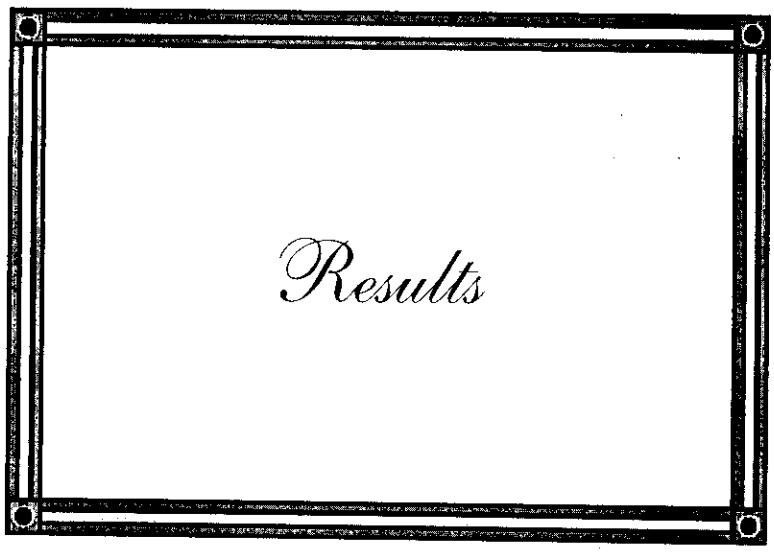
Results

RESULTS

Results of the present study are summarized in tables (7-19) and figures (2-12).

Figure (2) shows the distribution of bronchogenic carcinoma cases according to sex. In the present study, it was found that 13.3% of cases were females while 86.7% were males.

Figure (3) shows the distribution of benign chest diseases according to diagnosis. In the present study, it was found that COPD represented 50% of studied benign chest diseases cases while TB represented 50% of studied caes.

Figure (4) shows the distribution of bronchogenic carcinoma cases according to histopathological diagnosis. In the present study, the SCLC subtype represented 23.3% of cases, while NSCLC subtype represented 76.7% of cases.

Figure (5) shows the distribution of non-small cell lung cancer cases according to histopathology. It was found that, the squamous cell carcinoma subtype represented 47.8% of NSCLC cases, while adenocarcinoma subtype represented 43.5% of cases and large cell carcinoma represented 8.7% of cases.

Figure (6) shows the distribution of bronchogenic carcinoma cases according to clinical stage. It was found that, stage II represented 40.0% of bronchogenic carcinoma cases, while stage III represented 36.7% of cases and stage IV represented 23.3% of cases.

The mean ±S.D. of serum CYFRA 21-1 and CEA in reference, benign and cancer groups are shown in table (7) and figure (7), (8). The mean ±S.D. of serum CYFRA 21-1 in reference group was 0.2±0.3ng/ml. The range was 0.1-1ng/ml. The mean ±S.D. of serum CEA in reference group was 1.5±0.7ng/ml. The range was 0.2-3ng/ml. The mean ±S.D. of serum CYFRA 21-1 in benign chest disease group was 0.8±1.3ng/ml. The range was 0.1-5.6ng/ml. The mean ±S.D. of serum CEA in benign chest disease group was 2.8±1.9ng/ml. the range was 0-5.6ng/ml. The mean ±S.D. of serum CYFRA 21-1 in lung cancer group was 27.1±33.6ng/ml. the range was 0.1-140ng/ml. the mean ±S.D. of serum CEA in lung cancer group was 21.9±30.1ng/ml. the range was 0-121.1ng/ml.

In benign chest diseases group, the mean ±S.D. of serum CYFRA 21-1 in COPD group was 1.3±1.6ng/ml. The range was

0.1-5.6ng/ml. The mean ±S.D. of serum CEA in COPD group was 3.2±1.8ng/ml. The range was 0-5.4ng/ml.

The mean ±S.D. of serum CYFRA 21-1 in TB group was 0.3±0.2ng/ml. The range was 0.1-0.8ng/ml. The mean ±S.D. of serum CEA in TB group was 2.3±1.9ng/ml. The range was 0.4-5.6ng/ml.

When patients were segregated according to histopathological classification into small and non-small cell lung cancer it was found that:

In patients with small cell lung cancer the mean±S.D. of serum CYFRA 21-1 was 1.3±0.8ng./ml. The range was 0.8-3ng/ml. The mean ±S.D. of serum CEA was 6.2±5.0ng/ml. The range was 1.4-14.1ng/ml.

