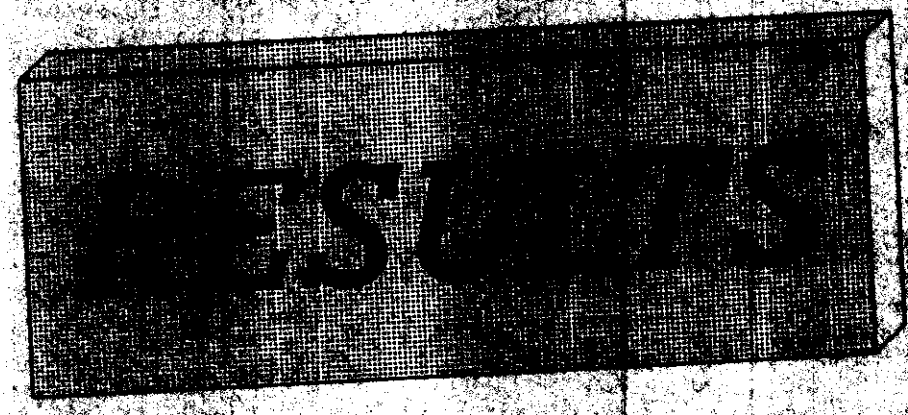
ESTOCKS

RESULTS

AGE AND SEX DISTRIBUTION OF CASES AND CONTROL SUBJECTS

Table (1): Age and Sex distribution of cases and control subjects at the time of the study.

Age in yreas	Asthmatic group		COPD group		Control group	
	M	F	M	F	M	F
1-10	1	1	0	0	0	0
11-20	2	4	0	0	0	6
21-30	3	6	0	1	7	3
31-40	9	7	3	2	3	0
41-50	3	6	8	8	1	0
51-60	4	2	13	7	0	0
> 60	2	0	8	0	0	0
	24	26	32	18	11	9
Total No	50		50		20	
Range	9-65		30-70		16-45	
X Mean	36.2		54.24		25.85	
S.D. ±	13.84		12.53		7 6.32	

STATISTICAL COMPARISON OF VENTILATORY FUNCTIONS BETWEEN DIFFERENT GROUPS:

Table (2): shows statistical comparison of ventilatory functions between asthmatic patients and the control subjects before and after bronchodilater administration.

The mean value of FVC% in asthmatic patients was 67.20±22.96 before bronchodilator and it became 82.34±22.41 after bronchodilator, the % change was 27.58±26.16. While in the control subjects it was 96.53±6.60 before bronchodilator and it became 96.82± 5.96 after bronchodilator, the % change was 0.57±6.65. So the difference between both groups as regards FVC% was statistically highly significant before and after bronchodilator and also as regards the % change "P<0.001".

The mean value of FEV_1% in asthmatic patients was 47.43±16.86 before bronchodilator and it became 67.14±20.50 after bronchodilator, the % change was 48.29±35.70. While in the control subjects it was 97:37±4.36 before bronchodilator and it became 99.81± 3.93 after bronchodilator, the % change was 2.53±1.82. So the difference between both groups as regards FEV_1% was statistically highly significant before and after bronchodilator and also as regards the % change "P < 0.001".

The mean value of FEV_1/FVC % in asthmatic patients was 71.64± 14.03 before bronchodilator and it became 81.53±12.55 after bronchodilator, the % change was 15.62±14.99. While in the control subjects it was 99.41± 4.31 before bronchodilater and it became 99.42± 4.03 after bronchodilator,

the % change was 0.03±1.84. So the difference between both groups as regards $FEV_1/FVC\%$ was statistically highly significant before and after bronchodilator and also as regards the % change "P < 0.001".

The mean value of $FEF_{25-75}\%$ in asthmatic patients was 25.13± 12.59 before bronchodilator and it became 38.97±18.34 after bronchodilator, the % change was 64.29±55.46. While in the control subjects it was 87.29±11.61 before bronchodilator and it became 87.21± 11.22 after bronchodilator, the% change was 0.18±6.15. So the difference between both groups as regards $FEF_{25-75}\%$ was statistically highly significant before and after bronchodilator and also as regards the % change P < 0.001.

Table (3) shows statistical comparison of ventilatory functions between patients with COPD and the control subjects before and after bronchodilator administration.

