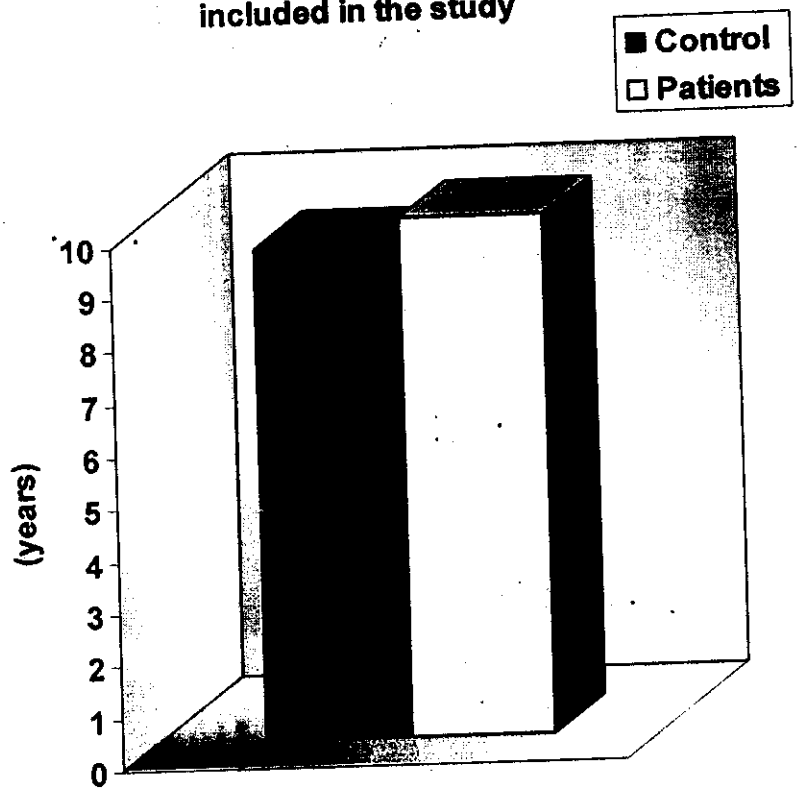
Results

The study encompassed 20 patients presenting by severe asthma, with mean age of 9.9±2.4; range 7-14 years and 10 controls with mean age of 9.4±2.8; range 6.5-14 years. There were 12 male patients and 8 females; and 7 of controls were males and the other 3 were males, (Table 1). There was a non-significant difference between patients and controls as regards age, (Fig. 1) or sex, (Fig. 2) presentation.

