



Original Article:

Study of the Clinical Patterns in Varicella in a Tertiary Hospital at Coastal Karnataka

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Abstract: Context: There are very few studies regarding the clinical patterns and manifestations of a very common viral infection, Varicella, especially from south India. **Aims:** To study the cutaneous manifestation of Varicella with an emphasis on vaccination status. **Settings and Design:** Cross sectional study. **Methods and Material:** A total of 118 patients attending the Dermatology OPD of a private medical college in coastal Karnataka with cutaneous manifestations of varicella were enrolled. Study period was from January 2010 to December 2010. **Statistical analysis used:** Data was analysed using SPSS version 11.5. Various frequency distribution tables, diagrams and chi square test were used to describe and analyse the data. **Results:** Majority of the patients were males (62.7%) and 21-30 years was the most common age group involved. There were 74 students, out of which eight were in the preschool group aged between 3-4 years. Most of the patients visited the hospital on the second day after onset of the symptoms. 108(91.5%) patients complained about the presence of various prodromal symptoms. Scalp was the most common (39.8%) site of onset of the rash. Itching was experienced by 76(64.4%) patients. Peak number of cases (35.6%) was seen in the month of January. The cutaneous rash was most commonly (57.7%) distributed over face, scalp, trunk, upper and lower limbs, with predominantly central distribution. Soft palate was the most common site (87%) involved in the oral cavity. **Conclusions:** A wide variety of combination symptoms with classical cutaneous polymorphic vesicular rash and oral lesions was seen.

Key Words: Varicella; Cutaneous manifestations; Vaccination

Introduction:

Varicella is a highly infectious acute viral infection caused by Varicella-zoster virus of Herpesviridae family.¹ Heberden in 1767 distinguished chickenpox from smallpox.² The word chickenpox comes either from "chichen-pois" for chick pea, describing the pea sized blisters or "gican" meaning to itch.² In 1888 von Bokay first noticed the association between varicella and herpes zoster.² Availability of varicella vaccine and subsequent breakthrough varicella may possess diagnostic challenge. There are very few studies and data regarding the varied clinical features of varicella which may help in diagnosing the infection early and hence this study was conducted.

Subjects and Methods

Patients attending the Dermatology OPD of a private medical college in south India were included in the study. A total of 118 patients were enrolled for the cross sectional study from January 2010 to December 2010. Diagnosis of varicella was made clinically by the presence of characteristic polymorphic papulo-vesicular rash. A detailed history regarding the prodrome, site of onset, progression of skin rash, associated symptoms, contact, recurrence, pregnancy & vaccination status were recorded. A thorough clinical examination was done including the site-wise distribution of various skin & mucosal lesions, and lymphadenopathy. Routine blood investigation like complete hemogram, liver and renal function test, random blood sugar, ELISA for Human Immunodeficiency Virus (HIV) and routine urine examination were conducted in selected patients.

Results:

Of the total 118 varicella patients studied, 74(62.7%) were males. Maximum number of patients (50) was in the age group of 21-30 years (Table 1).

Table 1: Age-sex distribution of the study subjects.

| Age in years | Males No. (%) | Females No. (%) | Total No. (%) |
|--------------|---------------|-----------------|---------------|
| <10 | 24(20.3) | 10(8.5) | 34(28.8) |
| 11-20 | 11(9.3) | 8(6.8) | 19(16.1) |
| 21-30 | 30(25.3) | 20(16.9) | 50(42.4) |
| 31-40 | 2(1.7) | 4(3.4) | 6(5.1) |
| 41-50 | 2(1.7) | 2(1.7) | 4(3.4) |
| 51-60 | 2(1.7) | 0(0) | 2(1.7) |
| 61-70 | 3(2.5) | 0(0) | 3(2.5) |
| Total | 74(62.7) | 44(37.3) | 118(100) |

Mean age \pm SD was 20.3 \pm 13.6 years, with age ranging from 3 to 70 years. Majority of the patients were students 74(62.7%), out of which school going (5-15 years) constituted 37.9% of the student subgroup (Table 2, 3).

Table 2: Distribution of the study subjects on the basis of occupation (n=118)

| Students | No. (%) |
|-------------------|-----------|
| Students | 74 (62.7) |
| Skilled workers | 2 (1.7) |
| Unskilled workers | 10 (8.4) |
| Professional | 20 (17) |
| Retired | 2 (1.7) |
| Housewife | 8 (6.8) |
| Others* | 2 (1.7) |
| Total | 118 (100) |

*Business etc.