The mean value of Value of FVC% in patients with COPD was 52.34±16.75 before bronchodilator and it became 56.39±17.23 after bronchodilator, the % change was 8.35±6.07. While in control subjects it was 96.53±6.60 before bronchodilator and it became 96.82±5.96 after bronchodilator, the% change was 0.57±6.65. So the difference between both group as regards tthe FVC% was statistically highly significant before and after bronchodilator and as regards the % change "P<0.001".

The mean value of $FEV_1\%$ in patients with COPD was 36.40±15.74 before bronchodilator and it became 39.26±15.44 after bronchodilator, the % change was 9.27±5.78. While in control subjects it was 97.37±4.36

before bronchodilator and it became 99.81±3.93 after bronchodilator, the % change was 2.53±1.82. So the difference between both groups as regards the FEV1% was statistically highly significant before and after bronchodilator and also as regards the % change $P < 0.001$.

The mean value of $FEV_1/FVC\%$ in patients with COPD was 66.40± 14.07 before bronchodilator and it became 69.35±12.84 after bronchodilator, the % change was 8.82±44.27. While in the control subjects it was 99.41± 4.31 before bronchodilator and it became 99.42±4.03 after bronchodilator, the % change was 0.03±1.84. So the difference between both groups as regards $FEV_1/FVC\%$ was statistically highly significant before and after bronchodilator "P<0.001" but non significant as regards the % change "P>0.05".

The mean value of $FEF_{25-75}\%$ in patients with COPD was 15.73±8.35 before beonchodilator and it became 17.22±8.98 after bronchodilator, the% change was 11.71±30.92. While in control subjects it was 87.29±11.61 before bronchodilator and it became 87.21±11.22 after bronchodilator, the % change was 0.18±6.15. So the difference between both groups as refards $FEF_{25-75}\%$ was statistically highly significant before and after bronchodilator "P<0.001 " but statistically significant as regards the % change "P<0.05".

why to perform on normals?

Table (2) Statisitical comparison of ventilatory functions before and after bronchodilator administration between asthmatic patients and control subjects.

	No		FVC%			FEV1%			FEV1/FVC%			FEF25-57%		
			PR	PO	%ch	PR	PO	%ch	PR	PO	%ch	PR	PO	%ch
Asthmatic Patients	50	X̄	67.20	82.34	27.58	47.43	67.14	48.29	71.64	81.53	15.62	25.13	38.97	64.29
	-	S.D±	22.96	22.41	26.16	16.86	20.50	35.70	14.03	12.55	14.99	12.59	18.34	55.46
Control subjects	20	X̄	96.53	96.82	0.57	97.37	99.81	2.53	99.41	99.42	0.03	87.29	87.21	0.18
		S.D±	6.60	5.96	6.65	4.36	3.93	1.82	4.31	4.03	1.84	11.61	11.22	6.15
t-test			8.22	4.21	6.77	19.37	10.77	9.03	12.58	8.97	7.21	19.73	13.36	8.04
p			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Significance			H.S.	H.S.	H.S.	H.S.	H.S.	H.S.	H.S.	H.S.	H.S.	H.S.	H.S.	H.S.

PR= Pre bronchodilator , PO = Post bronchodilator % Ch = % Change

Why ?

Table (3) Statistical comparison of ventilatory functions before and after bronchodilator administration between patients with COPD and control subjects.

	No		FVC%			FEV1%			FEV1/FVC%			FEF250-75%		
			PR	PO	%ch	PR	PO	%ch	PR	PO	%ch	PR	PO	%ch
Patients withCOPD	50	X	52.34	56.39	8.35	36.40	39.26	9.27	66.40	69.35	8.82	15.73	17.22	11.71
		S.D±	16.75	17.23	6.07	15.74	15.44	5.78	14.07	12.84	44.27	8.35	8.98	30.92
control subjects	20	X	96.53	96.82	0.57	97.37	99.81	2.53	99.41	99.42	0.03	87.29	87.21	0.18
		S.D±	6.60	5.96	6.65	4.36	3.93	1.82	4.31	4.03	1.84	11.61	11.22	6.15
t-test			15.82	14.55	4.52	25.07	25.70	7.36	14.91	14.82	1.40	25.06	24.87	2.51
p			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	>0.05	<0.001	<0.001	<0.05
significance			H.S	H.S.	H.S.	H.S.	H.S.	H.S.	H.S.	H.S.	N.S.	H.S.	H.S.	S

