Original Article
Immunology Allergy

IMMUNOPHENOTYPING RELATED TO CLUSTER OF DIFFERENTIATION (CD) MARKERS IN PATIENTS WITH ATOPIC DERMATITIS

IHSAN E. AL-SAIMARY*
SUNDIS S. BAKR*
KHALIL E. ALHAMDI**

SUMMARY: Determination of concentrations of cluster of differentiation (CD) markers in patients with atopic dermatitis and comparison with healthy individuals were carried out in this study.

It was found that the mean concentrations of positive lymphocytes for AD patients reached 82.2%, 55.7%, 28.7%, and 21.9% for CD3, CD4, Cd8, and CD19, respectively, and those of healthy individuals reached 72.2, 40.3, 18.5, and 13.1 for CD3, CD4, Cd8, and CD19 respectively. We found that the mean values of CDs for AD patients were high than those of healthy individuals (65.7%, 75.9%, 94.4% and 68.5%) (P<0.05)

Key words: Cluster of designation (CD), CD3, CD4, CD8, CD19, atopic dermatitis.

INTRODUCTION

Atopic dermatitis (AD) was first introduced in 1933 by Hill and Sulzberger in recognition of the close association between AD and respiratory allergy (1). The concept that AD has an immunologic basis is supported by the observation that patients with primary T-cell immunodeficiency disorders are frequently associated with elevated serum IgE levels and eczematoid skin lesions indistinguishable from AD (2). Cluster designation of monoclonal antibodies (CD, cluster of differentiation) designated from 1st to 8th workshops on international human leukocyte differentiation antigens with a total number of 247 CDs (3). Leukocytes express distinct assortments of molecules on their cell surfaces, many of which reflect either different stages of their lineage-specific differentiation or different states of activation or inactivation. The molecules on the surface of leukocytes are routinely detected with anti-leukocyte monoclonal antibodies (mAbs). Using different combinations of mAbs with the cell surface immunophenotypes, tone can find out different leukocyte subpopulations, including the functionally distinct mature lymphocyte subpopulations of B-cells, helper T-cells (T_H), cytotoxic T-cells (Tc), and Natural Killer (NK) cells (3). The dermal cellular infiltrate in AD mainly consists of CD_4^+ and CD_8^+ T-cells

*From Department of Microbiology, College Medicine, University of Basrah, Basrah, Iraq.
**From Department of Medicine, College Medicine, University of Basrah, Basrah, Iraq.

with a CD_4/CD_8 ratio similar to peripheral blood levels (4). In recent studies, CD_8^+ CLA^+ T-cells in induction of immunoglobulin E (IgE) and prolonged eosinophil survival (5).

The aim of the present study is to evaluate or determine immunophenotyping of AD patients by measuring the concentration of CDs in patients suffering from atopic dermatitis.

MATERIALS AND METHODS

A total of 5 ml of venous blood was collected by aseptic venipuncture from 108AD patients and form the control group of 100 healthy persons in sterile glass tubes containing 10 U/ml of sodium heparin or EDTA (anticoagulated tubes). All steps of the CD marker procedure were carried out according to the instructions provided in the company's user manual (Bio source Int., Belgium) (6,7), which included the following three steps:

1. Isolatiing mononuclear (MN) cells (lymphocytes) by density gradient centrifugation using lymphoprep to give a lymphocyte concentration of $1-2 \times 10^7$ cells/ml.

2. Measuring the lymphocyte count and viability by Trypan blue exclusion test. More than 95% of the lymphocyte viability was ensured to perform the immunophenotyping analysis (8).

3. Determining the specificity and concentration of the known fluorescent monoclonal antibodies (McAbs) by immunoflorescence technique.

We used four McAbs in the present study: Anti-CD_3-McAb, Anti-CD_4-McAb, Anti-CD_8-McAb, and Anti-CD_{19}-McAb

A reaction was considered positive when the cells had multiple fluorescent dots on the membrane or homogenous bright green membrane fluorescence (7).

Statistical analysis:

Chi-square test and ANOVA test were carried out by using SPSS program ver (11).