Table 3: Distribution of the study subjects on the basis of occupation (student subset n=74)

| Students | No. (%) |
|------------------------------|-----------|
| Pre-school (3-4 yr) | 8 (10.8) |
| School (5-15 yr) | 28(37.9) |
| Medical students | 14 (18.9) |
| Nursing students | 4 (5.4) |
| Non-medical college students | 20 (27) |
| Total | 74 (100) |

Maximum number of patients (45.7%) had symptoms since 2 days, with a mean duration of 2 days. Various prodromal symptoms like fever, malaise, coryza, headache, joint pain, loss of appetite & nausea were present among 108(91.5%) patients (Table 4).

Table 4: Prodrome symptoms among the study subjects (n=108)

| Prodrome | No. (%) |
|----------------------------|-----------|
| Fever | 26(24.1) |
| Malaise | 2(1.9) |
| Loss of appetite | 12(11) |
| Other combination symptoms | 68(63) |
| Total | 108 (100) |

Fever alone and in combination with other prodrome symptom was seen in 90(76.2%) patients. The most common combination prodrome symptom was fever with loss of appetite, seen in 16(13.6%) patients (Table 5). There is no association between fever & loss of appetite combination prodrome symptom with itching, and the association found to be insignificant ($p>0.05$).

Table 5: Combination prodrome symptoms among the study subjects (n=68)

| Combination symptoms | No. (%) |
|----------------------|----------|
| F,M | 10(14.8) |
| F,LA | 16(23.6) |
| M,F,C,H | 2(2.9) |
| M,F,H | 2(2.9) |
| F,C,LA | 8(11.9) |
| F,JP | 2(2.9) |
| F,C,H | 2(2.9) |
| M,F,H,LA | 2(2.9) |
| F,N | 2(2.9) |
| F,H,LA | 2(2.9) |
| M,H | 2(2.9) |
| M,F,C,LA | 2(2.9) |
| M,F,LA | 10(14.8) |
| M,LA | 2(2.9) |
| F,H | 4(5.9) |
| Total | 68(100) |

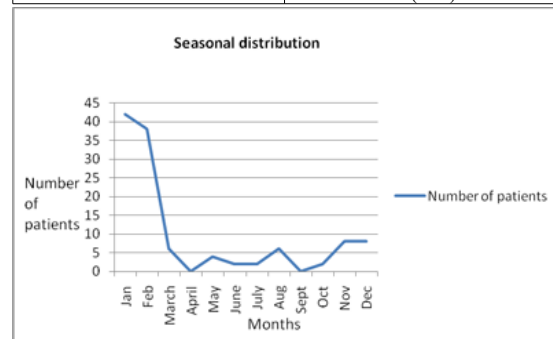
F-Fever M-Malaise LA-Loss of appetite C-Coryza H-Headache JP-Joint pain N-Nausea.

Cephalocaudal progression of the skin rash was seen in 88(74.5%) patients. Majority of the patients (39.8%) first noticed the rash over the scalp followed by face (34.7%). Among

the 76(64.4%) patients who had itching, majority (54 patients) experienced mild intensity itching. The number of cases (35.6%) peaked during the month of January (Graph 1). Second episode of varicella was seen in two patients aged 55 & 58 years, age of first episode was 8 & 10 years respectively.

Table 6: Duration between contact with varicella/herpes zoster and onset of symptoms

| No. of days | No. (%) |
|-------------|-----------|
| <=7 days | 14 (19.5) |
| 8-10 days | 6(8.3) |
| 11-14 days | 50(69.5) |
| >=15 days | 2(2.7) |
| Total | 72(100) |



Graph 1: Showing the seasonal distribution of the study subjects

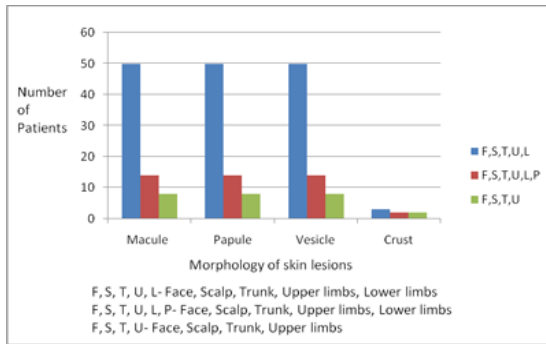
Contact with a patient of varicella (93%) or herpes zoster (7%) was seen in 72(61%) patients. Maximum number of varicella cases developed after 11-14 days of contact (Table 6). Two patients were pregnant who developed varicella at 7th & 8th month of gestation. However there were no complications associated with varicella among these patients. Only six patients with varicella were previously vaccinated with a single dose of varicella vaccine (Table 7).

