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Original Research Article

A Descriptive Observational Study of Prurigo Nodularis in a Rural Tertiary Care Centre

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Abstract

Background: *Prurigo nodularis is a highly pruritic condition, often considered as a reaction pattern to chronic pruritus. Variety of diseases that induce chronic pruritus may lead to the development of a vicious itch–scratch–cycle resulting in therapy refractory nodular lesions. Our aim is to study the demographics, clinical pattern and associated dermatological or systemic causes of chronic pruritus in patients with prurigo nodularis.*

Methods: *A Descriptive observational study is conducted among 50 patients of prurigo nodularis. History, detailed examination and relevant investigations for common associated conditions of chronic pruritus were done and data are subjected to statistical analysis.*

Observations: *Fifty patients enrolled in the study with a male female ratio of 1.17:1. The commonest site affected is the extensor aspect of legs. Most common association is atopic diathesis with an earlier age of onset of the disease than the rest. The other conditions associated were popular urticaria, allergic contact dermatitis, varicose eczema, scabies and urticaria. Interestingly, We found two cases of chronic dermatophytosis who developed prurigo nodularis. The systemic factors for chronic pruritus in our patients were diabetes, hypothyroidism and HIV infection. 4% of the patients had a positive family history. Serum total IgE levels is found to be raised in 84% of the patients and correlated with disease severity.*

Conclusion: *About 54% of our patients with prurigo nodularis had an underlying causative factor for chronic pruritus. As prurigo nodularis is chronic and refractory condition, it is important to treat the underlying pruritus in order to control the disease.*

Keywords: *prurigo, prurigo nodularis, etiology, associated diseases, chronic pruritus, serum IgE levels.*

Introduction

Prurigo nodularis (PN) also known as prurigo nodularis of Hyde, first described in the year 1909, is a chronic disease of uncertain etiology, characterized by numerous, pruritic, symmetrically distributed, hyperkeratotic or eroded nodules, commonly affecting the extremities.[1]

PN occurs in patients with chronic pruritus and is a reaction pattern due to chronic scratching. The nodules in PN are also intensely itchy and thus a vicious itch–scratch–cycle may evolve resulting in long lasting and highly therapy refractory PN.[2]

Since PN is a reaction pattern to chronic pruritus, it occurs in a broad variety of diseases that may induce chronic pruritus like cutaneous, systemic, neurological or psychiatric diseases.[3] There isa paucity of studies in Indian population investigating the etiological and various associated factors in PN.

Aim

The aim of our study is to study the demographics, clinical pattern, various underlying etiological factors and systemic co morbidities causing chronic pruritus in patients with prurigo nodularis.

Methods

After obtaining ethical clearance from the institutional ethical committee, A descriptive observational study was done among 50 patients, clinically diagnosed as prurigo nodularis by two dermatologists in the outpatient department of dermatology from February 2018 to August 2019. Patients who were not willing to participate and patients with prurigo of pregnancy were excluded. A detailed history to identify any underlying cause of pruritus and clinical examination was carried out and the data were entered in predesigned proforma. Relevant investigations like skin biopsy to confirm the diagnosis, investigations to rule out systemic causes of chronic pruritus like blood sugar, renal, liver and thyroid function tests, complete hemogram, human immunodeficiency virus (HIV) screening and serum IgE estimation by electrochemical luminescence immunoassay, were done in all patients. Patch testing was also done in suspected cases of contact sensitivity. Data collected was entered in an Excel sheet and results were subjected to statistical analysis by SPSS software version 20 and analyzed using chi square method.

Observations

Demography

Age and Sex distribution of the patients is tabulated in Table.1. 32% (n=16) were students, 30% (n=15) were farmers, 14% (n=7) were housewives, 14% (n=7) in executive jobs and remaining 10% were unskilled laborers.

