

Original Research Article

Cutaneous manifestations of endocrine disorders

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ABSTRACT

Background: It is a well-known fact that the skin is referred to as a window or mirror to the body. The present study was undertaken to know the spectrum of cutaneous manifestations in endocrinological disorders.

Methods: A total of 500 patients with endocrinological disorders attending the Medical and Dermatology OPD at Dr. PSIMS&RF were studied. Among the 500 cases studied, 417 patients had diabetes, 81 cases had thyroid disorder and 2 patients had Addison's disease.

Results: Most common dermatoses observed in patients with diabetes mellitus were infections {(fungal 25.3%), bacterial (6.92%), viral (5.42%)} followed by eczemas (13.2%), psoriasis (8.13%). Among 81 patients with thyroid disease, 78 patients were hypothyroid and 3 patients had hyperthyroidism and skin manifestations were observed in 55 (67%) of the patients with thyroid disorders. Most common dermatoses observed in patients with hypothyroidism were fungal infections (23.07%), urticaria (19.23%), xerosis (13.46%), bacterial infections (13.46%), psoriasis (11.53%). All 3 hyperthyroid patients have shown skin manifestations. 2 patients had diffuse hair loss and 1 patient had vitiligo. 2 cases of Addison's disease were observed and both of them showed diffuse hyperpigmentation with accentuation over palmar creases, knuckles and gums.

Conclusions: The present study shows the wide range of skin lesions in patients with endocrinological disorders particularly diabetes mellitus and thyroid disease. Through knowledge of the associated skin lesions helps in early diagnosis of underlying endocrine abnormality and thereby appropriate treatment provided at the earliest helps in preventing complications.

Keywords: Endocrine disorders, Fungal infections

INTRODUCTION

Hormones are known to be essential in regulating physiologic processes in each system of the body, including the skin. Endocrine diseases, through excess or deficiencies of hormones, can result in changes in cutaneous function and morphology and lead to a complex symptomatology.

Cutaneous manifestations may provide important clues to the diagnosis of endocrine disorders including diabetes mellitus patients with endocrine diseases are especially

susceptible to a number of associated mucocutaneous disorders.¹

Diabetes mellitus is a common medical disease with sequelae that affect almost every organ system. Thyroid hormone has tremendous impact on activity of integument, its effects are more notable during deficiency or excess states.²

The present study is undertaken to know the spectrum of dermatological manifestations in various endocrine disorders, which enables us to make an early diagnosis of

the same. Recognition of systemic illness is important in order to ensure that appropriate treatment is provided at the earliest, thus preventing complications.

METHODS

The present study included patients attending the OPDs of General Medicine & DVL and also inpatients referred from other Departments of our hospital from October 2015-November 2016.

A Total of five hundred patients with endocrine disorders were taken as the subject material. This included patients with pre-existing endocrine disorders and patients suspected to have endocrine disorder based on the skin lesions, which were confirmed later by investigations.

Detailed history was taken and clinical examination for skin lesions was done. Blood investigations including hemoglobin, total leukocyte count, differential count, ESR,

Urine routine examination including sugar, albumin and microscopy were done. Relevant investigations pertaining to the endocrine disorder were done and noted

Gram staining of purulent material, culture and sensitivity of pus were done in bacterial infections. Direct microscopic examination using 10% KOH solution was done in fungal infections. Skin biopsy was done in relevant cases. The data thus collected was compiled and analyzed.

RESULTS

In the present study 500 patients were studied majority of the patients were in the age group of 51-60 years 155 (31%) followed by 41-50 years 125 (25%), 61-70 years 92 (18.4%). 31-40 years 56 (11.2%), and ≥ 71 years were 46 (9.2%). The age group between 41-60 years constituted 56% of the study group. Among the 500 patients studied, 206 (41.2%) were males and 294 (58.8%) were females.

Table 1: Prevalence rate of skin manifestations in endocrine disorders.

Endocrine disorder	Total no. of patients	No. of patients with skin manifestations	Percentage (%)
Diabetes mellitus	417	332	79.6
Thyroid	81	55	67
Addison's disease	2	2	100

Table 2: Various skin manifestations associated with diabetes mellitus.