Table (1): Demographic data of study participants

	Control	Patients
Number	10	20
Age (years)	9.4±2.8	9.9±2.4
Sex; M:F	7:3	6:4

Fig. (1): Mean age of patients and controls included in the study



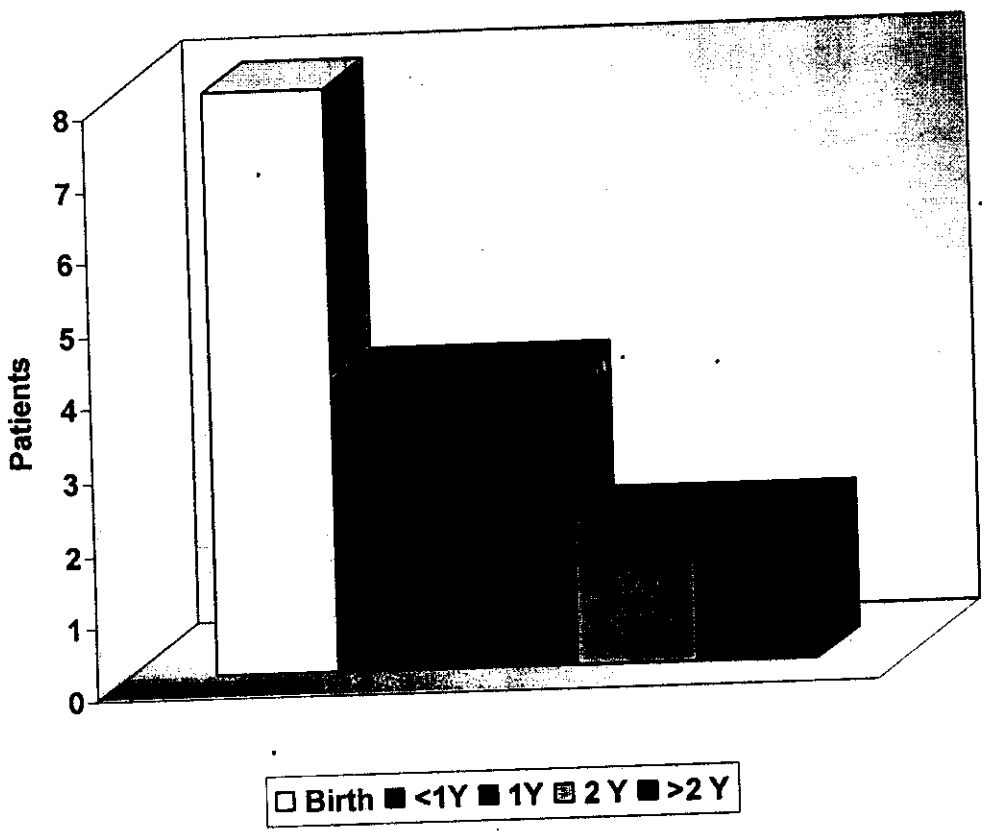
Age of onset of disease

In 8 patients (40%) disease was started to present since birth, in 4 patients (20%) disease started to symptomatize at age younger than one year, in other 4 patients at age of one year and in 2 patients at age of 2 years; while in the other 2 patients disease was presented at age of 4 years, (Table 2, Fig. 3).

Table (2): Patients' distribution according to age at onset of symptoms

Age at onset	Number	%
Birth	8	40
<1 year	4	20
1 year	4	20
2 year	2	10
>2 year	2	10

Fig. (3): Patients distribution according to age of onset of symptoms



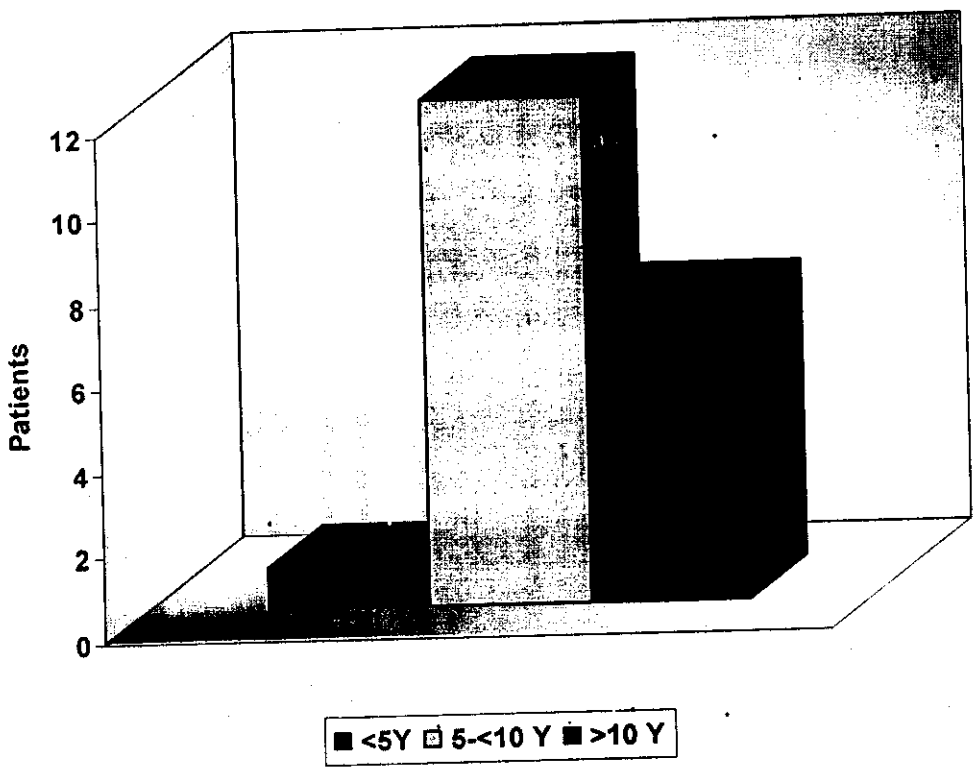
Duration of disease

Only one patient (5%) had disease duration of 3 years; while 12 patients (60%) had mean disease duration of 7.7±0.8; range: 6.3-9 years and the other 7 patients (35%) had diseased since a mean duration of 12.3±1.5; range: 10-14 years, (Table 3, Fig. 4).

Table (3): Patients' distribution according to duration of disease

Age at onset	Number (%)	Duration (years)
<5 years	1 (5%)	3
5-<10 years	12 (60%)	7.7±0.8
>10 years	7 (35%)	12.3±1.5

Fig. (4): Patients distribution according to duration of disease



Routine laboratory Investigations

- **Hemoglobin concentration**:

  There was a significant ($P<0.05$) decrease of hemoglobin concentration in patients (11.2±1.2; range: 9.2-13.8 gm) compared to control levels, (13±1; range: 11.5-14 gm), (Table 4, Fig. 5).