Table 1. Age and Sex distribution

Age				
Mean Age	41.72 ± 20.15 years			
Range	11 to 75 years			
Age group	**N**	**%**	**Male**	**Female**
<30 years	17	34	2	15
31-50 years	16	32	13	3
>50 years	17	34	12	5
Sex				
Male -27	Female -23			
M:F Ratio	1.17:1			

Clinical parameters

Mean duration of illness among the patients in our study is 32.24 (±46.13) months. Mean age of onset of disease is 39.2 (± 20.15) years. The detailed age of onset among patients with history of atopy and non atopic individuals is given given in table.2. Frequency of site of involvement is given in table.3. Most of the patients had multiple sites of involvement. Only 8% had a single site of involvement. 36% of the patients have at least two sites of involvement (e.g. legs and feet). 22% have three sites, 20% have four sites and 14% have more than 4 sites of involvement. Our patients had lesions of three morphologies i.e. nodules, papules and plaques with secondary changes like erosions and excoriations. (Figures.1 and 2.)Morphological pattern of the disease in our study is shown in Figure.3.

Table 2. Age of onset of the disease

	Number of patients(n)	Mean age of onset (in years)	Standard deviation	P Value
Overall	50	39.2	20.15	
Atopic individuals	11	22.63	15.97	**0.001**
Non Atopic	39	43.87	18.8	

Table 3. Site of involvement

Site involved	% of patients (n)
Legs	96 (48)
Feet	80 (40)
Forearms	48 (24)
Hands	36 (18)
Thighs	18 (9)
Arms	14 (7)
Trunk	14 (7)

Figure 1: Papules and Nodules over the shin

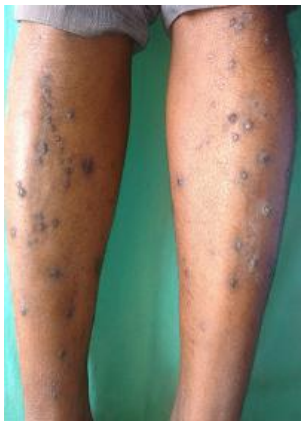


Figure.2: Lesions involving legs and feet

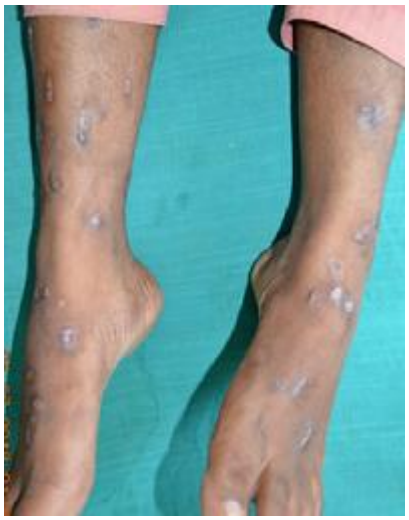


Figure 3. Morphological pattern

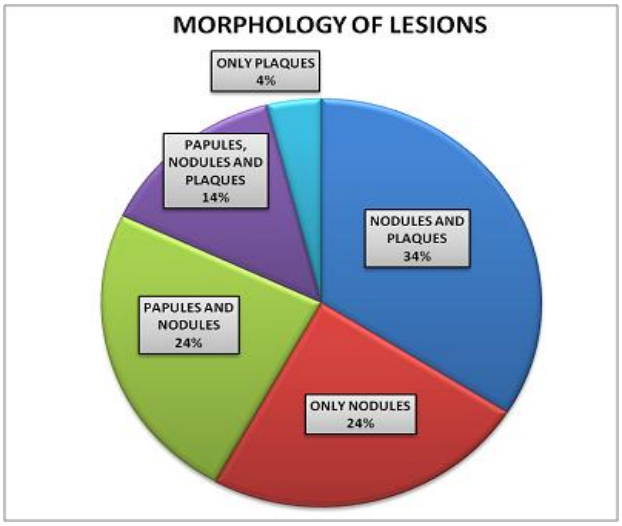
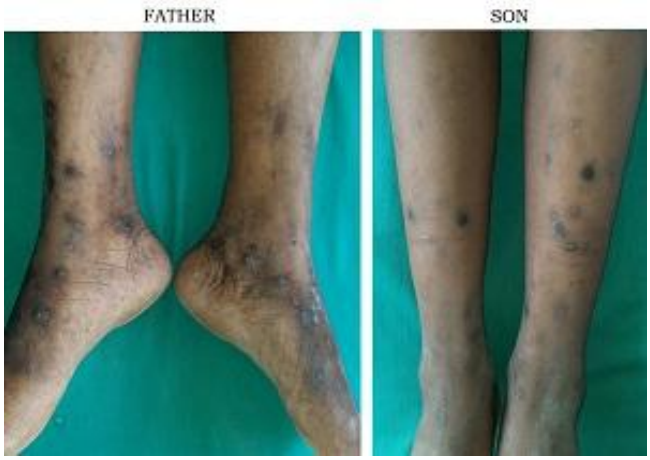


