

Serum Prolactin in Males with Chronic Plaque Type Psoriasis Vulgaris

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ABSTRACT

Introduction: Prolactin (PRL) has been implicated in keratinocyte hyperproliferation and thus may have an effect on the etiopathogenesis of psoriasis. Researchers have reported inconsistent data on the levels of serum prolactin in patients with chronic plaque type of psoriasis vulgaris (PV) depending on the PASI scale (severity index), with very few studies specifically on males. The present study was carried out to evaluate the serum levels of prolactin in male patients with PV depending on the PASI scale.

Material and Methods: A case control study was conducted at a tertiary care hospital. After IEC approval, 50 patients newly diagnosed males of PV were compared with 50 normal healthy controls for levels of prolactin. Serum prolactin was measured by enzyme linked fluorescence assay.

Results: Serum prolactin was significantly raised ($p < 0.001$) in patients with PV when compared with healthy controls. The levels were also significant ($p < 0.001$) in patients when compared to the severity of the disease.

Conclusion: Prolactin does seem to play a role in the pathogenesis of psoriasis and may serve as a biological marker of disease activity in patients with psoriasis. However further studies with large sample size should be carried out so as to validate this hypothesis.

Keywords: Prolactin, Psoriasis Vulgaris, Males

INTRODUCTION

Chronic plaque type of psoriasis vulgaris, one of the most common hyperproliferative inflammatory cutaneous disease, affects 2-3% of the population. (1) It is a T cell immune mediated disease influenced by multifactorial etiologies (genetic combined with triggering factors). Among the numerous factors which are implicated for the pathogenesis of psoriasis, stress and hormones are said to have a key role. Prolactin (PRL) is a peptide hormone secreted not only by the anterior pituitary gland but also by many extra-pituitary sites (2) The hypothesis that PRL may be involved in the pathogenesis of psoriasis has been supported by the fact that prolactin receptors exist on epidermal keratinocytes (3) It acts as a neuroendocrine modulator of skin epithelial cell proliferation and of the skin immune system by forming a 'prolactin-circuit' between the central nervous system and the skin. The suggested pathway is by binding to specific skin receptors, modulation of cytokine release in the skin, and stimulation of somatomedin release by mesenchymal cells thereby affecting epithelial cell growth in the skin. Feedback signals, arising from the skin tend to modify pituitary PRL release and may have a role in skin pathology

Thus, among the hormones, PRL is a major mediator for

signal which is upregulated in response to psychological and physical stress (4). It is said to have multiple immune-stimulatory effects including increasing the synthesis of IFN-gamma and IL-2 by Th1 lymphocytes and activation of Th2 lymphocytes with autoantibody production (5).

The possible role of PRL in the pathogenesis of psoriasis has suggested certain conflicting reports (7,8). Moreover, literature has suggested variable correlation between the serum prolactin levels and severity of disease (8,9). In fertile females, variations in the baseline serum prolactin level can be expected (9,10) which could be responsible for the variations in the levels of prolactin in different studies. Hence with this in mind, the present study to assess the levels of PRL in male patients suffering from chronic plaque type of psoriasis (PV) was undertaken.

MATERIAL AND METHODS

A case control study, after IEC approval, was undertaken in NKP Salve Institute of Medical Sciences and Research centre, Nagpur. The diagnosis of PV in 50 male patients was confirmed by a dermatologist based on clinical findings (Auspitz sign, clinical features of psoriasis like erythema, itching, thickening and scaling of the skin) and, where indicated, by histopathological studies. PV was the only type of psoriasis that was considered for the study. Assessment of psoriasis area and severity index (PASI) score (11, 12) was taken into consideration for evaluation of the severity of disease.

50 controls were randomly selected from healthy volunteers who were matched with the study subjects in terms of age. Universal sampling method was taken into consideration. All the individuals signed the informed consent form. Patients suffering from fever, joint pain, malignancy, those taking active systemic therapy (i.e., antidepressants, antipsychotics, butyrophenones, estrogens, H2 blockers, methyldopa, metoclopramide, phenothiazines, reserpine, verapamil, etc.) or having arthritis, evidence of renal, hepatic, endocrinopathy (which may lead to alteration in

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hormone levels including head trauma, prolactinoma, hypothalamus diseases, hypo/hyperthyroidism, and adrenal and renal diseases), and any malignancy or physical and psychiatric condition with an aim to avoid instances of secondary hyperprolactinemia and already receiving treatment for psoriasis were excluded from the study.

Venous blood sample (5 mL) was collected and immediately centrifuged and the serum was frozen and stored at -20° C until analysis. The serum PRL (ng/ml) was assayed by enzyme linked fluorescence assay and inferences were drawn.

STATISTICAL ANALYSIS

The mean and standard deviation were determined for each variable. All the results were expressed as mean \pm S.D. Comparison of data was done by applying student t-test. The correlation between severity of disease and prolactin levels were determined by pearson's correlation co-efficient. P-value <0.05 was considered significant.

