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Evaluation CD4 T Lymphocyte in Rheumatoid Arthritis Patients in Karbala Province

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ABSTRACT

Introduction: *Rheumatoid arthritis (RA) is a systemic autoimmune disease characterized clinically by inflammatory arthritis and extra-articular involvement. CD4+ T cells form a large proportion of the inflammatory cells invading the synovial tissue, and are involved in the RA pathologic process*

Methodology: *A total of 50 RA patients and 50 healthy control subjects were included. All subjects did not have other autoimmune disease except RA, tumor, active infection, or a history of related drug administration. Peripheral blood mononuclear cells were isolated and analyzed by flow cytometry .*

Results: *Our analyses revealed CD4 T-Cell were positive correlated with erythrocyte sedimentation rate and C-reactive protein levels in RA patients.*

Conclusions: *Our results indicate that CD4-T cells play an important role in modulating RA disease activity and can serve as a parameter of disease activity.*

Introduction

Rheumatoid arthritis is One of the most common autoimmune diseases, characterized clinically by arthralgia, swelling, immobility, and immunological dysfunction. Additionally, multi systemic and multi organ involvement as well as abnormalities may be seen in RA patients. 1 The main cause of RA disease is still unclear, but there are several factors that contribute to the development of RA, of which is the interaction of genetic and environmental factors, tobacco smoking, microbial infections 2, All of these factors raise the risk of RA, In addition to early exposures, such as if the mother smoked, a child's risk of developing RA is higher. 3. RA differs from other organ-specific autoimmune disorders in that it is defined by the activation and

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proliferation of stromal tissues in the target organ rather than the initial cell death and tissue destruction. Furthermore 4, no antigen or antigens unique to the target organ have been identified in RA 5, Understanding how abnormal MHC class II restricted T-cell responses might cause persistent immune -inflammatory responses that target the synovial joint has been a major challenge for many decades given the strong genetic associations between RA and genes encoded within the major histocompatibility complex (MHC) 6. The pathogenesis of RA involves a variety of innate and adaptive effector cells, including as neutrophils, fibroblasts, B cells, and T lymphocytes 7. Numerous immunological abnormalities may be present in RA patients, including T cell, B cell, and macrophage involvement in RA pathogenesis 8. Either the synovium or the peripheral blood can include these cells. Rheumatoid factors (RF), anti-citrullinated protein antibodies (ACPA), and pro-inflammatory cytokines are among the physiologically significant proteins secreted by B-cells in support of RA 9. T-cell activation is also mediated by B-cells through the production of co-stimulatory molecules. T-cells' primary role in RA is to activate fibroblasts and macrophages, turning them into cells that damage tissue 10, B lymphocytes have a significant impact on the immune response by regulating the generation of antibodies 11-12. However, a CD4 has recently been defined in a number of investigations. T cells secrete pro-inflammatory cytokines, which are crucial to the pathophysiology of RA 13 , Auto reactive CD4 (+) T-cell activation can result in autoimmune diseases14 , CD4 T cells are enriched in RA and may directly contribute to RA pathogenesis by producing IFN-γ and IL-17 5. CD4+T-lymphocytes in new-onset DMARD- naïve RA patients show IL-17A and IFN γ abnormalities in TN, indicating their relevant role in early disease pathogenesis 14.

Materials and Methods

We selected 30 healthy control people who did not have RA and 60 patients with chronic rheumatoid arthritis. According to clinical criteria and immunological tests reviewed by a specialized physician at the hospital's department of rheumatology and physiotherapy, RA was identified. Individuals were deemed clinically healthy after being cleared of any signs of RA or another autoimmune disease.

Flow cytometric analysis

All antibodies were employed at doses that were found to be ideal for staining in antibody titrations. Briefly, a sample of whole blood was incubated with 5 µL CD4-FITC in the dark for 30 min at room temperature. They were then washed with phosphate-buffered saline twice, and fixed with 1% paraformaldehyde at room temperature. Then, two-color immunofluorescence analysis was performed using MPL FC 500 (Beckman Coulter, Brea, CA). Data analysis was performed using CXP software. An appropriate gate was drawn around the lymphocyte population, as defined by forward scatter and side scatter characteristics. The gated cells were then analyzed for CD4 expression.

Data analysis

Person correlations were used to analyze relationships between variants. p values of < 0.05 were considered to be significant. All analyses were performed with statistical software SPSS version 2026 (SPSS Inc., Chicago, IL).

Results

In study group table (1), there is a statistically significant positive correlation between cluster of differentiation 4 (CD4+) T lymphocyte subsets and Rheumatoid factor (RF) at *(r=.310)* and highly significant positive correlation between C-reactive protein (CRP) and erythrocyte sedimentation rate (ESR) at *(r*=.596*).* For the control group table (2), there is a statistically significant positive correlation between erythrocyte sedimentation rate (ESR) and Anti–cyclic citrullinated peptide (Ant-CCP) at *(r*=.392*).*

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Table 1. ***Pearson correlation among study group variable***

	1	2	3	4	5	6
1.Rheumatoid factor	-	.310*	.074	-.155-	.015	.134
2.cluster of differentiation 4		-	.076	.079	.195	.005
3.Gender			-	.033	.002	.083
4.erythrocyte sedimentation rate				-	.596**	-.170-
5.C-reactive protein					-	-.232-
6.Anti–cyclic citrullinated peptide						-

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2- tailed).

*. Correlation is significant at the 0.05 level (2-tailed)

From our analyses revealed CD4 T-Cell were positive correlated with erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP) levels in RA patients. Additionally, patients with elevated CD4 had considerably greater levels of the CD4+ T cell subsets than did healthy controls.

Table 2. ***Pearson correlation among control group variables***

	1	2	3	4	5	6
1.Gender	-	.096	.185	-.237-	-.017-	-.126-
2.cluster of differentiation 4		-	.226	-.415-*	-.220-	.151
3.erythrocyte sedimentation rate			-	-.177-	.147	.392*
4.C-reactive protein				-	.274	-.022-
5.Rheumatoid factor					-	.209
6.Anti–cyclic citrullinated peptide						-

Conclusions

RA is a chronic autoimmune disease with synovitis as the main clinical feature, and is internationally recognized as a major refractory disease ,Clinically, the pathogenesis of the disease remains to be defined, but it is believed to be the result of a combination of factors such as heredity, environment, sex hormones, and infection . Clinical studies suggest that the disorder of cellular immune and the imbalance of cell subsets are closely related to the occurrence and development of Rheumatoid arthritis. The findings of the study suggest that CD4-T cells are crucial in regulating Rheumatoid arthritis disease activity. CD4 with high level may promote the occurrence and development of RA. and can be used as a measure of disease activity.

List of abbreviations

RA: Rheumatoid arthritis

CD4: cluster of differentiation 4

RF: Rheumatoid factor

ESR: erythrocyte sedimentation rate

CRP: C-reactive protein

Anti-ccp: Anti–cyclic citrullinated peptide

Consent to publish

Not applicable

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Competing interests

Not applicable

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