Figure 3: Family History (father and son - both with H/o atopy)



Associated underlying etiological factors for pruritus

Frequency of dermatological and systemic co morbidities among the patients were shown in table.4. Eleven patients (22%) had history of atopic diathesis (Allergic rhinitis / allergic conjunctivitis / bronchial asthma or atopic dermatitis). Family history is positive in two patients (4%) (Figure.4).

About 54% of the patients (n=27) in our study had either a single or multiple underlying etiologic factors for pruritus, which are of dermatological, systemic or psychiatric origin. About 28% (n=14) had a single underlying dermatological etiology for pruritus [atopy (n=7), popular urticaria (n=2), contact dermatitis (n=2), dermatophytosis (n=2) and scabies (n=1)]. 6% (n=3) of the patients had

multiple dermatological factors [atopy with popular urticaria (n=2) and atopy with food allergy and urticaria (n=1))]. 12% (n=6) of the patients had a single systemic factor [diabetes (n=4), hypothyroidism (n=1) and HIV infection (n=1)] and 6% (n=3) had both a systemic and a dermatologic factor for pruritus [diabetes and atopy (n=1), hypothyroidism with varicose eczema (n=1)]. 2% (n=1) had psychiatric illness (delusional parasitosis).

Table 4. Frequency of systemic co-morbidities and dermatological causes of chronic pruritus in our patients.

SYSTEMIC COMORBITIDIES	**% (n)**
Diabetes	12 (6)
Hypothyroidism	4 (2)
HIV infection	2 (1)
DERMATOLOGICAL CAUSES	**% (n)**
Atopic diathesis	22 (11)
PapularUrticaria	10 (5)
Allergic contact Dermatitis	6 (3)
Dermatophytosis	4 (2)
Scabies	2 (1)
Urticaria	2 (1)
Varicose veins	2 (1)
PSYCHIATRIC DISEASE	**% (n)**
Delusional parasitosis	2 (1)

Serum IgE levels were found to be elevated in 82% (n=41) of the patients from the normal reference value of <200 IU/ml. The difference in IgE levels among atopic and non atopic individuals with PN is given in table.5. Intensity of pruritus in our patients is graded by a numerical visual analog scale (VAS) ranging from 0 to 10, '0' being 'no itch' and '10' being 'worst intractable itch'. Disease severity is graded by the approximate number of pruriginous lesions (nodules, papules and plaques). Correlation between mean serum IgE and severity of PN is given in Table.6.

Table 5: Total serum IgE levels in Atopic and non atopic individuals with PN

Patients with PN	**N**	**Total serum IgE**		**Mean IgE (IU/ml)**	**Standard deviation**	**P value**
		Elevated	Normal			
Atopic	11	11	0	2682.509	3733.071	0.152
Non atopic	39	30	9	921.4341	1492.394	

Table 6: Correlation of Disease severity and Serum Total IgE Levels

Severity	**N**	**Total Approximate number of lesions (Mean)**	**Mean VAS**	**Mean IgE (IU/mL)**		
				Mean	**Standard deviation**	**P value**
GRADE 1 (<20 lesions)	16	13.81 ± 4.57	6.31 ± 1.35	331.69	225.59	0.00
GRADE 2 (21 to 50 lesions)	19	35.26 ± 8.44	7.36 ± 0.89	753.38	985.81	
GRADE 3 (50 to 100 lesions)	11	67.54 ±16.13	8.36 ±0.92	1563.56	1208.34	
GRADE 4 (>100 lesions)	4	119.5 ± 6.85	9.5±1	7155.75	4440.25	