Table 7: Age distribution of the vaccinated subjects (n=6)

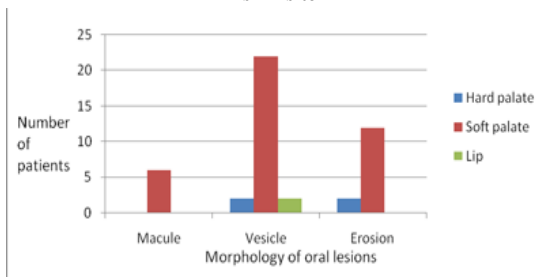
| Age of the study subject in years | Vaccination age in years | Duration between varicella and vaccination in years |
|-----------------------------------|--------------------------|---|
| 3 | 2 | 1 |
| 3 | 1 | 2 |
| 6 | 3 | 3 |
| 6 | 4 | 2 |
| 16 | 6 | 10 |
| 17 | 6 | 11 |

There were no history of associated illness like diabetes mellitus, hypertension and immunocompromised state (HIV infection) among the study subjects.

The cutaneous rash was most commonly (57.7%) distributed over face, scalp, trunk, upper limbs, and lower limbs (Table 8), with predominantly central distribution. Macule, papule & vesicle (polymorphic) were the most common morphological cutaneous lesions observed during the study (Graph 2). Vesicles were predominantly elliptical and few round, 2-4 mm in diameter on erythematous base. Skin rash were distributed more on medial than on lateral aspect of the limbs. Palms were involved in 11.8% of the patients, with vesicle being the most common morphology. None of the patients had sole involvement. Soft palate was the most common site (87%) involved in the oral cavity, with vesicles being the most common lesion (Graph 3). Lymphadenopathy was seen in 18 patients, consisting of cervical (10), submandibular (6) & inguinal (2) lymph nodes. Routine blood investigation showed leucopenia & lymphocytosis in 72 % of the selected patients and none of them tested positive for HIV.



Graph 2: Showing the morphology of the most common skin site



Graph 3: Showing the morphology of oral mucosal lesions

Table 8: Distribution of the most common site of skin rash

| Site | No. (%) |
|-----------------------------------|----------|
| Face | 2(1.7) |
| Trunk | 6(5) |
| Face, trunk | 6(5) |
| Face, scalp | 4(3.4) |
| Face, scalp, trunk | 2(1.7) |
| Face, trunk, UL | 2(1.7) |
| Face, trunk, UL, LL | 6(5) |
| Face, scalp, trunk, UL, LL | 68(57.7) |
| Face, scalp, trunk, UL, LL, palms | 14(11.9) |
| Face, scalp, trunk, UL | 8(6.9) |
| Total | 118(100) |

UL- Upper limbs LL-Lower limbs



Figure 1: Characteristic oval vesicles on erythematous base over the back.

Discussion:

Varicella is a highly infectious acute viral infection clinically characterized by a vesicular exanthem, and frequently associated with fever and malaise.¹ Severity of infection in adults is usually more with numerous lesions and prolonged febrile illness.^{1,2} Significant mortality and morbidity is seen in immunocompromised patients (like HIV infection), with skin lesions being extensive and often hemorrhagic.²

Epidemiology of varicella is different in temperate and tropical countries, with maximum number of infection occurring before adolescence in temperate countries.¹ In tropical country like India seroprevalence pattern showed the varicella mainly affecting the young adult population, as also observed in our study.^{1,3-6} This late susceptibility in tropics (more in rural areas) may be due to epidemiological interference from other viruses and less exposure to varicella zoster virus.⁷ In our study majority of the patients (62.7%) were students (school going student subset of 37.9%), likely due to higher exposure from the educational institutions. This high exposure may be due to highly contagiousness, 1-2 days even before the onset of varicella rash and due to the occurrence of subclinical cases.^{1,8} Heininger U et al¹ describes that there is no sex difference in varicella, but majority of our patients were males (62.7%). This higher number of male patients was due to an outbreak in boy's school.

Varicella manifests abruptly in young children with the simultaneous onset of rash and low grade fever, and in our study mean duration of symptoms was 2 days.² The various prodromal symptoms common in adolescents and adults, like fever, malaise, coryza, headache, joint pain, loss of appetite & nausea, were present in 91.5% of our patients.⁸ Heininger U et al¹ and Chen MT et al⁸ describes varicella as an febrile illness, although fever was seen in only 76.2% of our patients. When varicella rash is seen in the absence of fever, the risk of transmission to family members or colleagues increases as there is a possibility to ignore since varicella is believed to be a febrile disease. The most common combination prodrome symptom was fever with loss of appetite, seen in 13.6% of our patients, may be useful clue to the diagnosis of varicella.

