VOLUME - 10, ISSUE - 10, OCTOBER - 2021 • PRINT ISSN No. 2277 - 8160 • DOI : 10.36106/gjra

Original Research Paper

Dermatology

POLYMORPHOUS LIGHT ERUPTION AND ITS ASSOCIATION WITH HYPOTHYROIDISM AND AUTOIMMUNE THYROIDITIS – A COMPARATIVE CROSS-SECTIONAL STUDY

Dr. Jerriton Brewin C MBBS Post-Graduate, Department of DVL, Sri Venkateshwaraa Medical College Hospital & Research Centre, Ariyur, Puducherry.

Dr. Brinda G David M.D., Associate Professor, Department Of DVL, Sri Venkateshwaraa Medical College Hospital & Research Centre, Ariyur, Puducherry.

Dr. Roshni Menon* M.D.,DVD.,Professor And Head of The Department, Department Of Dvl, Sri Venkateshwaraa Medical College Hospital & Research Centre, Ariyur, Puducherry. *Corresponding Author

ABSTRACT

BACKGROUND In many parts of the world, polymorphous light eruption (PLE) is the commonest cause of photosensitivity. Previous studies have suggested the association of PLE with multiple autoimmune diseases. Few studies are available suggesting the association of PLE with autoimmune thyroiditis. We have undertaken this study to confirm such an association and to predict which cases of PLE are likely to have hypothyroidism and autoimmune thyroiditis.

METHODS This was a cross-sectional study with comparative group with 75 PLE cases and 75 controls. Thyroid function test (TFT) was done for all subjects and, if found abnormal, anti-thyroid peroxidase (TPO) antibodies were tested. The studied parameters were compared using Pearson's chi-squared test for significance.

RESULTS The male to female ratio was 1:2.1. Hypothyroidism and autoimmune thyroiditis were significantly present in PLE cases. PLE lesions with papular morphology, persistent and recurrent PLE, positive family history and associated other autoimmune diseases were significantly associated with autoimmune thyroiditis.

CONCLUSION PLE is significantly associated with hypothyroidism and autoimmune thyroiditis. Hence we suggest screening of PLE patients for hypothyroidism and, if required, for autoimmune thyroiditis for early diagnosis and treatment.

KEYWORDS : Polymorphous light eruption, hypothyroidism, autoimmune thyroiditis

INTRODUCTION

Polymorphous light eruption (PLE) is the most common idiopathic photodermatosis.1 Though the exact etiology is unknown, it is postulated to be an abnormal delayed hypersensitivity reaction to undetermined self-antigens.2 The age and sex predilection are similar to many other autoimmune disorders, with females of 20 to 40 years being commonly affected.3 Common cutaneous manifestations of hypothyroidism include coarse, dry skin and diffuse alopecia.4 When hypothyroidism is due to autoimmunity, additional autoimmune associations such as vitiligo, alopecia areata, chronic urticaria, immunobullous disorders and connective tissue diseases have been reported.5 Autoimmune thyroiditis is a disorder characterized by autoantibodies against thyroid peroxidase and thyroglobulin. This study aims to determine the association between PLE and autoimmune thyroiditis and to determine the association between various clinico-epidemiological features of PLE and autoimmune thyroiditis.

MATERIALS AND METHODS

This was a cross-sectional study with comparative group conducted at a tertiary care teaching hospital in Puducherry from November 2018 to May 2020. After obtaining clearance from the institutional research and ethics committee, 75 cases with PLE and equal number of age- and sex-matched controls without PLE were enrolled for the study. The control group were either bystanders of the patient or other volunteering patients from the OPD. A detailed history followed by clinical examination will be made and a clinical diagnosis of PLE will be made by the following criteria:6[3] Rash that appears following sun exposure on exposed parts of the body with latency period of 30 minutes to several hours – maximum up to 3 days – that may be pruritic and that heals without scarring within a few days to 2 weeks of subsequent sunlight avoidance. The rash can be any of the following types: papular, plaque, papulovesicular, vesicobullous, hemorrhagic, plaque, micropapular (pinpoint), strophula (insect-bite like), purpuric/haemorrhagic, erythema multiforme-like and sine eruptione.

Pregnant and lactating women, patients on topical or systemic corticosteroids and photosensitizing drugs were excluded from the study. Thyroid function tests (TFT) were done from the blood samples of all 150 subjects. Those with normal TFT were classified as euthyroid and those with abnormal TFT were classified either as hypothyroidism or hyperthyroidism depending on their hormone levels. Subjects with abnormal TFT were further tested for the presence of anti-thyroid peroxidase (TPO) antibodies. The studied parameters were compared using Pearson's chi-square test for significance. For comparison of probability, p value of < 0.05 was taken as statistically significant difference.

