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Lmyphocytic subpopulations in the exacerbations of respiratory tract infections of patients with COPD

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Objective Peripheral blood T lymphocyte subpopulations of patients with chronic obstructive pulmonary disease (COPD) hospitalized at the 3rd clinic of Yedikule Thoracic Diseases Hospital with a clinical picture of respiratory tract infection were measured.

Method Measurements were performed by flow cytometric method. CD4, CD8, CD4/CD8 results were compared with values accepted to be normal by employing student-t test.

Results Ten of our cases (76.9%) possessed a CD4 percentage of over normal value. Median value was found to be 36.43. In 11 of our cases (84.6%) a CD8 percentage of over normal value was detected. Median value was 31.45. Ten of our cases (76.9%) had a CD4/CD8 value of over normal. Median value was 1.07.

CD4 levels and percentages of our patients with COPD were found to be significantly high at p= 0.039 level compared to normals. CD8 percentages, however were found to be significantly high at p=0.001 compared to normals, whereas CD4/CD8 ratio did not manifest any significance compared to normals.

Conclusion Our findings determined the increase in T cells following antigenic stimulus in exacerbation of respiratory tract infections in patients with COPD.

Key words Lymphocytic subpopulations, exacerbation, COPD.

Introduction

According to consensus reports published by American Thoracic Society (ATS) and European Respiratory Society (ERS) in 1995, COPD is a partially reversible disease associated with hyperreactivity of respiratory tract, and characterized by progressive airway obstruction which decreases maximum expiratory flow due to chronic bronchitis and emphysema (1,2).

Besides causing epithelial damage, bacterial and viral agents also allow inflammatory cells to migrate into airways; as a result, cytokins pretolytic enzymes and oxidants elaborated by these cells increase epithelial cell destruction (3,4,5). It is also noted that apart from this local immune response which increase tissue damage in COPD, there are also alterations in peripheral blood immunologic parameters (immunoglobulin and lymphoycte subgroups). Attempts were made, in this study, to establish the diagnosis and follow-up of these exacerbations by examining peripheral blood lymphocyte subgroups in acute attacks of COPD produced by infection.

Material and Method

In 13 male patients with COPD; with a mean age of 43.61, who were hospitalized at the Third Clinic of Yedikule Thoracic Diseases Hospital with a clinical picture of exacerbation of respiratory tract infections, CD4, CD8 and CD4/CD8 ratios, which were peripheral blood T lymphocyte subgroups, were measured by flow cytometric method. COPD diagnoses in all cases were compatible with ATS criteria, with no associated disease (Table I).

CD4, CD8 and CD4/CD8 results were compared with values accepted to be normal by employing student-t test.

Table I. Data of the patients

Cases	Ages	Cigarette smokers	Mucopurulent sputum	Leucocyte count	FEV_1%	FVC%	FVC	pH	PCO_2	PO_2
1	56	+	+	7800	64	78	72	7.38	48	65
2	45	+	+	6200	71	80	73	7.40	44	72
3	35	+	+	10.300	73	96	65	7.39	48	67
4	46	+	+	11000	56	75	63	7.37	52	63
5	38	+	+	9600	63	80	64	7.39	51	67
6	62	-	+	7400	45	72	52	7.35	63	65
7	30	+	+	12600	75	98	61	7.41	38	73
8	60	-	+	8500	48	85	4	7.36	58	60
9	25	+	+	9200	74	90	74	7.42	48	75
10	32	-	+	10600	65	87	65	7.38	51	67
11	47	-	+	7200	59	92	53	7.35	69	68

12	36	+	+	8400	68	76	77	7.38	52	72
13	55	-	+	6200	49	82	45	7.35	65	62

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Ten of our cases (76.9%) had a CD4 percentage of over normal value (p=0.039). In 11 of the patients, a CD8 percentage of over normal was established (p=0.001) 10, however (76.9%) possessed a CD4/CD8 value of above normal value yet did not show a significant difference (p>0.05). The results are given in Table II.

Table II. CD_4, CD_8 persentages.

Cases	CD4%	CD8%	CD4/CD8
1	55.2	16.90	3.27
2	41	21	2
3	55.1	16.85	3.27
4	13.76	50	0.27
5	39.21	29.65	1.32
6	28	30	0.93
7	21.46	55.33	0.39
8	35.43	29.45	1.20
9	41.87	45.34	0.92
10	36.43	31.45	1.15
11	35	42	0.83
12	42	39	1.07
13	36	45	0.8
Mean	37.04±11.58	34.77±12.44	1.34± 0.95

Discussion

It is very difficult to make a clinical evaluation related with the role played by infection in acute attacks of COPD. Despite acute infection exacerbation, signs such as fever and chills may not be observed. Laboratory findings such as increased sedimentation rate and leucocytosis may not develop. The increase in the amount of sputum and a change in its color from a white mucoid appearance to yellow or green are valuable findings for endobronchial infection (6). In most reports, acute attack in COPD was described as dyspnea and increased cough, and a change in the quantity and quality of sputum in a patient with COPD (2,7). However green-colored sputum may not always be a sign of infection and this appearance may not reflect infection. Therefore, further methods are required.

In the exfoliative cytologic examination of sputum in acute infection exacerbations in patients with COPD, increased neutrophils as well as decreased macrophages could be established. Increase in lymphocytes and bronchial epithelial desquamation was notted (8). In all cases included in our study, sputum with mucopurulent appearance was identified, and evaluated as acute attack due to infection with history, physical examination and blood gas findings.

In the recent studies, T lymphocyte and macrophage infiltration particularly in the bronchial mucosa of chronic bronchial cases were examined. Immunohistochemical measurements of bronchial biopsies, obtained from those with chronic bronchitis with low FEV_1 percentage, revealed an increase in the rates of T lymphocyte and macrophages (9). In another study, leucocyte common antigen ($CD4_5$), T lymphoycte (CD_3 + cells) were found to be increased in the epithelia and lamina propria of those with chronic bronchitis. Furthermore, IL-2 receptor + cells (CD_{25}+cells) and such increased lymphocytic activation markers as very late activation antigen (VLA-1) were detected (10). It was also reported that neutrophilic chemotactic factors such as IL-8 and leucotrien-B_4 (LT-B_4) were also increased (11,12). IL-8 is released from active monocytes and induces neutrophil and basophil chemotaxis. Similarly, macrophage activation leads to the metabolism of arachidonic acid with LT-B_4 release (13).

In a study carried out at the Veterinary Faculty of the University of California in USA, peripheral blood lymphocyte subpopulations of horses with COPD were examined, where it was observed that CD4 percentage was increased significantly, whereas CD4/CD8 ratio did not change (14). A study on smokers revealed that smokers with COPD had a higher CD4 percentage than non smokers, whereas non smokers with COPD had a higher CD4/CD8 ratio (15).

CD4 and CD8 percentages, in our cases, were significantly higher, similar to other studies. However CD4/CD8 ratio did not change significantly. The present study showed an increase in T cells following antigenic stimulus in infection exacerbations of airways in patients with COPD.

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