RESULT

The present study comprised of 50 patients and 50 controls. The mean age (\pm SD) of psoriatic patients was 42.38 ± 11.41 years and of healthy volunteers was 41.7 ± 12.29 . The levels of serum PRL (ng/ml) was 12.758 ± 4.65 in the control group as compared to 65.40 ± 21.99 in the study group ($p < 0.001$). The levels of prolactin correlated significantly with the severity of disease (0.932) (table-1).

DISCUSSION

The polypeptide hormone PRL is secreted by the anterior pituitary. Besides its "beyond the mammary horizon" action, the hormone is said to play an important role in humoral and cell mediated immune reaction thus influencing the expression of autoimmune diseases.(13)

The theory of role of PRL in the pathogenesis of psoriasis which is a chronic, inflammatory, hyperproliferative dermatological disease dates back to 1981 when Weber (14) in his study demonstrated that bromocriptine, a potent dopaminergic inhibitor of pituitary PRL, induced remission of epidermal lesions and arthritis in patients of PV.

It is also hypothesized that prolactin due to its potent growth regulatory effect on integumental structures contributes to human skin and pathology. (15) Maryam et al demonstrated that PRL concentration was significantly elevated in blister fluid drawn from lesions of psoriatic patients suggesting a role for locally produced prolactin in the skin (15). Rathika et al (16), Dilme-Carreras E (8) and Handjani et al (17) found significant levels of serum PRL in patients of psoriasis implicating the pituitary-originated circulating prolactin in the disease.

PRL is a member of the type I cytokine superfamily and said to exert a variety of immunostimulatory effects. Also in vitro studies have demonstrated the effects of PRL on Keratinocyte either by enhancement of CXCL9/10/11 (18) or of CCL20 production by PRL (19). However, Robati RM et al (20) and El-Khateeb EA et al (21) have in their studies suggested that

	Serum prolactin (ng/ml)	Paersons Correlation coefficient
Mild (n=8)	34.8 ± 3.05	0.28
Moderate (n=33)	65.03 ± 16.46	0.84
Severe (n=9)	93.96 ± 3.78	0.31

Table-1: Levels of prolactin and correlation with severity of disease in males with psoriasis.

there is no change in the levels of PRL in patients suffering from psoriasis. Since, the earlier studies carried out reflected a data of both genders, the difference of opinion could be a reflection of several physiological factors. (22) as well as small number of sample size. Our study which determines the levels of serum PRL in men suffering from PV supports the findings that serum PRL is significantly increased when compared to normal healthy controls and also when correlated with the severity of disease.

This is in concordance with the study of Roboti RM(20) who showed that the PRL level was significantly higher in male patients in comparison with control group and returns to normal by treatment.

The proliferative effect of prolactin on human keratinocytes in vitro may possibly play a role in the pathogenesis of psoriasis (23). Clinical evidence and experimental evidence support that the PRL- circuit which serves as a link of skin epithelial cell proliferation and the skin immune system (24), binds to specific skin receptors, modulation of cytokine release in the skin, and stimulation of somatomedin release by mesenchymal cells thereby affecting epithelial cell growth in the skin. Thus, the rise in the serum may play a role in the hyper proliferation of keratinocytes in vivo, which is the hallmark of the disease process. Kooijman et al (25) have suggested that a local source of PRL or a PRL like substance that may induce or exacerbate psoriatic lesions which may be independent from the pituitary sources of PRL. The decidual fibroblast cells may also express prolactin and hence may be responsible for the increased levels. However, Ghiasi et al (15) however found that the levels of serum PRL are not different in men suffering from psoriasis as compared to healthy normal controls.

Of the many theories which have been, much needs to be done to know the exact pathophysiology behind increase in the levels of prolactin in males suffering from PV.

The limitation to our study was that we did not measure the level of stress in each patient; it was taken into consideration that none of them was under obvious stress at the time of hormonal measurement. In addition, finding of new cases of psoriasis was a big challenge and the reason for a smaller sample size. We focused on serum levels of PRL; moreover, since hyperprolactinemia may link the development of psoriasis with that of the psoriatic comorbidities.

CONCLUSION

Future studies that might measure prolactin in the local skin and evaluate the expression of their receptors simultaneously would be more beneficially for the therapeutic efficacy of these antipsoriatic drugs.