RESULTS

The male to female ratio was 1:2.1 with mean age of 31.13 ± 10.42 years and 31.54 ±11.33 years in cases and controls, respectively. Abnormal TFT showing hypothyroidism (Table 1) was present in 19 cases (25.33%) and 5 controls (6.66%) and this difference was found to be statistically significant ($p = 0.002$). None of the subjects in either group had hyperthyroidism.

Table 1 Comparison of Hypothyroidism in cases and controls

			Hypothyroidism		Total	P value
			Present	Absent		
Group	Cases	Count	19	56	75	0.002
		% within Group	25.33%	74.66%	100.00%	
	Controls	Count	5	70	75	
		% within Group	6.66%	93.33%	100.00%	
Total		Count	24	126	150	
		% Within Group	16.00%	84.00%	100.00%	

Table 2 Comparison of anti-TPO antibodies (Ab) in cases and controls

			Anti-TPO Ab		Total	P value
			Present	Absent		
Group	Cases	Count	9	66	75	0.002
		% within Group	12.00%	88.00%	100.00%	
	Controls	Count	0	75	75	
		% within Group	0.00%	100.00 %	100.00%	
Total		Count	9	141	150	
		% Within Group	6.00%	94.00%	100.00%	

Anti-TPO antibodies (Table 2) were present in 9 cases (12%) whereas none of the controls had anti-TPO antibodies, which was statistically significant (p = 0.002). Hypothyroidism was newly detected in 8 PLE cases (10.67%) and 2 controls (2.67%) and this difference was statistically significant (p = 0.04). There were 11 known cases of hypothyroidism in PLE group and 3 known cases of hypothyroidism in control group and all of them were on L-thyroxine supplementation.

It was found that PLE lesions which were recurrent, persisting beyond 2 weeks, having positive family history of PLE and co-existent urticaria or vitiligo had significant associations with autoimmune thyroiditis (Table 3). Similarly, papular PLE and lesions occurring in 3 or more sites were significantly associated with autoimmune thyroiditis (Table 4 & Table 5) (Figure 1).

Table 3 Comparison of clinical history and associated diseases in anti-TPO Ab positive group and euthyroid group

History and associated diseases		PLE cases with anti-TPO Ab		PLE cases with euthyroidism		P value
		%	Count	%	Count	
Recurrence of PLE	Present	9	64.28%	5	35.71%	<0.0001
	Absent	0	0.00%	51	100.0%	
Family history of PLE	Present	3	60.0%	2	40.0%	0.002
	Absent	6	10.0%	54	90.0%	
Family history of thyroid disease	Present	2	33.33%	4	66.66%	0.147
	Absent	7	11.86%	52	88.13%	
Persistence of PLE beyond 2 weeks	Present	5	35.71%	9	64.28%	0.007
	Absent	4	7.84%	47	92.15%	
Urticaria	Present	4	80.0%	1	20.0%	<0.0001
	Absent	5	8.33%	55	91.66%	
Vitiligo	Present	2	100.0%	0	0.0%	<0.0001
	Absent	7	11.11%	56	88.88%	
Diabetes	Present	1	14.28%	6	85.71%	0.972
	Absent	8	13.79%	50	86.20%	

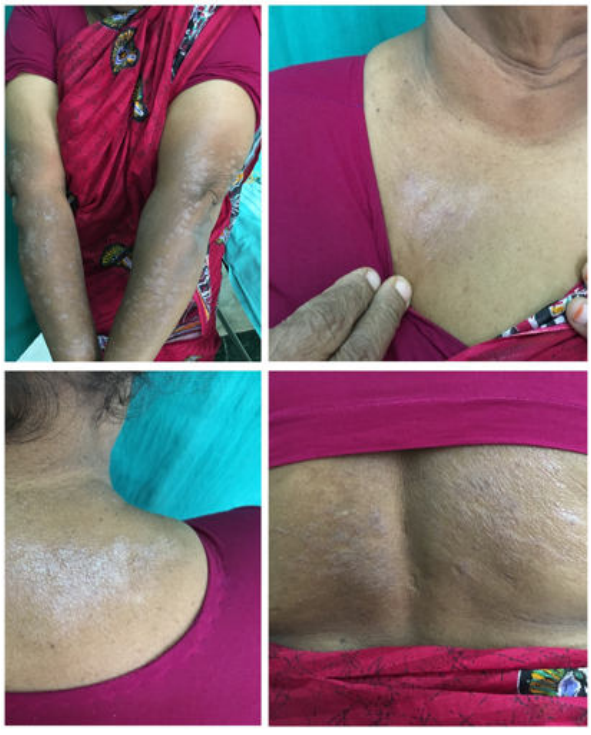
Table 4 Comparison of morphology of PLE in anti-TPO Ab positive group and euthyroid group

