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Research article

ROLE OF INFLAMMATION IN PELLAGRA: AN OBSERVATIONAL STUDY

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ABSTRACT

Background and objectives: Recent studies in medical science have established a fundamental role for inflammation in mediating all stages of this disease from initiation through progression and, ultimately, the thrombotic complications of atherosclerosis. Earlier studies documented the role of inflammation in pathophysiology of many diseases. But the information regarding the role of inflammation in pellagra is less. Therefore we hypothesized that, high levels of inflammatory markers like C Reactive Proteins (CRP), Tumor Necrosis Factor alpha (TNF alpha) and Interleukin 6 (IL6) will be present in pellagra patients. **Materials and methods: C**linically diagnosed pellagra patients aged between 18 to 40 years were recruited (n=63) from department of dermatology. Age and gender matched controls were recruited among staff and residents. Inflammation was assessed by using markers like C Reactive Proteins (CRP), Tumor Necrosis Factor alpha (TNF alpha) and Interleukin 6 (IL6) **Results:** There was no significant difference in anthropometric parameters. But, inflammatory markers hs CRP, TNF alpha and IL6 were significantly high in patients suffering from pellagra, when compared to age and gender matched controls ($p<0.001$) **Conclusion:** From this study, we can conclude that, the estimation of levels of inflammatory markers in pellagra patients at early stage will help to take measures to prevent the progression of disease.

Keywords: C Reactive Proteins, Tumor Necrosis Factor alpha, Interleukin 6, Pellagra, Inflammation.

INTRODUCTION

Pellagra was first coined by Casal in 1735, it was endemic in Asia and Africa where staple food is nicotinic acid deficient corn-based diet and related to poverty among refugees or displaced population [1]. Classically pellagra is characterized by combined deficiency of the essential amino acid tryptophan and the vitamin niacin [2]. Pellagra is characterized by the four classic symptoms – dermatitis, diarrhea, dementia, and death. Other symptoms include anxiety, anorexia, cheliosis, psychosis, delirium, constipation, dermatitis occurring on sun exposed areas, diminished strength, intermittent stupor, glossitis, nausea, melancholia, paralysis of extremities, stomatitis, peripheral neuritis, vomiting and weight loss[3,4].

Inflammation is the body's attempt at self-protection; the aim is to eliminate harmful stimuli, including irritants, damaged cells or pathogens - and start the healing process. Chronic inflammation lasts for several months and even years. It can result from failure to eliminate whatever was causing an acute inflammation, an autoimmune response to a self antigen - the immune system attacks healthy tissue, mistaking it for harmful pathogens, a chronic irritant of low intensity that persists[5].

Recent studies in medical science have established a fundamental role for inflammation in mediating all stages of this disease from initiation through progression and, ultimately, the thrombotic complications of atherosclerosis. Earlier studies documented the role of inflammation in pathophysiology of many diseases [6]. But the information regarding the role of inflammation in pellagra is less. Therefore we hypothesized that, high levels of inflammatory markers like C Reactive Proteins (CRP), Tumor Necrosis Factor alpha (TNF alpha) and Interleukin 6 (IL6) will be present in pellagra patients.

Hence, in this study we studied the levels of inflammatory markers like hs CRP, TNF alpha and IL 6 in clinically diagnosed pellagra patients.

MATERIALS AND METHODS

Study design: This is an observational study.

Ethical approval: The study was approved by institute ethics committee and obtained written informed consent.

Inclusion criteria: Clinically diagnosed pellagra patients aged between 18 to 50 years of both gender were recruited (n=63) from department of dermatology.

Exclusion criteria: We excluded patients suffering from chronic hypertension, diabetes mellitus, coronary artery diseases and other diseases where inflammatory markers were raised.

Age and gender matched controls were recruited among staff and residents.

