, Weil J, Bock H, Yazdani I. Seroepidemiology of varicella-zoster in Pakistan. Southeast Asian J Trop Med Public Health 2000; 31: 646-649.
[46] Chapman RS, Cross KW, Fleming DM. The incidence of shingles and its implications for vaccination policy. Vaccine 2003; 21: 2541-2547.
[47] Chidiac C, Bruxelle J, Daures JP, Hoang-Xuan T, Morel P, Leplège A, El Hasnaoui A, de Labareyre C. Characteristics of patients with herpes zoster on presentation to practitioners in France. Clin Infect Dis 2001; 33: 62-69.