PR = Pre bronchodilator PO = Post bronchodilator % Ch= % Change

STATISTICAL COMPARISON OF SERUM CALCIUM (TOTAL, PROTEIN-BOUND AND IONIZED) AND SERUM PHOSPHORUS BETWEEN DIFFERENT GROUPS:

Table (4) shows statistical comparison of serum calcium (total, protein-bound and ionized) and serum phosphorus between asthmatic patients and the control subjects. There was a highly significant reduction in the mean concentration of serum calcium in asthmatic patients ($\bar{X}$ 7.64±1.22 for total, $\bar{X}$ 3.50±0.89 for protein-bound and $\bar{X}$ 4.13±0.59 for ionized calcium) compared with the normal control subjects ($\bar{X}$ 9.67±0.43 for total, $\bar{X}$ 4.51± 0.59 for protein-bound and $\bar{X}$ 5.16±0.38 for ionized calcium) "$p < 0.001$". As regards the serum phosphorus there was non significant reduction in the mean value ($\bar{X}$ 4.16±0.99) compared with the normal control subjects ($\bar{X}$ 4.36± 0.35) "$p > 0.05$".

Table (5) shows statistical comparison of serum calcium (total, protein-bound and ionized) and serum phosphorus between patients with COPD and the control subjects. There was a highly significant reduction in the mean concentration of the serum calcium ($\bar{X}$ 7.21 ± 1.08 for total, $\bar{X}$ 3.09 ± 0.61 for protein-bound and $\bar{X}$ 4.12 ± 0.63 for ionized) compared with the normal control subjects ($\bar{X}$ 9.67 ± 0.43 for total, $\bar{X}$ 4.51 ± 0.59 for protein-bound and $\bar{X}$ 5.16 ± 0.38 for ionized) "$p<0.001$". As regards the serum phosphorus there was non significant difference in the mean concentration of serum phosphorus ($\bar{X}$ 4.45 ± 1.0) in pateints with COPD compared with the normal control subjects (X 4.36 ± 0.35) "$p > 0.05$".

Table (6) shows statistical comparison of serum calcium (total, protein-bound and ionized) and serum phosphorus between asthmatic patients and patients with COPD. The difference was statistically non significant.

Table (7) shows statistical comparison of serum calcium (total, protein-bound and ionized) and serum phosphorus between asthmatic patients on non steroid therapy and asthmatic patients on stroid therapy. There was non significant difference in the mean concentrations ($\bar{X}$ 7.68 ± 1.09 for total, $\bar{X}$3.60 ± 0.81 for protein-bound and $\bar{X}$ 4.08 ± 0.59 for ionzied calcium and $\bar{X}$ 4.18 ± 0.94 for serum phosphorus) in asthmatic patients on non steroid therapy compared with the asthmatic patients on steroid therapy ($\bar{X}$ 7.50 ± 1.58 for total, $\bar{X}$ 3.23±1.09 for protein-bound and $\bar{X}$ 4.27 ± 0.59 for ionized and $\bar{X}$ 4.13 ± 1.17 for serum phosphorus) "p > 0.05".

Table (8) shows statistical comparison of serum calcium (total, protein-bound and ionzied) and serum phosphorus between extrinsic and intrinsic asthmatic patients. There was non significant difference in the mean concentrations ($\bar{X}$ 7.43 ± 0.97 for total, $\bar{X}$ 3.31 ± 0.76 for protein-bound and $\bar{X}$ 4.12 ± 0.43 for ionized calcium and $\bar{X}$ 4.28 ± 1.03 for serum phosphorus) in extrinsic asthmatic patients compared with the entrinsic asthmatic patients ($\bar{X}$ 7.77±1.36 for total, $\bar{X}$ 3.63 ± 0.96 for protein-bound and $\bar{X}$ 4.14 ± 0.68 for ionized calcium and $\bar{X}$ 4.09 ± 0.07 for serum phosphorus) "p>0.05".

Table (9) shows statistical comparison of serum calcium (total, protein-bound and ionized) and serum phosphorus between patients with COPD not on steroid therapy and patients with COPD on steroid therapy. There was a significant reduction in serum calcium in the steroid-treated group ($\bar{X}$ 6.36 ± 0.62 for total and $\bar{X}$ 3.62 ± 0.23 for ionized calcium) compared with non

steroid-treated group ($\bar{X}$ 7.35 ± 1.08 for total and $\bar{X}$ 4.20 ± 0.64 for ionized calcium) "p < 0.001. As regards the serum phosphorus, there was non significant difference between both groups " p > 0.05".