In patients with non-small cell lung cancer the mean±S.D. of serum CYFRA 21-1 was 34.9±34.9ng./ml. The range was 0.1-140.0ng/ml. The mean ±S.D. of serum CEA was 26.7±32.9ng/ml. The range was 0-121.1ng/ml.

When patients with non-small cell lung cancer were segregated according to histopathological diagnosis it was found that :

- In patients with squamous cell carcinoma the mean±S.D. of serum CYFRA 21-1 was 62.7±31.0ng./ml. The range was 27.3-140ng/ml. The mean ±S.D. of serum CEA was 34.7±28.8ng/ml. The range was 2.2-92.0ng/ml. this group showed the highest mean values of both CYFRA 21-1 and CEA.

- In patients with adenocarcinoma the mean±S.D. of serum CYFRA 21-1 was 11.1±8.5ng./ml. The range was 0.1-25.6ng/ml. The mean ±S.D. of serum CEA was 23.2±38.6ng/ml. The range was 0.8-121.1ng/ml.

- The present study included 2 cases with large cell lung cancer. Their serum levels of CYFRA 21-1 were 0.2ng/ml and 2.3ng/ml (mean±S.D. 1.3±1.5ng/ml), while serum levels of CEA were 0.0ng/ml and 2.0ng/ml (mean±S.D. 1.0±1.4ng/ml).

When patients with lung cancer were segregated according to stages it was found that :

- In patients with stage II the mean±S.D. of serum CYFRA 21-1 was 15.5±27.3ng./ml. The range was 0.2-92.5ng/ml. The

mean ±S.D. of serum CEA was 11.3±25.8ng/ml. The range was 0-92.0ng/ml.

- In patients with stage III the mean±S.D. of serum CYFRA 21-1 was 28.5±41.6ng./ml. The range was 0.1-140ng/ml. The mean ±S.D. of serum CEA was 27.2±39.4ng/ml. The range was 1.2-121.1ng/ml.

- In patients with stage IV the mean±S.D. of serum CYFRA 21-1 was 44.6±23.9ng./ml. The range was 3.0-74.4ng/ml. The mean ±S.D. of serum CEA was 31.8±13.6ng/ml. The range was 2.9-44.2ng/ml. stage IV patients showed the highest mean values of serum CYFRA 21-1 and CEA.

Table (8) shows the statistical difference of CYFRA 21-1 and CEA between benign chest disease and control group. There was no significant difference in serum CYFRA 21-1 and serum CEA between benign chest disease and control group, at ($P>0.05$).

Table (9) shows the statistical difference of CYFRA 21-1 and CEA between bronchogenic carcinoma and control group.

There was a significant increase in serum CYFRA 21-1 and serum CEA in bronchogenic carcinoma than in control group (at $P<0.05$).

Table (10) shows the statistical difference of CYFRA 21-1 and CEA between bronchogenic carcinoma and benign chest disease. There was a significant increase in serum CYFRA 21-1 and serum CEA in bronchogenic carcinoma than in benign chest disease (at $P <0.05$).

Table (11) shows the statistical difference of CYFRA 21-1 and CEA between COPD and TB. There was no significant difference in serum CYFRA 21-1 and serum CEA between COPD and TB (at $P >0.05$).

Table (12) shows the statistical difference of CYFRA 21-1 and CEA between small cell lung cancer and non-small cell lung cancer. There was a significant increase in serum CYFRA 21-1 and serum CEA in non-small cell lung cancer than in small cell lung cancer (at $P <0.05$).

Table (13) shows the statistical difference of CYFRA 21-1 and CEA between squamous cell carcinoma and adenocarcinoma. There was a significant increase in serum CYFRA 21-1 in squamous cell carcinoma than in adenocarcinoma (at $P < 0.05$). There was no significant difference in serum CEA between squamous cell carcinoma and adenocarcinoma (at $p > 0.05$).

The percentage of positivity of CYFRA 21-1 and CEA in patients with bronchogenic carcinoma and benign chest disease are shown in table (14) :

- In benign chest disease group, five of the twenty cases (25%) had elevated CYFRA 21-1 serum level. Seven of the twenty cases (35%) had elevated CEA serum level.

- In COPD group, five of the ten cases (50%) had elevated CYFRA 21-1 serum level. Five of the ten cases (50%) had elevated CEA serum level.

- In TB group, none of the ten cases showed elevation of CYFRA 21-1 serum level. Two of the ten cases (20%) had elevated CEA serum level.

- In bronchogenic carcinoma group, twenty two of the thrity cases (73.3%) had elevated CYFRA 21-1 serum level. Sixteen of the thirty cases (53.3%) had elevated CEA serum level.