Skin disease	No. of cases	Percentage (%)
Fungal infections	84	25.3
Eczemas	44	13.2
Psoriasis	27	8.13
Bacterial infections	22	6.62
Generalized pruritus	22	6.62
Viral infections	18	5.42
Urticaria	18	5.42
Skin tags	17	5.12
DPN	16	4.81
Melasma	13	3.91
Xerosis	13	3.91
Lichen planus	12	3.61
Trophic Ulcer	11	3.31
Vitiligo	09	2.71
Acanthosis nigricans	07	2.10
PMLE	06	1.80
Lichen amyloidosis	06	1.80
Granuloma annulare	03	0.90
Vesiculobullous disorders	03	0.90
Diabetic bullae	03	0.90
Xanthelasma palpebrarum	02	0.60
IGH	01	0.30
Seborrhoeic keratosis	01	0.30
Prurigo nodularis	01	0.30
Pyoderma gangrenosum	01	0.30
Schamberg's disease	01	0.30
Kyrle's disease	01	0.30
Diabetic cheiroarthropathy	01	0.30

Table 3: Fungal infections in diabetes mellitus.

Fungal infection	No. of cases	Percentage (%)
Tinea corporis	32	38.0
Candidial intertrigo	13	15.4
Tinea versicolor	12	14.2
Onychomycosis	07	8.33
Chronic paronychia	07	8.33
Candidial balanoposthitis	06	7.14
Vulvovaginal candidiasis	05	5.95
Tinea cruris	01	1.19
Oral candidiasis	01	1.19

Table 4: Bacterial infections in diabetes mellitus.

Bacterial infection	No. of cases	Percentage (%)
Erythresma	7	30.4
Furunculosis	7	30.4
Hansen's disease	4	17.3
Sycosis Barbae	1	4.34
Folliculitis	1	4.34
Cellulitis	1	4.34
Lupus vulgaris	1	4.34

Table 5: Skin manifestations in patients with hypothyroid disorders.

Skin disease	No. of patients	Percentage (%)
Fungal infections	12	23.07
Urticaria	10	19.23
Xerosis	7	13.46
Bacterial infections	7	13.46
Psoriasis	6	11.53
Acanthosis nigricans	5	9.61
Alopecia areata	4	7.69
Diffuse hair loss	4	7.69
Melasma	4	7.69
Lichen amyloidosis	3	5.76
Vitiligo	3	5.76
Lichen planus	2	3.84
Generalized pruritus	2	3.84
Skin tags	2	3.84
PMLE	2	3.84
DPN	2	3.84
Xanthelasma palpebrum	1	1.92
Plane warts	1	1.92
Pompholyx	1	1.92
Prurigo nodularis	1	1.92
LSC	1	1.92

Among 500 patients 417 patients of diabetes mellitus, 81 patients of thyroid disorders and 2 patients of Addison's disease were encountered (Table 1).

Among 417 patients of diabetes mellitus studied (Table 2), 332 had skin lesions and infections constituted 37.64%. Among them, fungal infections 25.3% were the

most common skin manifestations followed by eczemas 13.2% and psoriasis 8.13%.

Among fungal infections, tinea corporis was observed in 32 patients (38%). Other cases observed were candidial intertrigo (15.4%), tinea versicolor (14.2%), onychomycosis (8.33%), chronic paronychia (8.33%),

candidial balanoposthitis (7.14%), vulvovaginal candidiasis (5.95%), tinea cruris (1.19%) and oral candidiasis (1.19%) (Table 3).

Erythrasma and furunculosis constituted 30.4% each in patients with diabetes. Other bacterial infections observed were Hansen's disease (17.3%), furunculosis (30.4%), sycosis barbae (4.34%), folliculitis (4.34%), cellulitis (4.34%) and lupus vulgaris (4.34%) (Table 4).

Viral infections encountered are, herpes zoster was observed in 11 patients (61.1%) followed by common warts (22.2%), plane warts (11.1%) and molluscum contagiosum (5.55%). Among vesiculobullous disorders, single case of pemphigus vulgaris, bullous pemphigoid, pemphigus foliaceus (33.3%) each was observed.

Various types of eczemas in diabetes mellitus are, LSC (43.1%) stasis eczema (29.5%), seborrhoeic dermatitis (18.1%), atopic dermatitis (4.54%), ABCD (2.27%) and pomphylx (2.27%).