Table (10) shows statistical comparison of serum calcium (total, protein-bound and ionized) and serum phosphorus among asthmatic patients in relation to sex. The difference was statistically non significant "p > 0.05".
Table (11) shows statistical comparison of serum calcium (total, protein-bound and ionized) and serum phosphorus among patients with COPD in relation to sex. The difference was statistically non significant "p > 0.05".

Table (4): Statistical comparison of serum calcium (total, protein-bound and ionized) and serum phosphorus between asthmatic patients and the control subjects.

	No		Serum Calcium			Serum Phosph.
			Total	Protein-bound	Ionized	
Asthmatic patients	50	X`	7.64	3.50	4.13	4.16
		S.D ±	1.22	0.89	0.59	0.99
control Subjects	20	X`	9.67	4.51	5.16	4.36
		S.D±	0.43	0.59	0.38	0.35
t-test			10.20	5.47	8.58	1.21
p			< 0.001	< 0.001	< 0.001	> 0.05
Sig.			H.S.	H.S.	H.S.	NS

Table (5) Statistical comparison of serum calcium (total, protein-bound and ionized) and serum phosphorus between patients with COPD and the control subjects.

	No		Serum Clacium			Serum phosph.
			Total	Protein-bound	Ionized	
Patients with COPD	50	X` S.D ±	7.21 1.08	3.09 0.61	4.12 0.63	4.45 1.00
Control subjects	20	X` S.D ±	9.67 0.43	4.51 0.59	5.16 0.38	4.36 0.35
t-test			13.51	8.91	8.39	0.55
p			< 0.001	< 0.001	< 0.001	> 0.05
sig.			H.S.	H.S.	H.S.	N.S.

Table (6) statistical comporison of serum calcium (total, protein-bound and ionized) and serum phosphorus between asthmatic patients and patients with COPD.

	No		Serum Calcium			Serum phosph
			Total	Protein-bound	Ionzied	
Asthmatic patients	50	X` S.D ±	7.64 1.22	3.50 0.89	4.13 0.59	4.16 0.99
Patients with COPD	50	X` S.D ±	7.21 1.08	3.09 0.61	4.12 0.63	4.45 1.00
t - test			1.83	2.68	0.08	1.43
p			>	>	>	>
Sig.			N.S.	N.S.	N.S.	N.S.

Table (7) Statistical comparison of serum calcium (total protein-bound, and ionized) and serum phosphorus between asthmatic patients on non steroid therapy and asthmatic patients on steroid therary.

	No		Serum Calcium			Serum phosph.
			Total	Protein-bound	Ionzied	
Asthmatic patients on non steroid therapy	37	X` S.D ±	7.68 1.09	3.60 0.81	4.08 0.59	4.18 0.94
Asthmatic Patients on steroid therapy	13	X` S.D ±	7.50 1.58	3.23 1.09	4.27 0.59	4.13 1.17
t - test			0.38	1.09	0.94	0.13
p			>	>	>	>
Significance			N .S.	N. .S	N. S.	N .S.

Table (8) Statistical comparison of serum calcium (total, protein-bound and ionized) and serum phosphorus between extrinsic and intrinsic asthmatic patients.

	No		Serum Calcium			Serum phosph.
			Total	protein-bound	Ionized	
Extrinsic asthmatic patients	20	X` S.D ±	7.43 0.97	3.31 0.76	4.12 0.43	4.28 1.03
Intrinsic asthmatic patients	30	X` S.D ±	7.77 1.36	3.63 0.96	4.14 0.68	4.09 0.97
t-test			1.02	1.29	0.11	0.66
p			>	>	>	>
Signif.			NS	NS	NS	NS

Table (9): Statistical comparison of serum calcium (total, protein-bound and ionized) and serum phosphorus between pateints with COPD not on steroid therapy and patients with COPD on steroid therapy.

	No		Serum Calcium			Serum phosph.
			Total	Protein-bound	Ionized	
patients with COPD not on steroid therapy	43	X` S.D ±	7.35 1.08	3.15 0.60	4.20 0.64	4.45 1.02
patients with COPD on steroid therapy	7	X` S.D ±	6.36 0.62	2.73 0.59	3.62 0.23	4.48 0.95
t-test			3.45	1.71	4.44	0.07
p			< 0.01	>	< 0.001	>
Significance			S	N.S.	H.S.	N.S.