- In small cell lung cancer group, one of the seven cases (14.3%) had elevated CYFRA 21-1 serum level. Three of the seven cases (42.8%) had elevated CEA serum level.

- In non-small cell lung cancer group, twenty one of the twenty three cases (91.3%) had elevated CYFRA 21-1 serum level. Thirteen of the twenty three cases (56.5%) had elevated CEA serum level.

- In squamous cell carcinoma group, all the eleven cases (100%) had elevated CYFRA 21-1 serum level. Nine of the eleven cases (81.8%) had elevated CEA serum level. This group showed the highest percentage of positivity of both CYFRA 21-1 and CEA.

- In adenocarcinoma group, nine of the ten cases (90%) had elevated CYFRA 21-1 serum level. Four of the ten cases (40%) had elevated CEA serum level.

- In large cell lung cancer group, one of the two cases (50%) had elevated CYFRA 21-1 serum level. None of the two cases had elevated CEA serum level.

- In stage II group, seven of the twelve cases (58.3%) had elevated CYFRA 21-1 serum level. Three of the twelve cases (25%) had elevated CEA serum level.

- In stage III group, eight of the eleven cases (72.7%) had elevated CYFRA 21-1 serum level. Seven of the eleven cases (63.6%) had elevated CEA serum level.

- In stage IV group, all the seven cases (100%) had elevated CYFRA 21-1 serum level. Six of the seven cases (85.7%) had elevated CEA serum level. Patients with advanced disease (stage IV) showed the highest percentage of positivity of both markers.

Table (15) and figure (9) show the sensitivity and specificity of CYFRA 21-1 and CEA in lung cancer. In the present study, the serum CYFRA 21-1 of 1.1ng/ml was considered the cut-off value of serum CYFRA 21-1. It is

calculated as follows: cut-off value of CYFRA 21-1= (mean + 3 S.D. of control). The serum CEA of 3.6ng/ml was considered the cut-off value of serum CEA. It is calculated as follows: cut-off value of CEA= (mean+3 S.D. of control).

It was found that the sensitivity of CYFRA 21-1 in lung cancer was 73.3%. The sensitivity of CEA in lung cancer was 53.3%. The specificity of CYFRA 21-1 in lung cancer was 71.4%. the specificity of CEA in lung cancer was 58.8%.

Table (16) and figure (9) show the sensitivity and specificity of CYFRA 21-1 and CEA in small cell lung cancer and non-small cell lung cancer. The sensitivity of CYFRA 21-1 in small cell lung cancer was 14.3%. The specificity was 79.3%. The sensitivity of CEA in small cell lung cancer was 42.8%. The specificity was 63.6%. The sensitivity of CYFRA 21-1 in non-small cell lung cancer was 91.3%. the specificity was 77.8%. The sensitivity of CEA in non-small lung cancer was 56.5%. The specificity was 69.7%.

- The sensitivity of the combination of CYFRA 21-1 and CEA in bronchogenic carcinoma was analysed. When a combination of the two markers was observed, the sensitivity of CYFRA

21-1 and CEA in bronchogenic carcinoma was 86.7% (table 17).

- In small cell lung cancer, the sensitivity of combined measurement of CYFRA 21-1 and CEA was 57.1%.

- In non-small cell lung cancer, the sensitivity of combined measurement of CYFRA 21-1 and CEA was 95.7%.

The sensitivity of combined measurement of CYFRA 21-1 and CEA was significantly higher than the sensitivity of CYFRA 21-1 or CEA measurement alone.

Table (18) and figure (10) show the correlation between CYFRA 21-1 and CEA. There was significant positive intermarker correlation r=0.35871, $P<0.05$.

Table (19) and figure (11) show the correlation between serum levels of CYFRA 21-1 and clinical stages of bronchogenic carcinoma. There was significant positive correlation between CYFRA 21-1 and bronchogenic carcinoma stages, r=0.4392, $P<0.05$.

Table (19) and figure (12) show the correlation between serum levels of CEA and clinical stages of bronchogenic carcinoma. There was significant positive correlation between CEA and bronchgoenic carcinoma stages $r=0.3511$, $P<0.05$.