Morphology of PLE		PLE cases with anti-TPO Ab		PLE cases with euthyroidism		P value
		%	Count	%	Count	
Papule	Present	6	31.57%	13	68.42%	0.008
	Absent	3	6.52%	43	93.47%	
Plaque	Present	1	9.09%	10	90.90%	0.616
	Absent	8	14.81%	46	85.18%	
Macule	Present	0	0.0%	16	100.0%	0.065
	Absent	9	18.36%	40	81.63%	
Papule with vesicle	Present	0	0.0%	3	100.0%	0.477
	Absent	9	14.51%	53	85.48%	
Papule with plaque	Present	1	11.11%	8	88.88%	0.798
	Absent	8	14.28%	48	85.71%	
Papule with macule	Present	1	14.28%	6	85.71%	0.972
	Absent	8	13.79%	50	86.20%	

Table 5 Comparison of sites of PLE diseases in anti-TPO Ab positive group and euthyroid group

Sites of PLE		PLE cases with anti-TPO Ab		PLE cases with euthyroidism		P value
		%	Count	%	Count	
Single site lesion	Present	4	6.89%	54	93.10%	<0.0001
	Absent	5	71.42%	2	28.57%	
Two sites lesions	Present	2	50.0%	2	50.0%	0.031
	Absent	7	11.47%	54	88.52%	
Three sites lesions	Present	1	100.0%	0	0.0%	0.012
	Absent	8	12.50%	56	87.50%	
Four sites lesions	Present	2	100.0%	0	0.0%	<0.0001
	Absent	7	11.11%	56	88.88%	

Figure 1 Extensive PLE lesions in more than 3 sites associated with hypothyroidism and positive anti-TPO antibodies in a female patient



DISCUSSION

The association between PLE and hypothyroidism have been suggested in a few studies (Table 6). In our study, abnormal TFT was present in 25.33% of PLE cases and 6.66% of controls, and the difference was statistically significant. Similar study conducted by Sharma L et al.7 with 100 cases and controls revealed that abnormal TFT was present in 25% of cases and 7% of controls, which was statistically significant. Overall recurrences, family history of PLE and associated vitiligo were comparable in both studies (Table 7).

Table 6 Comparison of studies with association of hypothyroidism and autoimmune thyroiditis

S.No	Study Name	Study Type	Association with hypothyroidism	Association with Autoimmune Thyroiditis
1	Hasan T et al, 19988 (n = 94)	Questionnaire-based follow-up study	Present	Commented but not confirmed
2	Seetharam K et al, 20109 (n=152)	Case-Control	Significantly present	Significantly present

4	Sharma L et al., 20147 (n = 200)	Case-Control	Significantly present	Not commented
5	Sharma P et al., 201710 (n = 90)	Prospective observational study	Present	Not commented
6	Chadha C et al., 201811 (n = 70)	Case-Control	Significantly present	Not commented
7	Bains A et al, 201912 (n = 126)	Cross sectional descriptive study	Present	Not commented
8	Present study (n = 150)	Comparative cross-sectional study	Significantly present	Significantly present

Table 7 Comparison of clinico-epidemiological features of PLE with Sharma et study

S. No	clinico-epidemiological features of PLE	Sharma L et al study13 (n=200)	Present study (n=150)
1	Abnormal TFT	25%	25.33%
2	Recurrence	24% (p >0.7)	29.33%
3	Family history of PLE	10%	8%
4	Vitiligo	2%	2.67%

As per Sharma et al.,[7] the most common site of PLE lesions in patients with abnormal TFT was the neck (28.57%) followed by face (27.27%). Papular PLE was the most common morphology (27%) followed by plaques and macules (16% each). But these clinical and epidemiological features of PLE were not found related to abnormal TFT on statistical comparison. Tests for anti-TPO antibodies were not done in their study. Unlike their study, we found significant associations of certain clinico-epidemiological features of PLE with anti-TPO antibodies, which may help predict the presence of thyroid disorder in such PLE cases. In a long-term follow-up study by Hasan et al[8] with 94 PLE cases, they report that 8% had hypothyroidism or non-toxic goitre of probable autoimmune etiology, all of whom were females. The most common morphology of PLE was vesiculopapular variety (37.23%). They also could not find statistically significant differences in the clinical characteristics of PLE between patients with or without autoimmune diseases. In a study by Seetharam KA et al.[9] with 112 PLE cases and 40 controls, it was found that hypothyroidism was present in 25.9% of PLE cases and 7.5% of controls, which was statistically significant similar to our study. All 25.9% of hypothyroid PLE cases had anti-TPO antibodies. Other studies found association of PLE with hypothyroidism but did not comment on anti-TPO antibodies (Table 6). Hasan T el al.[8] have suggested that PLE is a slowly ameliorating disease with a tendency to develop autoimmune diseases. Our study helps substantiate their statement.