Table (10) Statistical comparison of serum calcium (total, protein-bound and ionized) and serum phosphorus among asthmatic pateints in relation to sex.

	No		Serum Calcium			Serum posph.
			Total	Protein-bound	Ionized	
Female Asthmatic patients	26	X` S.D ±	7.44 1.14	3.39 0.85	4.04 0.59	4.17 0.94
Male Asthmatic patients	24	X` S.D ±	7.85 1.29	3.62 0.94	4.23 0.59	4.16 1.07
t-test			1.19	0.91	1.08	0.03
p			>	>	>	>
Significance			NS	NS	NS	NS

Table (11) Statistical comparison of serum calcium (total, protein-bound and ionized) and phosphorus among patients with COPD in relation to sex.

	No		Serum Calcium			Serum phosph.
			Total	Protein-bound	Ionized	
Female patients with COPD	18	X` S.D ±	7.31 1.06	3.03 0.46	4.27 0.73	4.37 0.99
Male patients with COPD	32	X` S.D ±	7.16 1.10	3.12 0.69	4.04 0.55	4.5 1.02
t-test			0.46	0.53	1.17	0.41
p			>	>	>	>
Significance			N.S.	N.S.	N.S.	N.S.

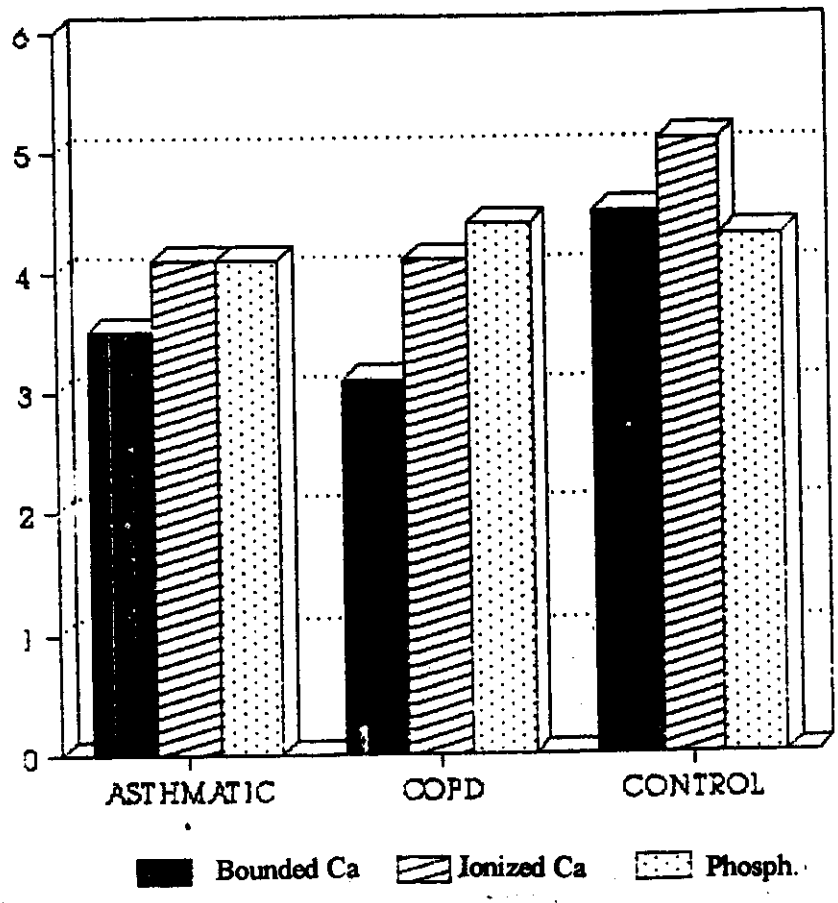

Fig. (1):

Comparative histogram of serum calcium and phosphorus among different groups.