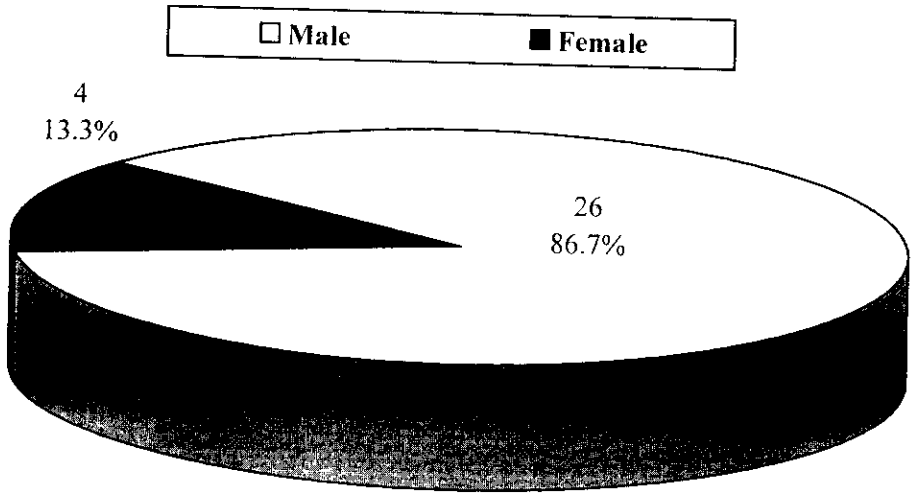

Figure (2) : *Distribution of bronchogenic carcinoma cases according to sex.*

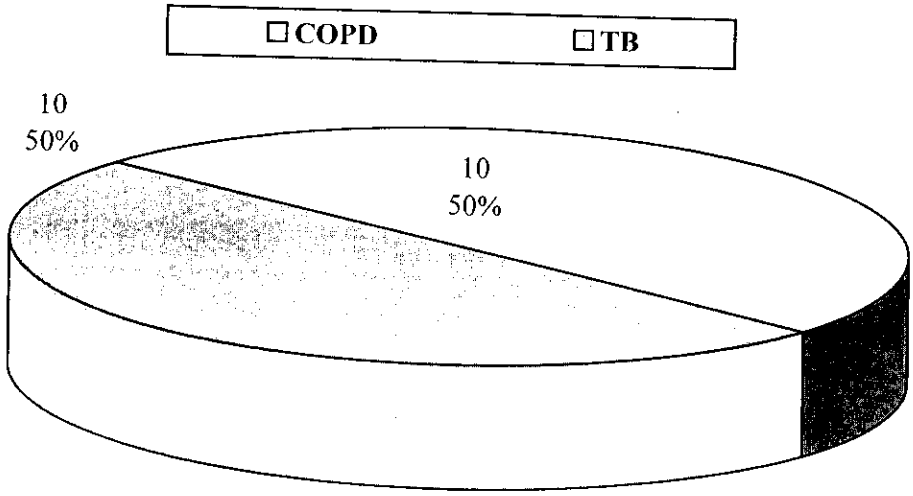

Figure (3) : *Distribution of benign chest diseases according to diagnosis.*

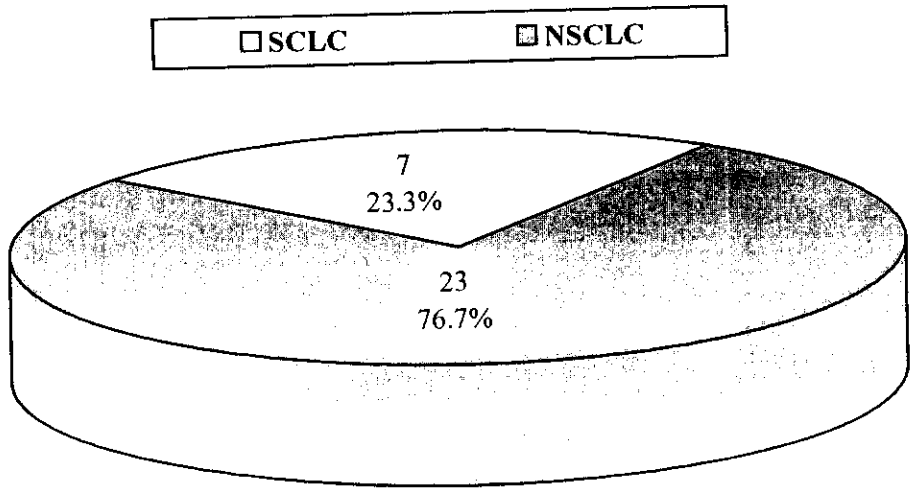

Figure (4) : *Distribution of bronchogenic carcinoma cases according to histopathologicaL diagnosis.*