Out of 81 patients with thyroid disorders, 78 patients had hypothyroidism out of which 52 patients had skin manifestations. All the skin diseases were listed in (Table 5). Among the 81 patients, 26 patients did not have any skin lesions and few patients had more than one dermatological manifestation. 3 patients of hyperthyroidism were examined for cutaneous lesions and all the 3 patients had skin manifestations. 2 patients had diffuse hair loss and 1 patient had vitiligo.

Bacterial infections observed in thyroid disorders are, folliculitis in 2 patients (28.5%). Other cases observed are cellulitis, pyoderma, erythrasma, lupus vulgaris and Hansen's disease (14.2%) each. Fungal infections encountered in thyroid disorders are, tinea corporis in 5 patients (41.66%), tinea versicolor (25%), candidial intertrigo (16.6%), oral candidiasis (8.33%), onychomycosis (8.33%).

Table 6: Skin lesions in patients with adrenal disorder.

Adrenal disorder	No. of patients
Addison's disease	2

Only 2 cases of Addison's disease were encountered in present study (Table 6). In both the cases, diffuse pigmentation all over the body with accentuation over palmar creases, knuckles and gums was observed.

DISCUSSION

In the present study, 500 cases with endocrine disorders were examined for skin manifestations. Among the 500, 417 patients had diabetes, 81 cases had thyroid disorder and 2 patients had Addison's disease.

During the present study, the age group between 41-60 years constituted 56% of the study group as shown in the Table 1. This is because diabetes constituted the major study group and it is more common in this age group. This study correlated well with the study of Mahajan et al, in which 63% of the patients belonged to 41-60 years age group.³ Wani et al, Nigam and Pande also reported that frequency of skin disease in diabetes mellitus was more in fifth and sixth decades.^{4,5}

In the present study, among the 500 patients studied 206 (41.2%) were males and 294 (58.8%) were females as shown in Table 2. Romano et al also reported female preponderance in their study.⁶

As shown in Table 3, out of 417 diabetic patients studied 332 patients had skin manifestations with a prevalence rate of 79.6%. This is well comparable with study of Mahajan et al where 76.6% and 64% of the diabetic patients had skin manifestations.³

The present study also includes 81 patients with thyroid disorders with 67% having skin manifestations. Samson et al have observed skin manifestations in 54% of thyroid patients in their study.⁵ 2 cases of Addison's disease have been observed in this study and both the cases showed skin manifestations.

Diabetes mellitus: The various dermatological manifestations seen in patients of diabetes mellitus have been listed out in Table 4. Infections (fungal, bacterial and viral) constituted 37.64% of the skin lesions. Gulati et al reported cutaneous infections in 49% of diabetics in their study group.⁸ Our study is well comparable to the study of Wani et al who also reported 37.5% of skin infections in their study which is mainly because of impaired host defence mechanism in uncontrolled diabetes.⁴

Fungal infections alone accounted for 25.3% (84 cases) of the skin lesions. There were 38 cases of dermatophytosis (11.4%), 34 cases of candidiasis (10.29%), 12 cases of pityriasis versicolor (3.6%).

George et al found an incidence of 30% of dermatophytosis.⁹ In a recent work by Jolly et al on 29 consecutive patients with recurrent trichophyton rubrum infections, a significant number had elevated glucose tolerance curve.¹⁰ Radhu et al found fungal infections more commoner in type 11 diabetes.¹¹

Bacterial infections were observed in 22 cases (6.62%) with furunculosis (7 cases), erythrasma (7 cases), being the majority. 65% of erythrasma cases associated with diabetes mellitus. Obesity, heat, humidity were probably involved in the pathogenesis of erythrasma. In the present study eczemas constituted 44 cases (13.2%) followed by psoriasis (8.13%) accounting for the highest number of non-infective lesions. Greenwood showed that 2.5% of psoriasis had diabetes which was 10 times more than the

control group in his study.¹² Najdaw et al found eczema or dermatitis as the commonest skin disorder in 25.9% of cases.¹³ Anand showed that 8.88% of psoriasis patients had diabetes.¹⁴

In the present study, 22 cases (6.62%) generalized pruritus were observed. Rao and Pai also found that pruritus was the main presenting symptom and was noted in 60.23% patients in their series.¹⁵ Other dermatoses associated with an increased incidence of diabetes mellitus, were vitiligo (2.71%), lichen planus (3.61%), Kyrle's disease (0.30%), diabetic cheiroarthropathy (0.30%).