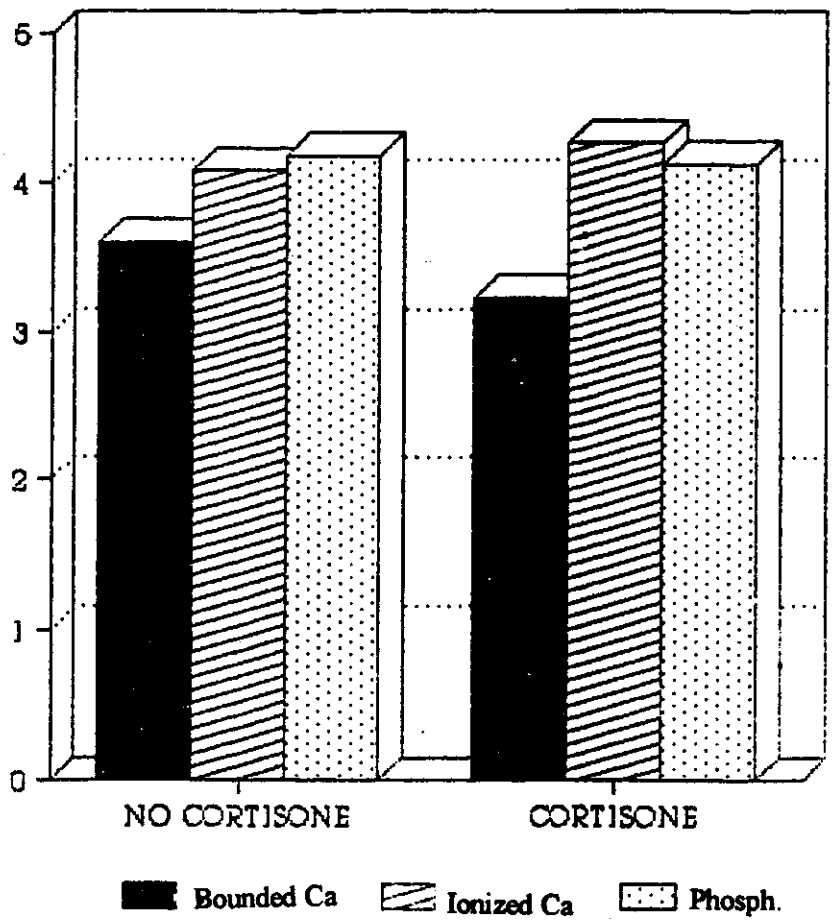

Fig. (2) :

Comparative histogram of serum calcium and phosphorus in asthmatics with and without cortisone therapy

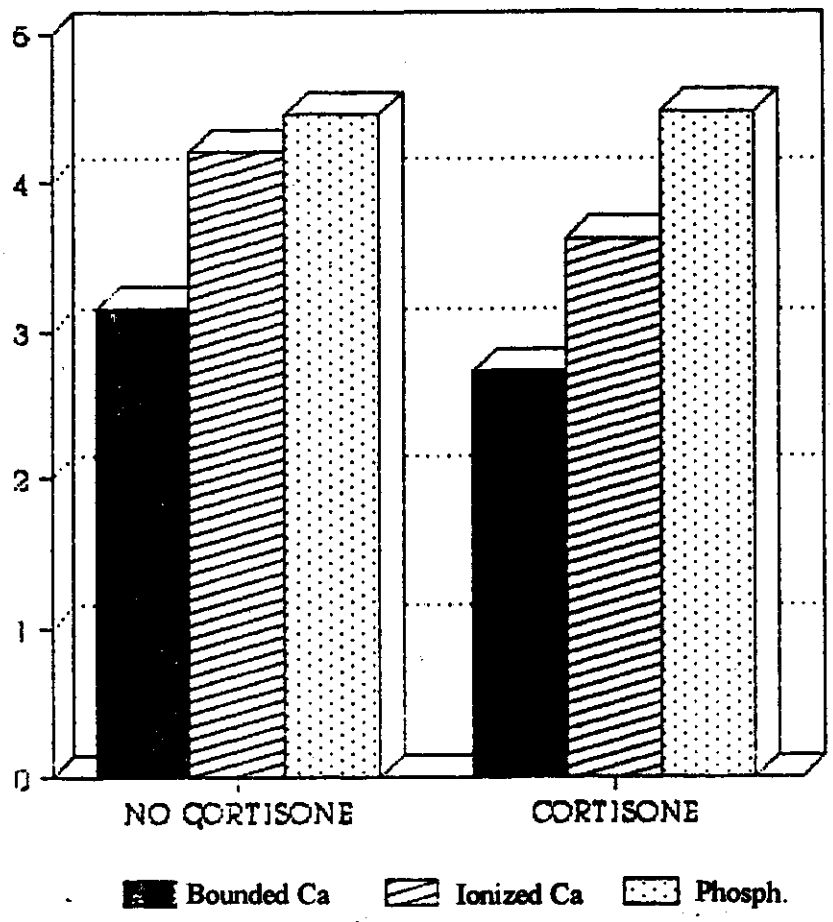

Fig. (3):