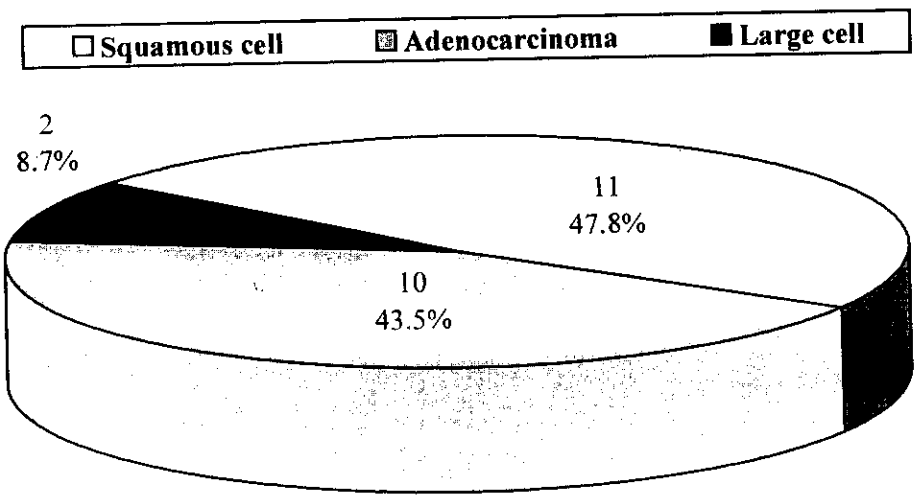

Figure (5) : *Distribution of non small cell lung cancer cases according to histopathology.*

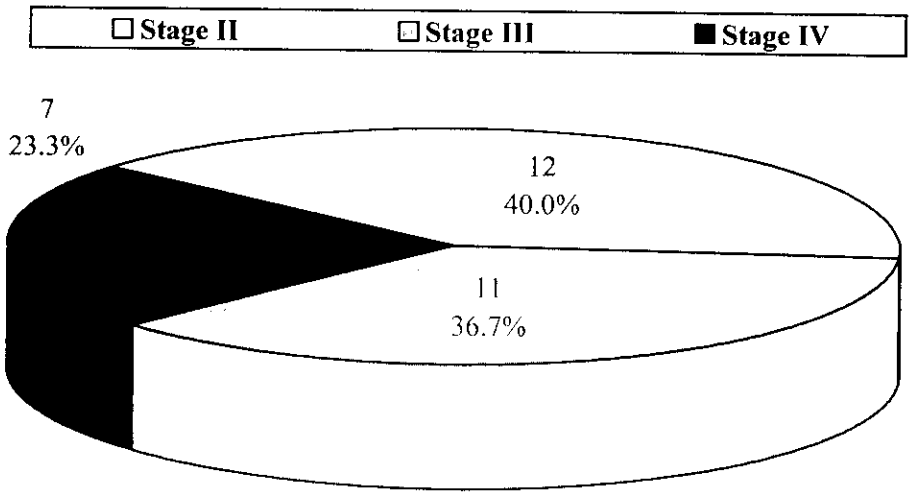

Figure (6) : *Distribution of bronchogenic carcinoma cases according to clinical stage.*

Table (7) : *Mean ± S.D. of serum CYFRA 21-1 and CEA levels in control group, benign and malignant pulmonary diseases.*

Variable	CYFRA 21-1 ng/ml			CEA ng/ml		
	Range	Mean ±	S.D.	Range	Mean ±	S.D.
Control (20)	0.1-1	0.2 ±	0.3	0.2-3.0	1.5 ±	0.7
Benign chest disease (20)	0.1-5.6	0.8 ±	1.3	0-5.6	2.8 ±	1.9
COPD (10)	0.1-5.6	1.3 ±	1.6	0-5.4	3.2 ±	1.8
T.B (10)	0.1-0.8	0.3 ±	0.2	0.4-5.6	2.3 ±	1.9
Lung Cancer (30)	0.1-140	27.1 ±	33.6	0-121.1	21.9 ±	30.1
Small cell lung cancer (7)	0.8-3	1.3 ±	0.8	1.4-14.1	6.2 ±	5.0
Non Small cell lung cancer	0.1-140.0	34.9 ±	34.9	0-121.1	26.7 ±	32.9
Squamous cell carcinoma (11)	27.3-140	62.7 ±	31.0	2.2-92.0	34.7 ±	28.8
Adenocarcinoma (10)	0.1-25.6	11.1 ±	8.5	0.8-121.1	23.2 ±	38.6
Large cell lung cancer (2)	0.2-2.3	1.3 ±	1.5	0-2.0	1.0 ±	1.4
Stages						
II (12)	0.2-92.5	15.5 ±	27.3	0-92.0	11.3 ±	25.8
III (11)	0.1-140	28.5 ±	41.6	1.2-121.1	27.2 ±	39.4
IV (7)	3.0-74.4	44.6 ±	23.9	2.9-44.2	31.8 ±	13.6