RESULTS

The mean values of CDs concentration (CD_3, CD_4, CD_8, and CD_{19}) of AD patients of +ve lymphocytes were 82.2%, 55.7%, 28.7%, and 21.9%, respectively, while those of of the healthy or control group were 74.2%, 40.3%, 18.5%, and 13.1 . It was observed that the mean values of CDs for AD patients were higher than those of healthy individuals (Figure 1)

The concentration of CDs (CD3, CD4, CD8, and CD19) had high mean values (65.7%, 75.9%, 94.4%, and 68.5%) for AD patients than those for the healthy/or control group, with significant differences ($P< 0.05$).

The statistical similarity analysis of CDs illustrated that CD3, CD4, and CD8 had similarity ranged between 94% and 97%, and CD19 splitted from its in similarity ratio near 63.86% (Figure 2).

DISCUSSION

Our results showed a significant elevation in the CD values of the various types studied. These results were compatible and confirmed by the results of other studies that evidenced correlation between various CDs and atopic dermatitis (9,10,11,12). Many other studies are available in other CDs such as CD23, CD24, CD26, CD28, CD30, CD45, CD83, CD137, and CD153 (13,14,15,16,17).

The importance of study CDs and their reactions with atopic dermatitis is interrupted with CD functions and their affecting role in immunopathology of allergic and/or atopic diseases (3). CD3 is associated with T-cell antigen receptor. The cytoplasmic domains of CD3 contain immunoreceptor tyrosine-based activating motifs and bind cytoplasmic tyrosine kinase, which initiates the activation of signal transduction pathways, eventually resulting in cell surface expression (18). CD4 is a coreceptor for MHC class II molecules. It binds Lek on the cytoplasmic face of membrane. This is a receptor for HIV-1 and HIV-2 (19). CD8 is a coreceptor for MHC class I molecules. It binds Lek on the cytoplasmic face of membrane (20). CD19 forms a complex with CD21 (CR2) and CD81 (TAPA-1), which is a coreceptor for B-cells-cytoplasmic domain. It binds cytoplasmic tyrosine kinases and PI-3 kinase (21).

CONCLUSION

We conclude elevation of concentrations of all the studied CDs of patients with atopic dermatitis than in control or healthy individuals.

