Volume-5, Issue-1, January -2016 • ISSN No 2277 - 8160

Research Paper | Medical Science

Long Pentraxin Ptx3 and Its Correlation with Severity of Psoriasis

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ABSTRACT

Psoriasis is a chronic, autoimmune, inflammatory cutaneous disease with systemic involvement. Main aim of this study was to evaluate long Pentraxin PTX3 as a marker for disease activity in Psoriasis patients and to establish its relationship with disease severity. Plasma Pentraxin PTX3 was analyzed in 50 Psoriasis patients of 20-50 years age group .50 age and sex matched healthy volunteers were taken as control. Result showed that Plasma levels of long Pentraxin PTX3 were significantly higher in Psoriasis patients compared to controls with p value < 0.0001. Also PTX3 level correlated significantly with disease severity in Psoriasis patients (grouped as mild, moderate and severe according to PASI score).So Long Pentraxin PTX3 may be regarded as a reliable biomarker of disease activity in Psoriasis patients and also to access disease severity in these patients.

KEYWORDS : Psoriasis, Long Pentraxin PTX3, PASI score

Introduction:

Psoriasis is a cutaneous disorder ,which is autoimmune ,chronic ,inflammatory condition characterized by sharply demarcated, red and silvery white scales which is slightly raised from the surface.(Vanizor Kural B et.al.2003, Menter A et.al.2008). 2.5% of world's population are affected by psoriasis. (Christophers E 2001, Baran A. et. al.2015). Inflammatory lesions in psoriasis are T-cell mediated. Many environmental factors together such as trauma, stress, smoking, some drugs, and genetic factors evoke a series of events in the dermis involving the innate and adaptive immunity. This leads to the process of inflammation in patients of psoriasis leading to the formation of pro-inflammatory cytokines such as interferon-α, interleukin-1&6, tumor necrosis factor-alpha (TNFα) and chemokines by Plasmacytoid dendritic cells and keratinocytes. Release of these proinflammatory factors leads to the activation of myeloid dendritic cell. These myeloid dendritic cell present antigens and secrete interleukins that leads to the differentiations helper cells Th-1 and Th-17.The T cells then secrete mediators that activate keratinocytes leading to abnormal cycle of epidermal development, with rapid and increased maturation of dermal cells, vascular changes and inflammatory features. These processes maintain inflammation in psoriasis (Nestle FO. et. al. 2009). Long Pentraxin PTX3 being an acute phase protein is induced in response to LPS and inflammatory cytokines including TNFα and IL-1 &6. Other name of Long Pentraxin 3 (PTX3) is TNF-stimulated gene 14 (TSG-14)which is glycoprotein in nature belonging to the Pentraxin super family of proteins. The characteristic of this family of protein is that it exhibits a C-terminal Pentraxin domain, and a unique N-terminal domain(Human Pentraxin 3/TSG-14

Quantikine ELISA Kit, R & D systems, a Biotechne brand). Other characteristic of this family is its cyclic multimeric structure. (Emsley J. et. al., 1994). Long Pentraxin 3 (PTX3) is rapidly produced and released by several cell types, particularly by phagocytic cells e.g mononuclear cells ,dendritic cells (DCs), fibroblasts and endothelial cells in response to primary inflammatory signals like interleukins, tumor necrosis factor α etc.(Garlanda C et al.,2005).

The pentraxins are divided into two groups on the basis of their primary structure.they are named as short pentraxins and long pentraxins. The short pentraxins are CRP and serum amyloid P.The prototype protein belonging to long pentraxin group is pentraxin 3 (PTX3). The main site of production of CRP and serum amyloid P is liver and is produced mainly in response to IL-6. (Steel DM.et.al ,1994).In contrast Long Pentraxin PTX3 are produced by a large number of tissues and cells and in particular by innate immunity cells and endothelial cells in response to proinflammatory signals which are so many in number. (Breviario F et. al. 1992, Alles VV et. al.1994, Mantovani A et. al.2006). Because of this extrahepatic synthesis of Long Pentraxin PTX3 in contrast to CRP, PTX3 levels are believed to be a true independent biomarker of disease activity produced at the sites of inflammation and infection (Fazzini F. et al 2006).

The severity of psoriasis are mainly graded as mild, moderate and severe which is based on PASI score .PASI stands for Psoriasis Area and Severity Index .(Garduno J . et al 2007).