- **Erythrocyte sedimentation rate (ESR)**

  ESR of patients (12±3.7; range: 7-19mm) showed significant ($P<0.05$) increase compared to that reported in controls (8±2.06; range: 6-12mm), (Table 3, Fig. 4).

- **Total leucocytic count (TLC)**

  There was significant ($P<0.05$) increase of TLC in patients (7358±2100; range 3700-12,000 cell/cc) compared to count detected in controls, (5980±986; range 4500-7500 cell/cc), (Table 3, Fig. 4).

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Table (2): Results of routine laboratory investigations

Group / Parameter	Control (n=10)	Patients (n=20)
Hemoglobin concentration (gm)	13±1 (11.5-14)	11.2±1.2* (9.2-13.8)
ESR (mm)	8±2.06 (6-12)	12±3.7* (7-19)
TLC (cell/cc)	5980±986 (4500-7500)	7358±2100* (3700-12000)

*: significant versus control

Fig. (5): Mean hemoglobin concentration of patients compared to control levels

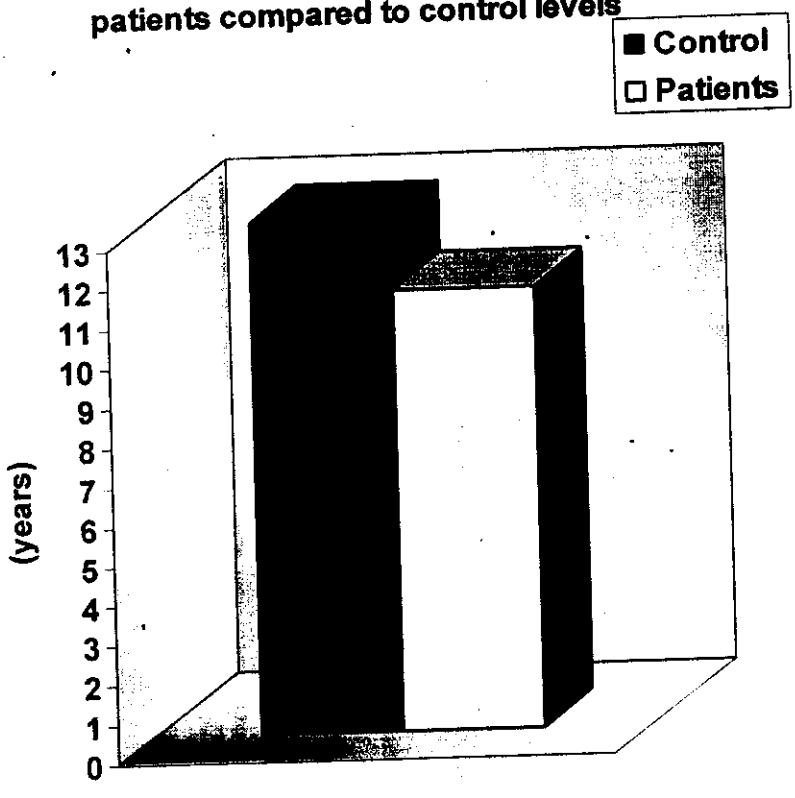


Fig. (6): Mean ESR in patients compared to control levels