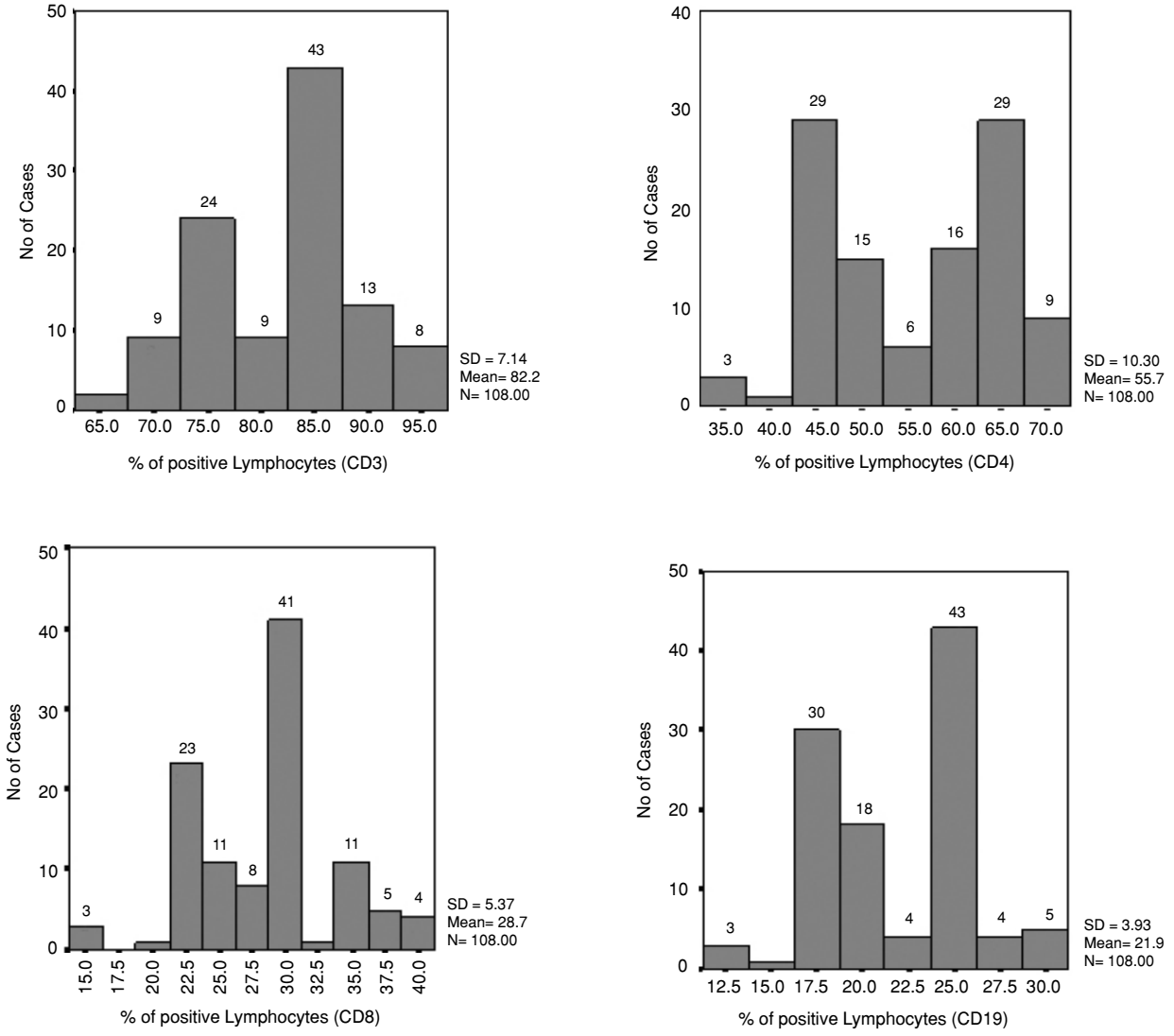

Figure 1: Illustrated all the studied clusters of designation (CD): CD3, CD4, CD8, and CD19 for ad patients (P<0.001).

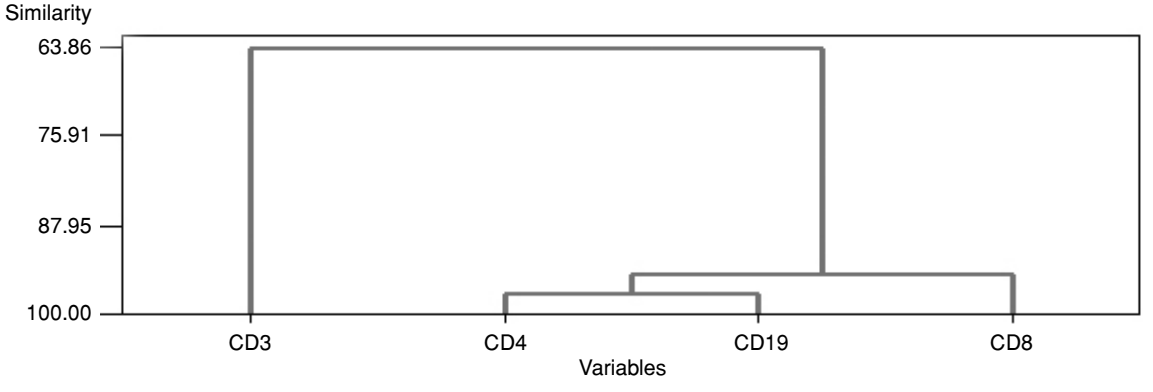

Figure 2: Statistical similarities between various types of clusters of differentiation (CD) (P<0.001).

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Correspondence:
Ihsan E. Al-Saimary,
Department of Microbiology,
College Medicine,
University Basrah, PO BOX 696 Ashar,
Basrah, IRAQ
e-mail: Ihsanalsaimary@yahoo.com