The PASI score is calculated according to an appropriate formula. A PASI score below 10 defines psoriasis as mild, between 10 and 20 as moderate, and above 20 as severe (Naldi L . et al 2007).

Pentraxin-3 (PTX-3),is a newly identified biomarker and as CRP is an acute phase reactant and also resembles it in structure and function. (Hansson GK, 2012).

Under normal condition PTX3 blood levels are low (<2 ng/ml) and increase rapidly and dramatically during infection and inflammation. (Garlanda C et al 2005).

The association between psoriasis and inflammation and inflammatory markers such as ,CRP is well known, however the pathophysiological role of PTX- 3 has not been well established in patients with psoriasis.. Therefore, the aim of the present study was to assess the association between PTX-3 and psoriasis and its relationship with the clinical severity of psoriasis.

Material and method:

This was a case control study done in clinical laboratory of Biochemistry department, IGIMS Patna in collaboration with the Department of Dermatology IGIMS Patna between October 2014 to October 2015. Written informed consent was taken from all the subjects. Plasma level of Long Pentraxin PTX3 was analyzed in 50 Psoriasis patients of 20-50 years age group .50 age and sex matched healthy volunteers were taken as control. Long Pentraxin PTX3 was measured using sandwich ELISA. Psoriatic patients with Psoriatic Area Severity Index (PASI) less than 10 were considered as mild psoriasis and PASI between (10-20) were considered as moderate and PASI >20 were considered as severe psoriasis. Out of 50 psoriatic patients 15 were of mild psoriasis, 15 with moderate psoriasis and 20 with severe psoriasis.

Statistical Analysis:

The data of the study were expressed as mean ± SD. Students t-test was applied for statistical comparisons .P value < 0.05 was considered statistically significant.

Result:

Mean plasma Long Pentraxin PTX3 value in psoriasis patients was , 3.99±2.08 ng/ml as compared to control group 2.56± 1.03 ng/ml with p value < 0.0001.Psoriasis patients were divided into three groups on the basis of severity using PASI score . Psoriatic patients with Psoriatic Area Severity Index (PASI) less than 10 were considered as mild psoriasis and PASI between 10-20 were considered as moderate and PASI >20 were considered as severe psoriasis. Out of 50 Psoriatic patients 15 were of mild Psoriasis, 15 with moderate Psoriasis and 20 with severe Psoriasis. Plasma Long Pentraxin PTX3 level (ng/ml) in mild psoriasis was 3.33±1.89, in moderate psoriasis was

3.60±2.05and in severe psoriasis was 4.79±2.07. Plasma level of Long Pentraxin PTX3 correlated significantly with disease severity in psoriasis patients.There was positive correlation between the levels of PTX3 and PASI score. Control group presented with lower values of Long Pentraxin PTX3 as compared with even milder form of psoriasis with PASI <10.

Table 1- Table showing plasma Long Pentraxin PTX3 level in case and control group

Number of patients	PASI<10		PASI 10-20		PASI >20		CONTROL	
	15		15		20		50	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Plasma Long Pentraxin PTX3 (ng/ml)	3.33	1.89	3.60	2.05	4.79	2.07	2.56	1.03

Discussion:

Psoriasis is known to be associated with several systemic disturbances such as cardiovascular disease, cerebrovascular disease,hypertension, dyslipidemia, atherosclerosis, type 2 diabetes mellitus, obesity, , osteoporosis, chronic obstructive pulmonary disease, and cancer (Breviario F el al1992) . It has been understood that psoriasis is not only a hyperkeratotic disorder of keratinocytes. A dysregulation of the immune system which is mediated by cytokines is also involved in the pathophysiology of the disease. The classification of this disease, therefore, has changed from 'skin disease' to a 'T-cell mediated disease'. T cells seem to play a crucial role by contributing to the development of systemic involvement. In our study we found that plasma Long Pentraxin PTX3 was significantly increased in psoriasis patients as compared to controls There was positive correlation between the levels of PTX3 and PASI score.

Our study was consisted with the study of Bevelacqua V et.al.(10)and S. Uysal et al (18) who also studied relationship between psoriasis and long Petraxin PTX3 and came to the conclusion that long Pentraxin PTX3 is elevated in psoriasis patients and there is positive correlation with disease severity.

Conclusion:

Psoriasis being an autoimmune inflammatory skin disorder and Long Pentraxin PTX3 being an acute phase protein is elevated significantly in patients of Psoriasis and it may be regarded as a reliable biomarker of disease severity in these patients.

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