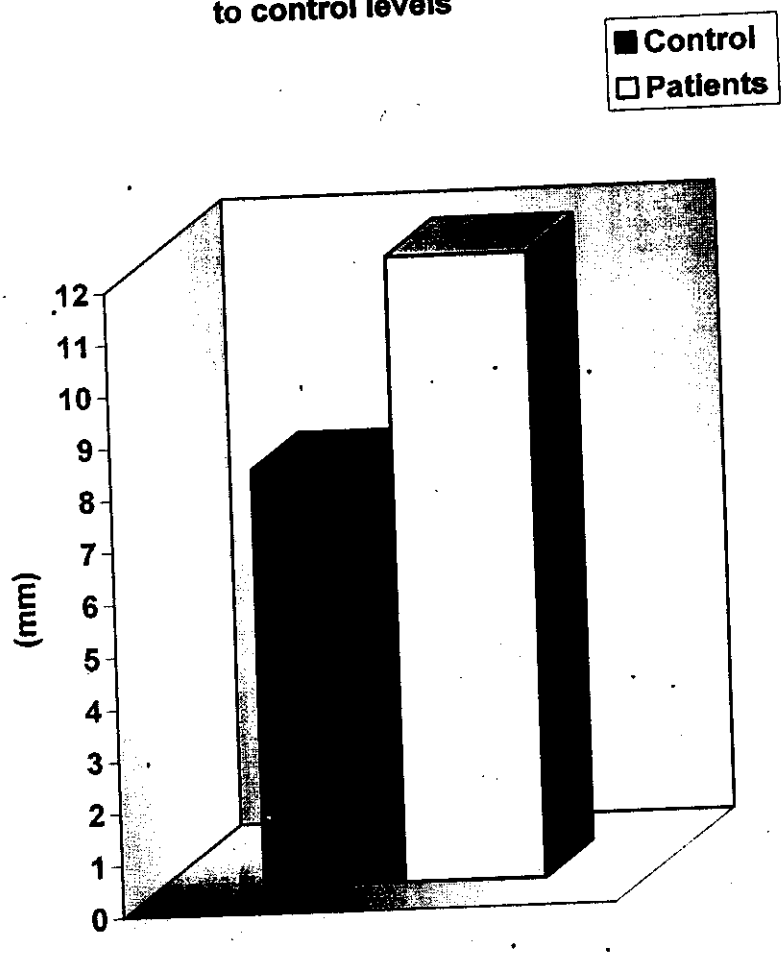
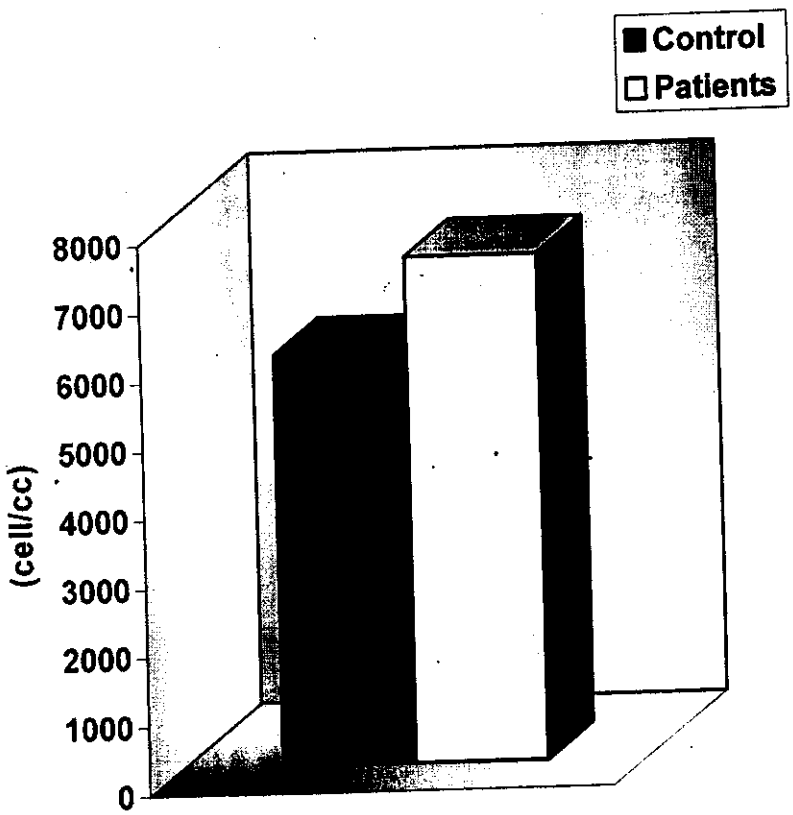


Fig. (7): Mean TLC in patients compared to control levels



Absolute Eisinophlic Count AEC

Detection of Antigen presenting cells (APC)

- **Number of patients according to frequency of ~~detection of APC cell/cc~~:**

  In control group; no APC could be detected in 4 controls (40%), one had frequency of APC of 50 cell/cc, and the other 5 controls had >50-<100 cell/cc. On contrary, in patients, 15 patients had APC in frequency of >100-500 cells/cc; while another 5 patients had >500 APC cells/cc. There was a significant increase of frequency of detection of APC in patients compared to controls, (X^2=9.15, P<0.001), (Table 5, Fig. 8).

- **Erythrocyte sedimentation rate (ESR)**

  ESR of patients (12±3.7; range: 7-19mm) showed significant (P<0.05) increase compared to that reported in controls (8±2.06; range: 6-12mm), (Table 3, Fig. 4).