Dawber found 4.8% of maturity onset of diabetes mellitus to have concomitant vitiligo.¹⁶ Late onset vitiligo, after the age of 40 years, appears to have a close association with diabetes mellitus. George et al found 2% of extensive lichen planus in their study. This study coincides with our study.⁹

Mahajan et al, observed one patient with waxy skin and stiff joint syndrome (diabetic cheiroarthropathy) and 2 patients were observed with diabetic bullae.³

Other lesions in our study included skin tags (5.12%), DPN (4.81%), xerosis (3.91%), acanthosis nigricans (2.10%) and xanthelasma palpebrarum (0.60%). The percentage of skin tags in our study is lower than the reported incidence by Kahana et al who observed 26.3% of patients with skin tags having diabetes mellitus.¹⁷ Acanthosis nigricans reported in this study was seen in 7 patients. Tissue resistance to insulin is a major feature underlying the development of acanthosis nigricans in many patients. 2 cases of xanthelasma palpebrarum were seen in our study. A report by Greenwood found xanthelasma palpebrarum in 9 of 500 diabetics, an incidence of 1.8%.¹²

Granuloma annulare was detected in 3 patients (0.90%). The association of granuloma annulare and diabetes mellitus is controversial. In the present study, 11 patients (3.31%) of foot ulcers were found. George et al in his study observed diabetic ulcer of foot in 2% of cases having diabetes mellitus.⁹

Thyroid disorder: The various skin manifestations encountered in hypothyroidism have been listed in Table 5. Fungal infections constituted the largest group (23.07%) which included dermatophytic infections (11.53%) candidial infections (5.76%) and tinea versicolor (5.76%). This is in contrast with other studies which may be because of humid environmental conditions in our area and poor hygiene in the patients.

19.23% of the cases in our study had chronic urticaria. Dogra et al reported 15.6% of patients with urticaria in their study.¹⁸ Leznoff and Sussman evaluated 624 patients with idiopathic urticaria and angioedema and found 90 patients to have evidence of thyroid disorder.¹⁹

Heymann has stated that the mechanism by which thyroid autoimmunity is associated with urticaria is poorly understood.²⁰ They have stated that there is clustering of thyroid microsomal antibodies in patients with a positive autologous serum test although it is unlikely that thyroid hormone itself has any in vivo effect on cutaneous vascular response to histamine and on the mast cell releasability.

In the present study, 12.7% of cases had xerosis. Dogra et al reported a very high incidence with xerosis.¹⁸ Hypohidrosis accompanied by cytologic changes within the eccrine apparatus and diminished sebaceous gland secretions have been considered potential etiologic factors.

Diffuse hair loss (7.69%) and alopecia areata (7.69%) were observed in the present study. Alopecia of hypothyroidism is mediated via hormone effect on the initiation as well as duration of hair growth. Normal telogen-anagen hair relationships were restored with thyroid hormone replacements.

The other associated conditions were psoriasis (11.53%), vitiligo (5.76%), melasma (7.69%), acanthosis nigricans (9.61%), lichen amyloidosis (5.76%), skin tags (3.63%), xanthelasma palpebrarum (1.92%).

The association between vitiligo and hypothyroidism has been well documented by Luffi et al and Neipomniscse et al.^{20,21} Milgeaum et al found that in a study of 45 children with alopecia areata 24% had abnormality of one or more thyroid function tests (i.e. T3, T4, TSH & AMA) although clinically most patients are normal.²²

In the present study, 3 cases of hyperthyroidism were observed. 2 patients had diffuse hair loss and 1 patient had vitiligo. Samson et al also reported hair loss and vitiligo in their study.⁵ 2 cases of Addison's disease were observed in our study. There is diffuse hyperpigmentation over the body with accentuation over knuckles, palmar creases and gums. Jabbour also reported Addison's disease in which the skin is hyperpigmented, mostly on the face, neck and back of hand.²³

CONCLUSION

The present study shows the wide range of skin lesions in patients with endocrinological disorders particularly diabetes mellitus and thyroid disease. Through knowledge of the associated skin lesions helps in early diagnosis of underlying endocrine abnormality and thereby appropriate treatment provided at the earliest helps in preventing complications.