Discussion

We analyzed the demographic and clinical parameters of fifty patients of PN in this study. Mean age of the patients in our study is 41.72 (± 20.15) years (range 11 to 75 years), which is lower than the mean age in the study by Iking *et al*[4] (61.54 ± 16.70) years (Range 11-95 years). Females are commonly affected in the studies by Iking *et al.*[4] (M:F ratio 1:1.76) and Tan *et al.*[5] (M:F ratio 1:1.17). But our study showed a slight male preponderance (M:F ratio 1.17:1). Although females (n=15) outnumber the males (n=2) in the younger group (< 30years), the males outnumber the females in middle(31to 50 years) and older age groups (>50 years) in our study. (Table.1).

Mean duration of illness in our patients is less, when compared to the other studies. (Iking *et al.* 77.48 ± 121.5 months and Tan *et al.* 84 months). Commonest site affected in our study is extensor aspect of legs followed by feet, forearms, hands, thighs, arm and trunk, which is similar to other studies. 56% of the patients had generalized disease (more than 3 sites involvement) similar to Tan *et al.* study (51%).[5]

Atopic individuals had an earlier age of onset when compared to non atopics (P=0.001) (table.2), which is consistent with the study by Tanaka *et al.*[6] in 1995. where, he described PN has two distinct forms -an early onset atopic and a late onset non-atopic form. 50% of the patients in Tanaka *et al.* study and 66.6% of the patients in Miyachi *et al.*[7] study had atopic predisposition. But our study showed only 22% of the patients had an atopic predisposition. Apart from atopy, other focal etiological factors for pruritus in our study were popular urticaria, allergic contact dermatitis [two patients are sensitive to *Parthenium* and one to multiple allergens (formaldehyde and black rubber mix)], scabies, urticaria and varicose eczema (table. 5). Interestingly two cases of chronic dermatophytosis (duration – 1year) developed prurigo nodules over the tinea patch lesions, which is an interesting new finding in our study.

Common systemic diseases associated with PN include thyroid diseases, metabolic diseases like diabetes,[8] uremia[9] and chronic liver disease[10]. Sometimes neuropathies and psychiatric diseases can lead to PN.[3,11] Among the systemic comorbidities in our study,12% of the patients had diabetes and 4% had hypothyroidism, which are the known factors to cause chronic pruritus and prurigo nodularis. One patient with pruriginous lesions of 1year duration is found to be positive for HIV in our study. A study from French Guiana has showed prevalence of HIV infection in PN is as high as 36%.[12] Our patients with PN had no other systemic factors like uremia and liver disease. Among psychiatric diseases, delusional parasitosisis found in one patient in our study.

As expected all atopic individuals (n=11) had an elevated serum IgE level because of the IgE mediated pathology. But 76% (n=30) of the non atopic individuals with PN also had an elevated IgE level.(Table 5). Although the mean IgE value of atopic individuals is more than non atopic individuals with PN, there is no statistical significance among the values (P=0.152). However there is a positive correlation of serum IgE levels with severity of disease in our study (P=0.00) (Table 6). Thus the elevated levels of serum IgE in our patients may be secondary phenomenon rather than a primary causative factor as indicated by the study by O'Loughlin S *et al*.[13]

Conclusion

Identifiable factors associated with pruritus were found in about 54% of the patients with PN in this study. The prevalence of atopy among our patients is low compared to previous studies. Patients with atopic tendency had an earlier age of onset of PN. Majority of our patients had elevated serum IgE levels. Significant number of patients had systemic causes indicating the need for systemic investigations. The management of PN is a therapeutic challenge. Hence there is a need to identify the etiology and to treat the underlying

pruritus in order to maintain the remission for a longer duration.

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