Table (2): Results of routine laboratory investigations

		Control (n=10)	Patients (n=20)
Number of patients according to the frequency of detection of AEC cell/cc	0	4	0
	0-50	1	0
	>50-100	5	0
	>100-500	0	15
	>500	0	5
Mean±SD (range) (cell/cc)		53±42 (0-100)	367±203* (120-820)

*: significant versus control

Fig. (8): Patients' distribution according to number of APC cells detected inblood/cc

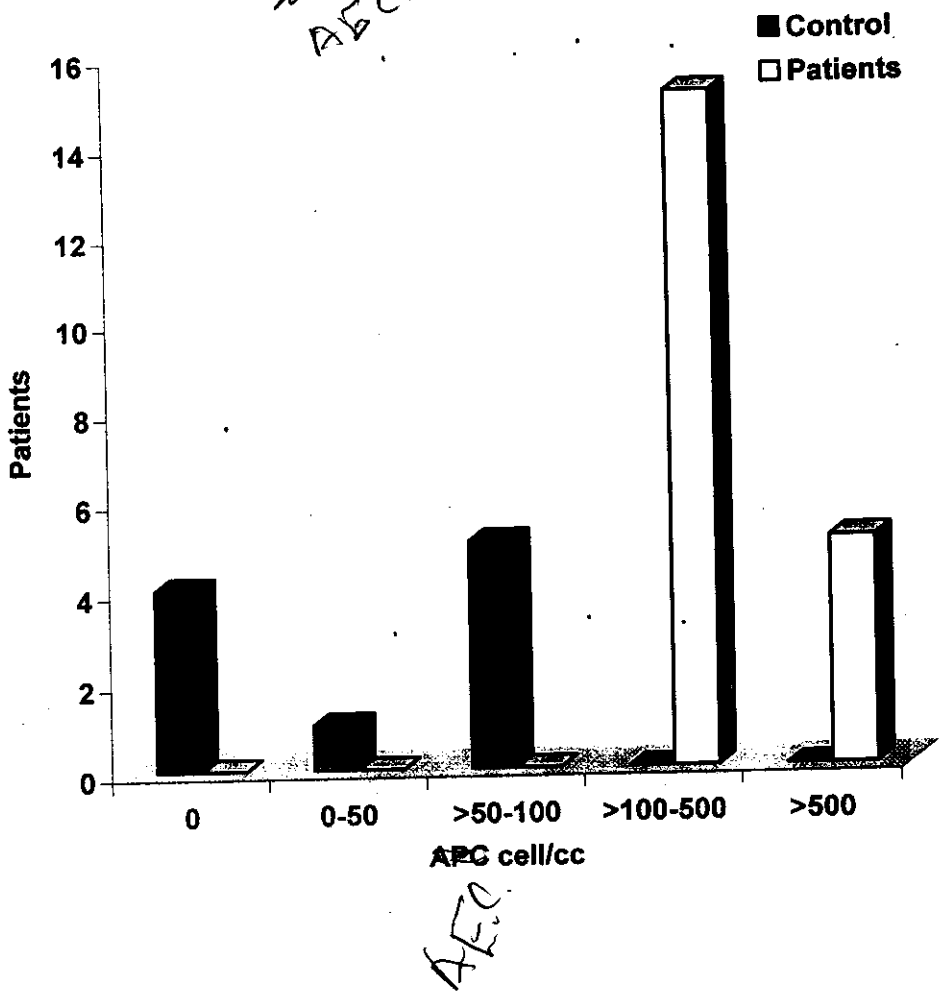
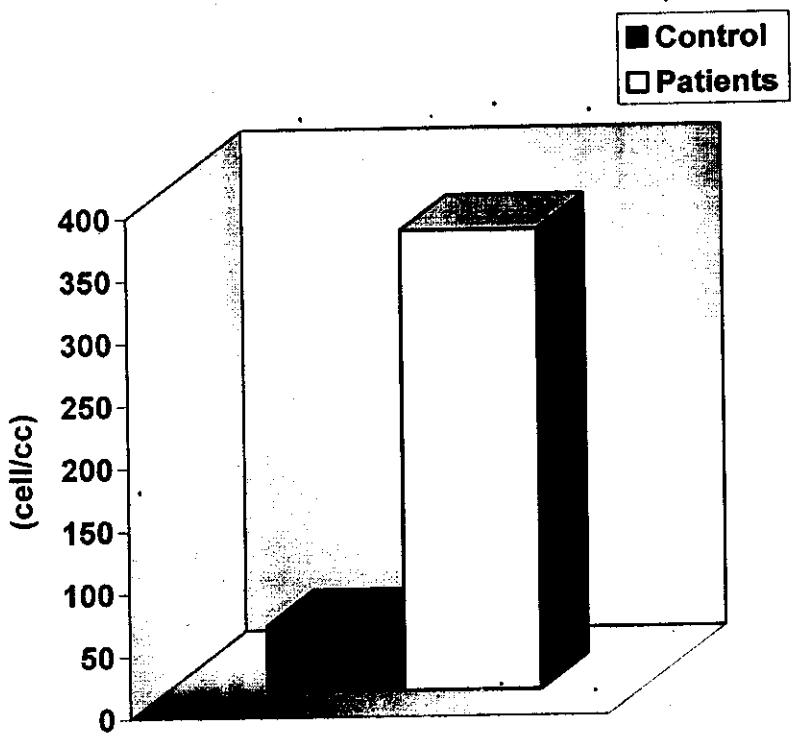