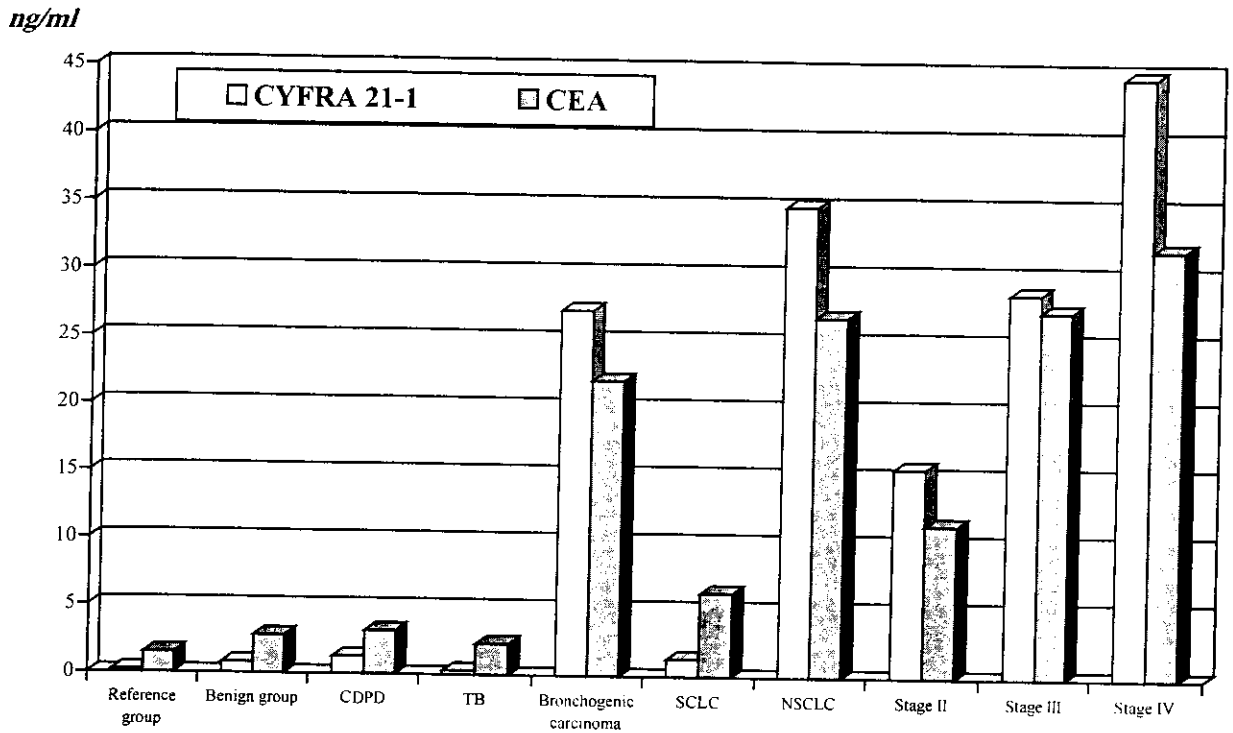

Figure (7) : *Mean value of CYFRA 21-1 and CEA in different studied groups.*

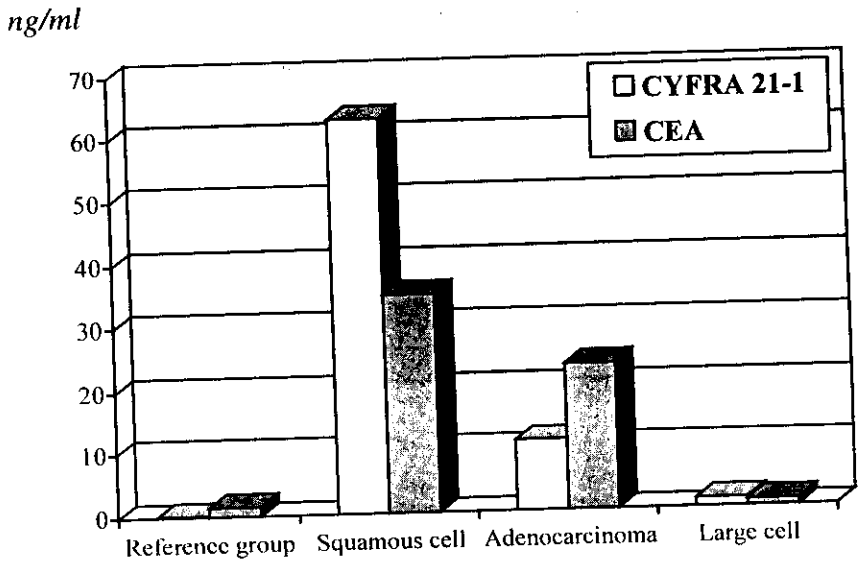

Figure (8) : *Mean value of CYFRA 21-1 and CEA in NSCLC.*

Table (8) : *Statistical difference of CYFRA 21-1 and CEA between benign chest disease and control group.*