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Ethical approval: The study was approved by the institutional ethics committee

REFERENCES

1. Bhat RK, Kaitan BK. Cutaneous manifestations of internal diseases. IADVL Text Book of Dermatology. 3rd edition. 2007: 1368.
2. Callen JP. cutaneous endocrinology and metabolic disease. Bologna Text Book of Dermatology. 2nd edition; 2008:8-679.
3. Mahajan S, Koranne RV, Sharma SK. Cutaneous manifestation of diabetes mellitus. Indian J Dermatol Venereol Leprol. 2003;69(2):105-8.
4. Wani MA, Hassan I, Bhat MH, Ahmed QM. Cutaneous Manifestations of Diabetes mellitus: A Hospital Based Study in Kashmir. Egyptian Dermatol Online J. 2009;5(2):1-6.
5. Nigam PK, Pande S. Pattern of dermatosis in diabetes. Indian J Dermatol Venerol Leprol. 2003;69:83- 5.
6. Romano G, Moretti G, Di Benedetto A, Giotre C, Di Cesare E, Russo G, et al. Skin lesions in diabetes mellitus: prevalence and clinical correlation. Diabetes Res Clin Pract. 1998;39:101-6.
7. Samson JF, Mathew PS, Libu GK, Jayakumar B. A study of cutaneous manifestations of hypothyroidism and hyperthyroidism. Kerala Med J. 2011; 52-54.
8. Gulati S, Jaganath K, Ashok SG. Cutaneous manifestations associated with diabetes mellitus-a study of 75 cases. 28th National conference Indian Association of Dermatologists, Venereologists and Leprologists. 2000;143:167-8.
9. George T. Cutaneous manifestations in Diabetes mellitus-Study of 50 cases. Indian J Dermatol Venerol Leprol. 1976;42:261-6.
10. Jolly HW, Carpenter CL Jr. Oral glucose tolerance studies in recurrent Trichophyton rubrum infections. Arch Dermatol. 1969;100:26.
11. Radhu TY, Vinayak V, Kanthraj GR, Girisha BS, Study of cutaneous manifestations of diabetes mellitus. Indian J Dermatol. 2004;49(2):73-5.
12. Greenwood AM, A study of the skin in five hundred cases of diabetes, Am Med Ass. 1927;89:774-6.
13. Najdawi F, Fa'ouri M. Frequency and types of skin disorders and associated diabetes mellitus in elderly Jordanians, East Mediterr Health J. 2002;8:574-8.
14. Anand LC. Assessment of Diabetic state in various skin disorders usually associated with hyperglycemia, Indian J Dermatol Venereol Leprol. 1978;44:95-102.
15. Rao GS, Pai GS. Cutaneous manifestations of diabetes mellitus: a clinical study, Indian J Dermatol Venereol Leprol. 1997;63:232-4.
16. Dawber RPR, Vitiligo in maturity onset diabetes mellitus. Br J Dermatol. 1968;80:275.
17. Kahana M, Grossman E, Feinstein A, Ronnen M, Cohen M, Millet MS. Skin tags: Cutaneous marker for diabetes mellitus. Acta Derm Venereol (Stockh). 1987;67:175-7.
18. Dogra A, Dua A, Singh P. Thyroid and skin. Indian J Dermatol. 2006;51(2):96-9.
19. Leznoff A, Sussman GL. Syndrome of idiopathic chronic urticaria and angioedema with thyroid autoimmunity: A study of 90 patients, J Allergy Clin Immunol 1989, 8 with thyroid autoimmunity: A study of 90 patients. J Allergy Clin Immunol. 1989;84:66-71.
20. Heymann WR. Chronic urticaria and angioedema associated with thyroid autoimmunity, Review and therapeutic implications. J Am Acad Dermatol. 1999;40:229-32.
21. Luffi RJ, Fridmanis M, Misiunas AL, Pafume O, Gonzalez EA, Villemur JA, et al, Associations of melasma with thyroid autoimmunity and other thyroid abnormalities and their relationship to the origin of melisma. J Clin Endocrinol Metab. 1985;61:28-31.
22. Niepomniscz H, Amad RH, Skin disorders and thyroid diseases. Endocrinol Invest. 2001;24:628-38.
23. Milgram SS, Mitchell AJ, Bacon GE, Rasmussen JE, Alopecia areata endocrine function and autoantibodies in patients 16 years of age or younger. J Am Acad Dermatol. 1987;97:57-61.
24. Jabbour SA. Cutaneous manifestations of endocrine disorders: a guide for dermatologists. Am J Clin Dermatol. 2003;4(5):315-31.

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