Fig. (9): Mean number of APC (cell/cc)detected in patients and controls included in the study



Results of Flow cytometry

Results obtained by flow cytometry were presented in table (5)

- **Percentage of CD4**:
  - The percentage of CD4 in pre-treatment samples (45.2±3; range: 39.8-50.2%) showed a non-significant (P>0.05) decrease compared to control levels, (46.8±3.1; range: 42-51.1%).
  - Furthermore, post-treatment samples showed a non-significant (P<0.05) decrease of percentage of CD4 (44.6±3.4; range: 39.7-51%) compared both to control and pre-treatment levels, (Fig. 10).
- **Percentage of T-helper cells**
  1. **T-helper (Th_0) cell**
     a. There was a significant (P<0.05) decrease of percentage of Th_0 in patients both pre-treatment sample (4.35±1.65; range: 1.9-6.6%) and post-treatment samples (5.02±1.26; range: 3-7.1%) compared to control levels, (6±1.1; range: 4.1-8%).
     b. There was a significant (P<0.05) decrease of the percentage of Th_0 in pre-treatment samples compared to post-treatment samples, (Fig. 11).
  2. **T-helper (Th_1) cell**
     a. There was a significant (P<0.05) decrease of percentage of Th_1 in patients both pre-treatment sample (12.53±2.9; range: 8.2-18.5%) and post-treatment samples (12.9±2.4; range: 9.3-17.7%) compared to control levels, (21.2±2.2; range: 17.9-25.2%).
     b. There was a non-significant (P>0.05) difference between percentage of Th_1 between pre-treatment and post-treatment samples, (Fig. 12).

3. **T-helper (Th_2) cell**
   a. There was a significant ($P<0.05$) increase of percentage of Th_2 in pre-treatment sample (20.4±2; range: 16.9-23.6%) compared to both control, (17.4±1.3; range: 15.9-20.2%) and post-treatment levels (17.9±2.17; range: 14.2-21.3%).
   b. There was a non-significant ($P>0.05$) difference between percentage of Th_2 cell in post-treatment samples compared to control samples, (Fig. 13).

- **The T1/T2 ratio**
  - There was a significant ($P<0.05$) decrease of Th_1/Th_2 in patients samples; pre-treatment (0.62±0.14; range: 0.39-0.81%) and post-treatment (0.73±0.13; range: 0.47-0.95%) compared to control levels, (1.21±0.05; range: 1.1-1.3%).
  - Moreover, there was a significant ($P<0.05$) increase of the Th_1/Th_2 ratio in post-treatment samples compared to pre-treatment samples, (Fig. 14).

Table (5): Results of Flow cytometry

Group / Parameter	Control (n=10)	Patients (n=20)	
		Before treatment	After treatment
CD4 (%)	46.8±3.1 (42-51.1)	45.2±3 (39.8-50.2)	44.6±3.4 (39.7-51)
Th_0 (%)	6±1.1 (4.1-8)	4.35±1.65* (1.9-6.6)	5.02±1.26*† (3-7.1)
Th_1 (%)	21.2±2.2 (17.9-25.2)	12.53±2.9* (8.2-18.5)	12.9±2.4* (9.3-17.7)
Th_2 (%)	17.4±1.3 (15.9-20.2)	20.4±2* (16.9-23.6)	17.9±2.17† (14.2-21.3)
Th_1/Th_2	1.21±0.05 (1.1-1.3)	0.62±0.14* (0.39-0.81)	0.73±0.13*† (0.47-0.95)

*: significant versus control
†: significant versus before treatment

Fig. (10): Mean percentages of CD4 cells as detected by flow Cytometry in patients (pre- & post-treatment) compared to control levels