Sample size: Sixty three

Methodology: Age, gender, height, weight were recorded for all the participants. The medical chart was reviewed for clinical characteristics, such as hypertension, diabetes, coronary artery disease etc., Blood was collected through vein puncture by aseptically, allowed to clot and centrifuged at 3,000 RPM at 4^{o}C for 10 min (Remi-refrigerated centrifuge) and the serum was separated and stored in a frozen state at - 20^{o}C for analysis. Inflammatory markers i.e, hsCRP, TNF alpha, IL 6 were assessed by using commercially available kits [7].

Statistical analysis: Statistical analyses were performed using Statistical Package for Social Sciences 16. Data expressed as mean ± SD. Independent student's paired'*t*' test was applied to compare various parameters between groups. The null hypothesis was rejected at $p<0.05$.

RESULTS

The baseline physiological characteristics of study participants are Table 1.There were no significant differences in baseline characteristics like age, gender and other anthropometric parameters like height and weight.

As shown in Table 2, the inflammatory markers hs CRP, TNF alpha and IL6 were significantly high in patients suffering from pellagra, when compared to age and gender matched controls ($p<0.001$)

Table: 1 Physiological characteristics of study participants.

Parameter	Pellagra patients	Controls
Age (Years)	47.54 ± 5.70	48.02 ± 5.43
Men/Women,	50/13	48/15
Height (cm)	161.54±7.34	162.14±8.66
Weight (Kg)	68.26 ±3.23	67.36±4.62

Table: 2. Between and within group difference of Oxidative stress and inflammatory markers.

Parameter	Pellagra patients	Controls
hs CRP (ng/ml)	9192.26± 2568.93	2655.21±1286.35*
TNF alpha (pg/ml)	200.64± 81.45	128.74± 43.59*
IL 6 (pg/ml)	311.54 ± 94.51	204.23± 73.21*

* $p<0.001$.

hs CRP: high sensitive C-reactive protein, TNF alpha: Tumor Necrosis Factor - alpha, IL6: Interleukin 6.

DISCUSSION

Despite of recent advances in the management and pathophysiology of pellagra, the information about the role of inflammation in the pathophysiology of pellagra is less. Therefore in this study we assesses the inflammation in pellagra patients by using hs CRP, TNF alpha and IL 6.

TNF-α initially defined in 1975, was eventually named as cachectin because of its putative role in the progression of cachexia. TNF-α is released in response to an array of inflammatory stimuli which are associated with multiple cell signaling pathways involved in the regulation of immune response. TNF-α exerts its biologic action by means of two TNF-α receptors, TNFR1 and TNFR2, which are depicted

by all nucleated cells. These kinds of receptors are entered into the cell membrane and consequently may also be cleaved and unveiled into the blood circulation. Lower quantities of these soluble TNF-α receptors could strengthen and extend the biologic action of circulating TNF-α, however higher levels of receptors may "buffer" the biologic outcomes of surplus circulating TNF-α[8]. Even though TNF-α is the best inflammatory marker in HF, some other cytokines may possibly perform a role.

Interleukin 6 (IL-6) is a pro inflammatory cytokine that offers a sophisticated role in the control and propagation of the immune reaction and, like TNF-α, may collocate certain aspects of the HF phenotype in animal models [9]. Generally, IL-6 seems to cause a hypertrophic reaction in myocytes, possibly leads to unfavorable remodeling.

C-reactive protein (CRP) was found in 1930 and named by its reaction with the C-polysaccharide of Streptococcus pneumonia. It is produced from the liver in response to inflammatory stimuli, and it activates the conventional complement cascade. As a biomarker of inflammation, this is routinely available in laboratories because of its role in the risk stratification of patients at risk for ischemic heart disease (IHD) [10].

In this study the levels of TNF alpha was significantly high in pellagra patients. This indicates that, in pellagra patients, the high levels of inflammatory markers may lead to other diseases like hypertension, coronary heart diseases etc. **Limitations:** Future studies should include more sample size and more precise inflammatory markers.

CONCLUSION

In conclusion, the results of this study indicate that estimation of levels of inflammatory markers in pellagra patients at early stage will help to take measures to prevent the progression of disease.

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Conflict of Interest: Nil

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