Comparative histogram of serum calcium and phosphorus in patients with COPD with and without cortisone therapy

Tables (12,13,14) show statistical correlation between serum calcium (total, protein-bound and ionized) and ventilatory functions before bronchodilator administration among asthmatic pateints. There was no significant positive or negative correlation "P > 0.05"

Table (15) shows statistical correlation between serum phosphorus and ventilatory functions before bronchodilator administration among asthmatic patients. There was no significant positive or negative correlation. "p > 0.05".

Tables (16,17,18) show statistical correlation between serum calcium (total-bound and ionized) and ventilatory functions before bronchodlator administration among pateints with COPD. There was no significant positive or negative correlation " P > 0.05".

Table (19) shows statistical correlation between serum phosphorus and ventilatory functions before bronchodilator administration among patients with COPD. There was no significant positive or negative correlation "p > 0.05".

Table (12): Statistical correlation between total calcium and ventilatory functions before bronchodilator administration among asthmatic patients.

Variables	(r)	P	significance
Total calcium and FVC%	- .014	> 0.05	NS
Total calcium and FEV_1%	- 0.073	> 0.05	NS
Total calcium and FEV_1 / FVC%	- .166	> 0.05	NS
Total calcium and $FEF_{25-75\%}$	- .094	> 0.05	NS

N=50 Critical value = + /-.278

Table (13) Statistical correlation between protein-bound calcium and ventilatory functions before bronchodilator administration among asthmatic patients.

Variables	(r)	P	significance
Protein-bound calcium and FVC%	.022	>0.05	NS
Protein-bound calcium and FEV_1%	.015	> 0.05	NS
Protein-bound calcium and FEV_1/ FVC%	- .028	> 0.05	NS
Protein-bound calcium and $FEF_{25-75\%}$	.024	> 0.05	NS

N = 50 Critical value = +/ - .278.

Table (14) Statistical correlation between ionized calcium and ventilatory functions before bronchodilator administration among asthmatic patients.

Variables	(r)	P	significance
Ionized calcium and FVC%	-.063	> 0.05	NS
Ionized calcium and FEV_1%	-.175	> 0.05	NS
Ionized calcium and FEV_1/ FVC%	- .261	> 0.05	NS
Ionized calcium and $FEF_{25-75\%}$	- .233	> 0.05	NS

N = 50 Critical value = +/--278.

Table (15) Statistical correlation between serum phosphorus and ventilatory functions before bronchodilator administration among asthmatic patients.

Variables	(r)	P	Significance
Serum Phosphorus and FVC%	.112	> 0.05	NS
Serum Phosphorus and FEV_1%	.161	> 0.05	NS
Serum Phosphrous and FEV_1/ FVC%	.150	> 0.05	NS
Serum Phosphrous and $FEF_{25-75\%}$	.025	> 0.05	NS

N = 50 Critical value = +/-.278.

Table (16) Statistical correlation between serum total calcium and ventilatory functions before bronchodilator administration among patients with COPD.

Variables	(r)	P	Significance
Total calcium and FVC%	-.036	> 0.05	NS
Total calcium and FEV_1%	.088	> 0.05	NS
Total calcium and FEV_1/ FVC%	.099	> 0.05	NS
Total calcium and $FEF_{25-75\%}$	.046	> 0.05	NS

N = 50 Critical value = +/-.278.

Table (17) Statistical correlation between serum protein-bound calcium and ventilatory functions before bronchodilator administration among patients with COPD.

Variables	(r)	P	significance
Protein-bound calcium and FVC%	-.26	> 0.05	NS
Protein-bound calcium and FEV_1%	.028	> 0.05	NS
Protein-bound calcium and FEV_1/ FVC%	- .017	> 0.05	NS
Protein-bound calcium and $FEF_{25-75\%}$	- .079	> 0.05	NS

N = 50 Critical value = +/-.278.