REFERENCES

1. Parisi R, Symmons DP, Griffiths CE, Ashcroft DM. Identification and Management of Psoriasis and Associated Comorbiditiy (IMPACT) Project Team. Global epidemiology of psoriasis: A systematic review of incidence and prevalence. *J Invest Dermatol.* 2013;133:377-85.
2. Jara LJ, Medina G, Saavedra MA, Vera-Lastra O, Navarro C. Prolactin and autoimmunity. *Clin RevAllergy Immunol.* 2009;1-10.
3. Langan EA, Griffiths CE, Paus R. Exploring the role of prolactin in psoriasis. *Arch Dermatol Res.* 2012; 304:115-8.
4. Arck PC, Slominski A, Theohardides TC, Peter EM, Paus R. Neuroimmunology of stress: skin takes center stage. *J Invest Dermatol.* 2006;126:1697-704.
5. De Bellis A, Bizzarro A, Pivonello R, Lombardi G, Bellastella A. Prolactin and autoimmunity. 2005; *Pituitary.* 8:25-30.
6. Paus R. Does prolactin play a role in skin biology and pathology? *Med Hypotheses.* 1991;36:33-42.
7. Giasuddin AS, El-Sherif AI, El-Ojali SI. Prolactin: does it have a role in the pathogenesis of psoriasis? *Dermatology.* 1998;197:119-122.
8. Dilme-Carreras E, Martin-Ezquerro G, Sanchez-Regana M, Umbert-Millet P. Serum prolactin levels in psoriasis and correlation with cutaneous disease activity. *Clin Exp Dermatol.* 2011;36:29-32.
9. Gorpelioğlu C, Gungor E, Alli N. Is prolactin involved in etiopathogenesis of psoriasis? *J Eur Acad Dermatol Venereol.* 2008;22:1135-1136.
10. Wisser H, Breuer H. Circadian changes of clinical, chemical and endocrinological parameters. *J Clin Chem Clin Biochem.* 1981;19:323-37.
11. Naldi L, Gambini D. The clinical spectrum of psoriasis. *Clin Dermatol.* 2007;25:510-518.
12. Malkic Salihbegovic E, Hadzigradic N, Cickusic AJ. Psoriasis and metabolic syndrome. *Med Arch.* 2015; 69:85-87.
13. Mohammad Abid Keen and Iffat Hassan. Serum Prolactin Levels in Psoriasis and its Association with Disease Activity: A Case-Control Study. *Indian J Dermatol.* 2014;59:562-566.
14. Weber G, Neidhardt M, Frey H, Galle K, Geiger A. Treatment of psoriasis with bromocriptine. *Arch Dermatol Res.* 1981;271:437-9.
15. Ghiasi M, Hallaji Z, Ali Narimani S. Serum prolactin level in psoriasis: Is it really higher than in healthy individuals? *Iran J Dermatol.* 2015;18:6-9.
16. Rathika S, Rajappa M, Chandrashekhar L, Munisamy M, Thappa DM. Effect of treatment on prolactin levels in patients with psoriasis vulgaris. *Clin Chim Acta.* 2014; 429:212-4.13.
17. Farhad Handjani, Nasrin Saki, Iman Ahrari, Mehdi Ebrahimi, Mohammad Mehdi Khorrami, and Parastoo Nematollahi. Serum Prolactin Levels in Psoriasis Vulgaris. *Dermatology.* Volume 2014, Article ID 586049, 3 pages.
18. Kanda N, Watanabe S. Prolactin enhances interferon-gamma-induced production of CXC ligand 9 (CXCL9), CXCL10, and CXCL11 in human keratinocytes. *Endocrinology.* 2007;148:2317-2325.
19. Kanda N, Shibata S, Tada Y, Nashiro K, Tamaki K, Watanabe S. Prolactin enhances basal and IL-17-induced CCL20 production by human keratinocytes. *Eur J Immunol.* 2009;39:996-1006.
20. Robati RM, Toossi P, Rahmati-Roodsari M, Sara Khalilazar, Ehsan Abolhasani, Nastaran Namazi, and Shima Younespour. Association of psoriasis severity with serum prolactin, thyroid hormones, and cortisol before and after treatment. *Scientific World Journal.* 2013;921819.
21. El-Khateeb EA, Zuel-Fakkar NM, Eid SM, Abdul-Wahab SE. Prolactin level is significantly elevated in lesional skin of patients with psoriasis. *Int J Dermatol.* 2011;50:693-6.
22. Wiwanitkit V. Serum prolactin level in psoriasis. *Iran J Dermatol.* 2016;19:65
23. Wittkowski KM, Leonardi C, Gottlieb A, Alan Menter, Gerald G. Krueger, Paul W. Tebbey, Jennifer Belasco, Razieh Soltani-Arabshahi, John Gray, Liz Horn and James G. Krueger. Clinical symptoms of skin, nails, and joints manifest independently in patients with concomitant psoriasis and psoriatic arthritis. *PLoS ONE*, vol. 6, no. 6, Article ID e20279, 2011.
24. Paus R. Does prolactin play a role in skin biology and pathology?. *Medical Hypotheses.* 1991;36:33-42.
25. R. Kooijman R, Gerlo S, Coppens A and Hooghe-Peters EL. Growth hormone and prolactin expression in the immune system. *Annals of the New York Academy of Sciences* 2000;917:534-540.

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