Majority of the patients (39.8%) in our study first noticed the rash over the scalp followed by face (34.7%) and cephalocaudal progression of the skin rash was seen in 74.5% of the patients, as also mentioned by Chen MT et al.⁸ Monica L et al² describes pruritus in varicella as almost universal, associated with the skin rash, while in our study only 64.4% patients had itching, and majority (71%) experienced mild intensity itching. Peak incidence of varicella is seen in the cooler, drier months (winter or spring) as the virus is heat labile.⁹ Similarly in our study peak number of cases (35.6%) were seen during the month of January (Graph 1). According to Chen MT et al⁸ progressive and recurrent varicella was observed more frequently in immunocompromised patients. Second episode of varicella was seen in two of our immunocompetent patients aged 55 & 58 years.

Range of incubation period of varicella is 10-21 days with an average of 14 days.^{1,8} In our study maximum number of varicella cases developed 11-14 days after the contact, which is consistent with the above data regarding incubation period. Two were pregnant in the third trimester without any complications in our study. Risk of congenital malformation with the infection after first 20 weeks of pregnancy is approximately 2%.² Varicella pneumonia and its complications is a risk to the mother when infection occurs in the third trimester.¹⁰ Only six patients were previously vaccinated with a single dose of varicella vaccine and the clinical presentation in them remained to be the same with the rest of the patients (Table 7). Chaves SS et al¹¹ describes that approximately 1 in every 5 children exposed to varicella zoster virus, who receives one dose of varicella vaccine may develop varicella. Breakthrough varicella is varicella disease in previously vaccinated individuals, may be difficult to diagnose as they tend to be milder.¹ Need for two-dose policy for varicella vaccine may be considered for the 15-20% of the vaccinees who are not fully protected after one dose.^{11,12} According to Agampodi SB et al¹³ incidence of varicella in medical undergraduates is very high. Medical, nursing students and nursing staff are in intimate contact with patients and thus vaccinating these susceptible will reduce work loss as well as transmission of infection in the hospital.

There was no history of associated illness among the study subjects, as varicella related complications are high in patients with coexisting diseases.¹⁴ None of our patients were smokers, as the risk of varicella pneumonia is high in this group.¹⁵

The distribution of skin rash in majority of the patients (57.7%) was seen over face, scalp, trunk, upper and lower limbs with relative sparing of extremities (Table 8) consistent with description by Straus SE et al.¹⁶ Macule, papule & vesicle (Figure 1) were the most common skin lesions (Graph 2) as the mean duration of onset in our patients was two days, because it takes 24-48 hours to form crust.^{1,2} Straus SE et al.¹⁶ describes the skin rash being more dense in the small of the back and between shoulder blades than on scapulae and buttocks. They also mention regarding the numerous lesions more profuse on the medial than on the lateral limbs, which was also seen in our study.¹⁶ Soft palate was the most common site (87%) involved in the oral cavity, with vesicles being the most common lesion (Graph 3), as vesicle can rupture to form erosions later.

Conclusions:

Varicella is an acute viral exanthem with varied clinical presentation. It can pose a diagnostic difficulty if a patient presents to a doctor too early before the occurrence of vesicles. Scalp being the most common site of onset of the rash, a high degree of suspicion is required for making the diagnosis in preventing its transmission in the community. Varicella classically described as a febrile and pruritic exanthem was seen only in 76.2% and 64.4% of our patients respectively.^{2,8} Thus diagnosis should be based on the presence of polymorphic skin lesions with a characteristic vesicular exanthem with cephalocaudal progression. Oral cavity was involved in 39% of our patients, with soft palate being the commonest site involved with vesicle and erosions, which should be examined to aid in the diagnosis. Young adults were the commonest age group involved by varicella as the study was conducted in a tropical country. Large number of cases can be expected in cooler and drier months like January and February. Vaccinating susceptible medical, nursing students and nursing staff will reduce work loss as well as transmission of infection in the hospital. Despite the number of vaccinated patients were few in our study, data may be useful in conducting exclusive study regarding varicella in vaccinees and to consider two-dose varicella vaccine policy for the 15-20% of the vaccinees who are not fully protected after one dose.^{11,12} Further extensive clinical study involving large number of patients is required in the post vaccination era.

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