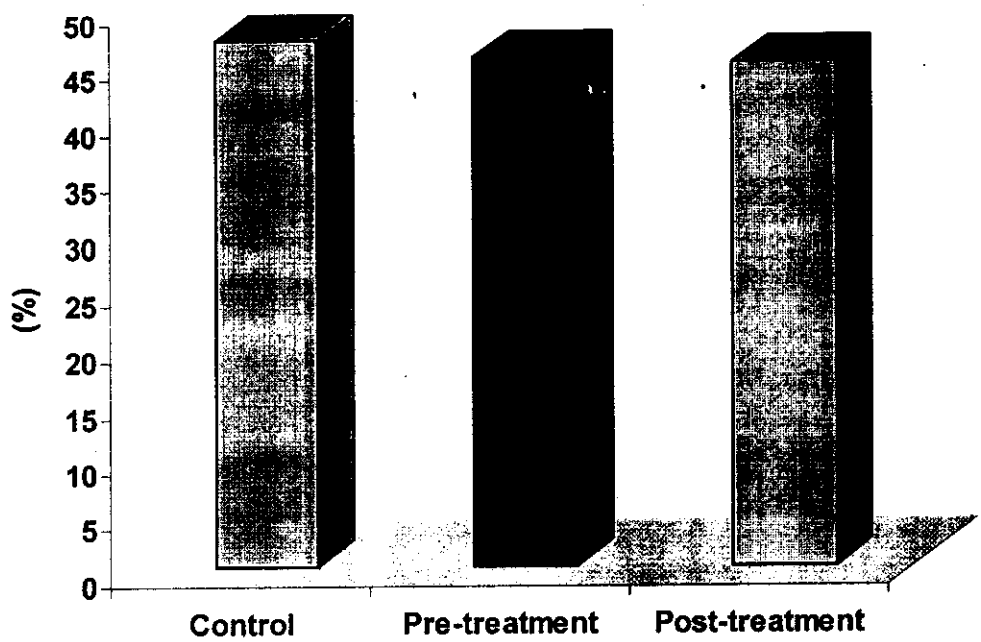


Fig. (11): Mean percentages of Th0 cells as detected by Flow Cytometry in patients (pre- & post-treatment) compared to control levels

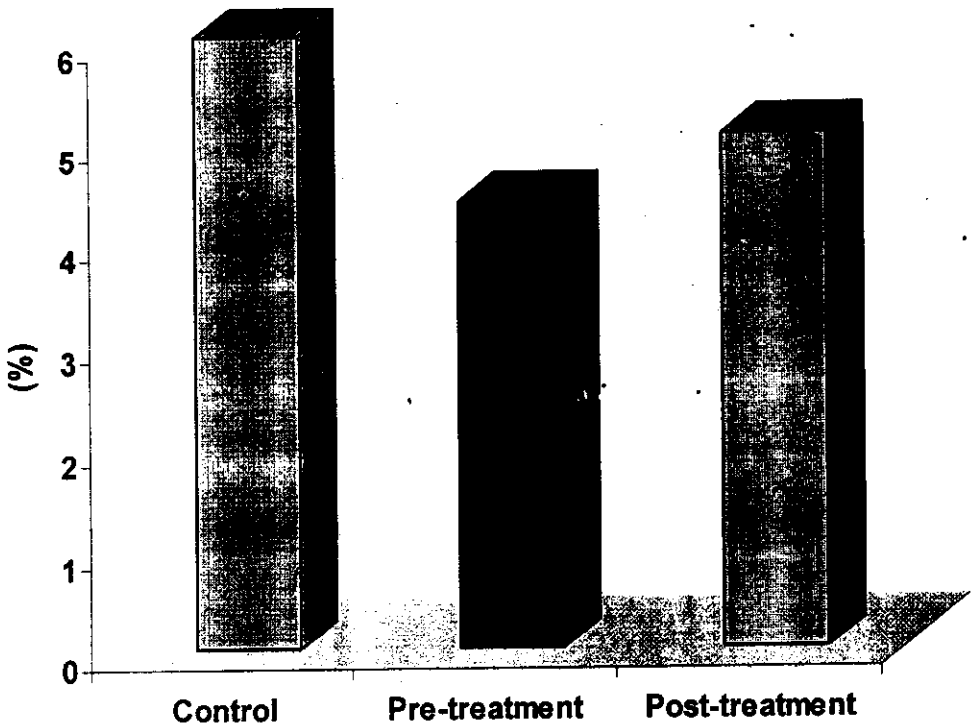


Fig. (12): Mean percentages of Th1 cells as detected by flowcytometry in patients (pre- & post-treatment) compared to control levels