Limitations of the study

The diagnosis of PLE was made mostly on clinical grounds. Histopathological examination of PLE was limited to a few doubtful cases. ANA testing was not done. Other thyroid autoantibodies such as TSH receptor antibodies and anti-thyroglobulin antibodies were not tested. Anti-TPO antibodies can also be present in euthyroid population and as such were not tested.

CONCLUSION

PLE is the most common idiopathic photodermatosis, commonly affecting females of 20-40 years. The association between PLE and autoimmune diseases has been a matter of non-consensus and only a few studies are available in the literature showing the association between PLE and autoimmune thyroiditis. Our study has found a significant association between PLE and hypothyroidism and autoimmune thyroiditis. Hence we suggest screening of all PLE patients for hypothyroidism and, if found hypothyroid, for autoimmune thyroiditis. Our study is also the first to find significant associations of autoimmune thyroiditis with recurring and persistent PLE, positive family history of PLE and PLE co-existing with other autoimmune diseases like urticaria or vitiligo. Such cases of PLE may therefore help to predict the presence of autoimmune thyroiditis. Euthyroid PLE patients may also benefit from long-term follow-up for developing autoimmune thyroiditis later in life.

REFERENCES

1. Lehmann P, Schwarz T. Photodermatoses: Diagnosis and Treatment. Dtsch Aerzteblatt Online [Internet]. 2011 Mar 4;108(9):135–41. Available from: https://www.aerzteblatt.de/10.3238/arztebl.2011.0135
2. Gruber-Wackernagel A, Wolf P. Polymorphous Light Eruption. In: Kang S, Amagai M, Bruckner AL, Enk AH, Margolis DJ, McMichael AJ, et al., editors. Fitzpatrick's Dermatology. 9th ed. USA: McGraw-Hill Education; 2019. p. 1611–27.
3. Ibbotson S, Dawe R. Cutaneous Photosensitivity Diseases. In: Chalmers R, Barker J, Griffiths C, Bleiker T, Creamer D, editors. Rook's Textbook of Dermatology. 9th ed. UK: John Wiley & Sons, Ltd; 2016. p. 127.1-36.
4. S.Haritha SH. Skin Manifestations of Hypothyroidism-A Clinical Study. IOSR J Dent Med Sci [Internet]. 2013;7(2):58–60. Available from: http:// www. iosrjournals. org/iosr-jdms/papers/Vol7-issue2/P0725860.pdf
5. Safer JD. Thyroid hormone action on skin. Dermatoendocrinol. 2011; 3:3: 211–5.
6. Wainwright NJ. Polymorphic Light Eruption. In: Ferguson, James. Dover JS, editor. Photodermatology. London: Manson Publishing Ltd; 2006. p. 29–34.
7. Sharma L, Lamba S, Singh S. Thyroid function tests in cases of polymorphic light eruption: A case-control study. Indian Dermatol Online J [Internet]. 2014;5(3):291–5. Available from: http:// www. idoj.in/ text. asp? 2014/ 5/3/291/ 137780
8. Hasan T, Ranki A, Jansen CT, Karvonen J. Disease Associations in Polymorphous Light Eruption. Arch Dermatol [Internet]. 1998 Sep 1; 134(9): 1081–5. Available from: http:// archderm. jamanetwork. com/article. aspx?doi=10.1001/archderm.134.9.1081
9. Seetharam K, Sridevi K. Association of polymorphic light eruption and autoimmune thyroiditis. Indian J Dermatology, Venereol Leprol [Internet]. 2010;76(6):704–5. Available from: http:// www.i jdvl.com/ text.asp? 2010/76/ 6/ 704/ 72448
10. Sharma P, Shah A. ULTRAVIOLET INDUCED LIGHT ERUPTIONS AND ABNORMAL LABORATORY THYROID TEST REPORTS- IS THERE ANY CORRELATION. J Evol Med Dent Sci [Internet]. 2017 Feb 9;6(12):960–2. Available from: https://www.jemds.com/data_pdf/Parikshit-.pdf
11. Chadha C, Deshmukh M, Shankar Gugle A. Study of Thyroid Function Tests in Cases of Polymorphic Light Eruption in Tertiary Care Institute. MVP J Med Sci. 2018;5(1):101–3.
12. Bains A, Tegta G, Vedant D. A cross-sectional study of cutaneous changes in patients with acquired thyroid disorders. Clin Dermatology Rev [Internet]. 2019;3(1):72–7. Available from: http:// www. cdriadvlkn. org/ text. asp? 2019/ 3/1/72/252304
13. Sharma L, Lamba S, Singh S. Thyroid function tests in cases of polymorphic light eruption: A case-control study. Indian Dermatol Online J [Internet]. 2014; 5(3):291–5. Available from: http:// www. idoj. in/ text. asp? 2014/ 5/ 3/ 291/ 137780