Variable	Benign chest disease	Control group	t	P
	Mean ± S.D.	Mean ± S.D.		
CYFRA 21-1 (ng/ml)	0.8 ± 1.3	0.2 ± 0.3	1.20	>0.05
CEA (ng/ml	2.8 ± 1.9	1.5 ± 0.7	0.92	>0.05

Table (9) : *Statistical difference of CYFRA 21-1 and CEA between bronchogenic carcinoma and control group.*

Variable	Bronchogenic carcinoma	Control group	t	P
	Mean ± S.D.	Mean ± S.D.		
CYFRA 21-1 (ng/ml)	27.1 ± 33.6	0.2 ± 0.3	4.38	<0.05
CEA (ng/ml	21.9 ± 30.1	1.5 ± 0.7	3.71	<0.05

Table (10) : *Statistical difference of CYFRA 21-1 and CEA between bronchogenic carcinoma and benign chest disease.*

Variable	Bronchogenic carcinoma	Benign chest disease	t	P
	Mean ± S.D.	Mean ± S.D.		
CYFRA 21-1 (ng/ml)	27.1 ± 33.6	0.8 ± 1.3	4.28	<0.05
CEA (ng/ml	21.9 ± 30.1	2.8 ± 1.9	3.47	<0.05

Table (11) : *Statistical difference of CYFRA 21-1 and CEA between COPD and TB.*

Variable	COPD	T.B.	t	P
	Mean ± S.D.	Mean ± S.D.		
CYFRA 21-1 (ng/ml)	1.3 ± 1.6	0.3 ± 0.2	1.84	>0.05
CEA (ng/ml	3.2 ± 1.8	2.3 ± 1.9	1.47	>0.05

Table (12) : *Statistical difference of CYFRA 21-1 and CEA between Small cell lung cancer and non small cell lung cancer.*

Variable	Small cell Lung cancer	Non Small cell lung cancer	t	P
	Mean ± S.D.	Mean ± S.D.		
CYFRA 21-1 (ng/ml)	1.3 ± 0.8	34.9 ± 34.9	4.61	<0.05
CEA (ng/ml	6.2 ± 5.0	26.7 ± 32.9	2.88	<0.05

Table (13) : *Statistical difference of CYFRA 21-1 and CEA between non small cell lung cancer types.*

Variable	Squamous cell carcinoma	Adenocarcinoma	t	P
	Mean ± S.D.	Mean ± S.D.		
CYFRA 21-1 (ng/ml)	62.7 ± 31.0	11.1 ± 8.5	4.32	<0.05
CEA (ng/ml	34.7 ± 28.8	23.2 ± 38.6	0.7	>0.05

Table (14) : *Percentage of positivity of CYFRA 21-1 and CEA in patients with bronchogenic carcinoma and benign chest disease.*

Variable	CYFRA 21-1		CEA	
	No.	%	No.	%
Benign chest disease (20)	5	25%	7	35%
COPD (10)	5	50%	5	50%
T.B (10)	-	-	2	20%
Bronchogenic carcinoma (30)	22	73.3%	16	53.3%
Small cell lung cancer (7)	1	14.3%	3	42.8%
Non Small cell lung cancer (23)	21	91.3%	13	56.5%
Squamous cell carcinoma (11)	11	100%	9	81.8%
Adenocarcinoma (10)	9	90%	4	40%
Large cell lung cancer (2)	1	50%	--	--
Stages				
II (12)	7	58.3%	3	25%
III (11)	8	72.7%	7	63.6%
IV (7)	7	100%	6	85.7%

Table (15) : *Sensitivity and specificity of CYFRA 21-1 and CEA in lung cancer.*

Variable	CYFRA 21-1		CEA	
	Sensitivity %	Specificity %	Sensitivity %	Specificity %
Lung cancer	73.3	71.4	53.3	58.8

- Cut off value of CYFRA 21-1 = 1.1 (mean +3 S.D. of control)
- Cut off value of CEA = 3.6 (mean +3 S.D. of control)