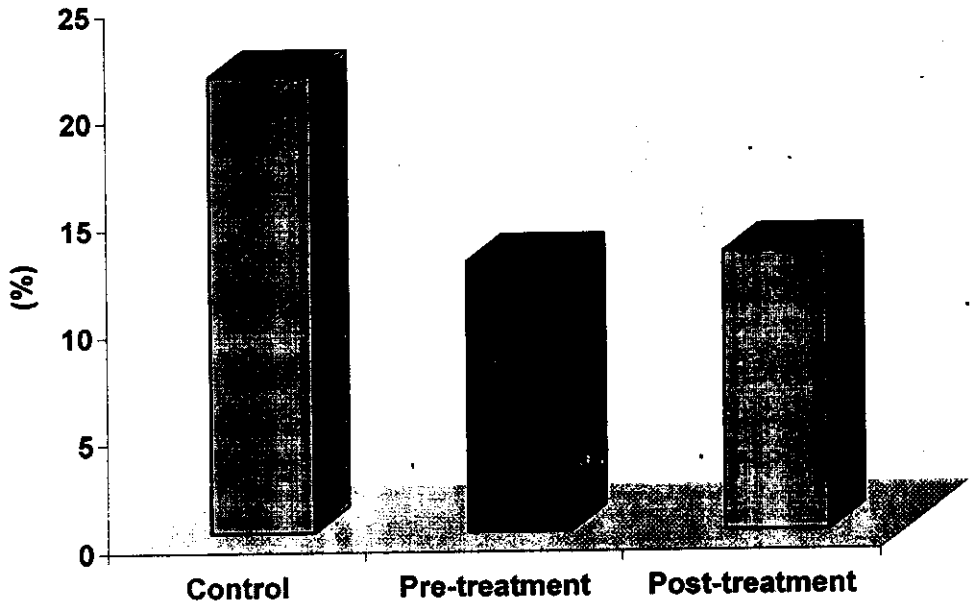


Fig. (13): Mean percentages of Th2 cells as detected by flowcytometry in patients (pre- & post-treatment) compared to control levels

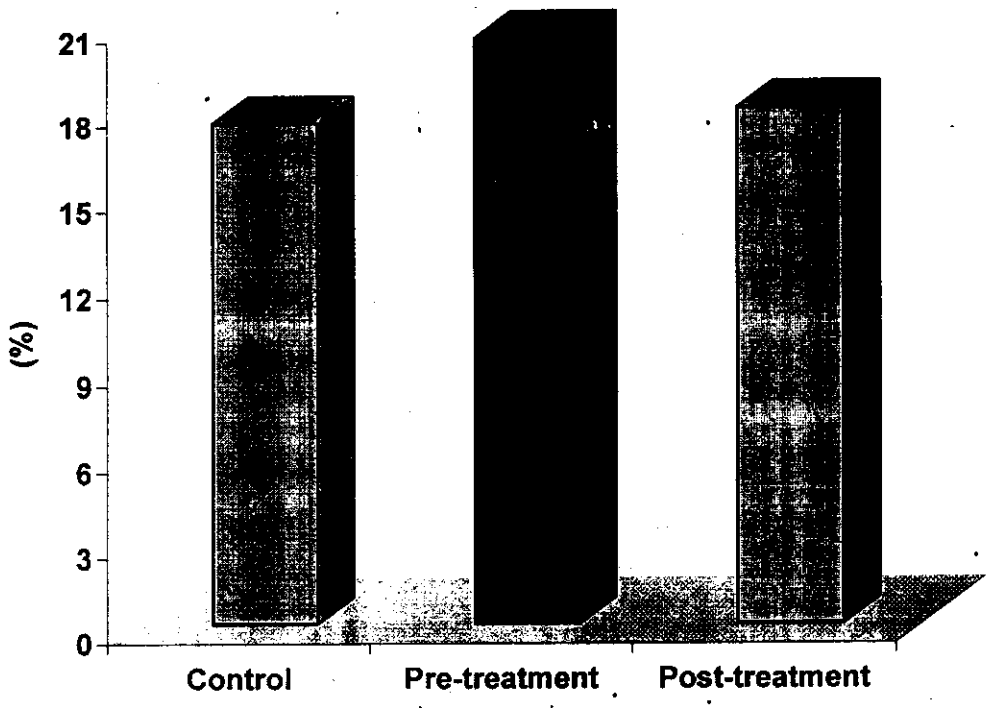


Fig. (14): Mean Th1/Th2 ratio as detected by flowcytometry in patients (pre- & post-treatment) compared to control levels