Table (16) : *Sensitivity and specificity of CYFRA 21-1 and CEA in lung cancer types.*

Variable	CYFRA 21-1		CEA	
	Sensitivity %	Specificity %	Sensitivity %	Specificity %
Small cell lung cancer	14.3	79.3	42.8	63.6
Non-small cell lung cancer	91.3	77.8	56.5	69.7

- Cut off value of CYFRA 21-1 = 1.1 (mean +3 S.D. of control)
- Cut off value of CEA = 3.6 (mean +3 S.D. of control)

Table (17) : *Sensitivity of combined measurement of CYFRA 21-1 and CEA.*

Variable	CYFRA 21-1 or CEA
	Sensitivity %
Bronchogenic carcinoma	86.7%
Small cell lung cancer	57.1%
Non-small cell lung cancer	95.7%

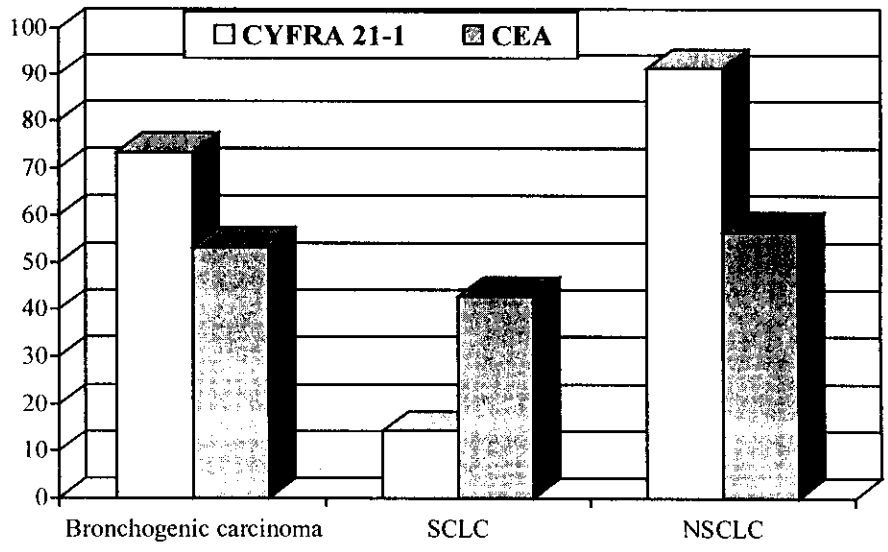

Figure (9) : *Sensitivity of CYFRA 21-1 and CEA in lung cancer and lung cancer types.*

Table (18) : *Correlation between CYFRA 21-1 and CEA.*

	CYFRA 21-1	
	r	Significance
CEA	0.35871	Significant positive correlation P<0.05

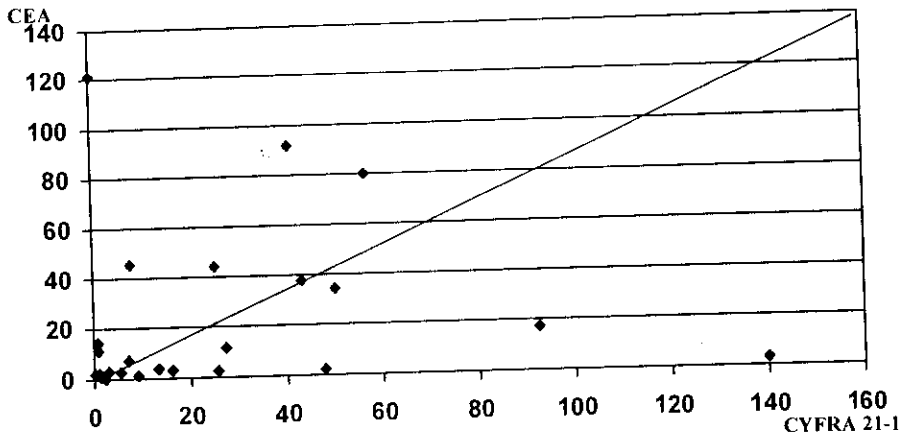

Figure (10) : *Correlation between CYFRA 21-1 and CEA. (ng/ml) (r=0.35871) significant positive correlation.*

Table (19) : *Correlation between CYFRA 21-1 and CEA with bronchogenic carcinoma stages*

	Bronchogenic Carcinoma stages	
	r	Significance
CYFRA 21-1	0.4392	Significant Positive correlation P<0.05
CEA	0.3511	Significant Positive correlation P<0.05

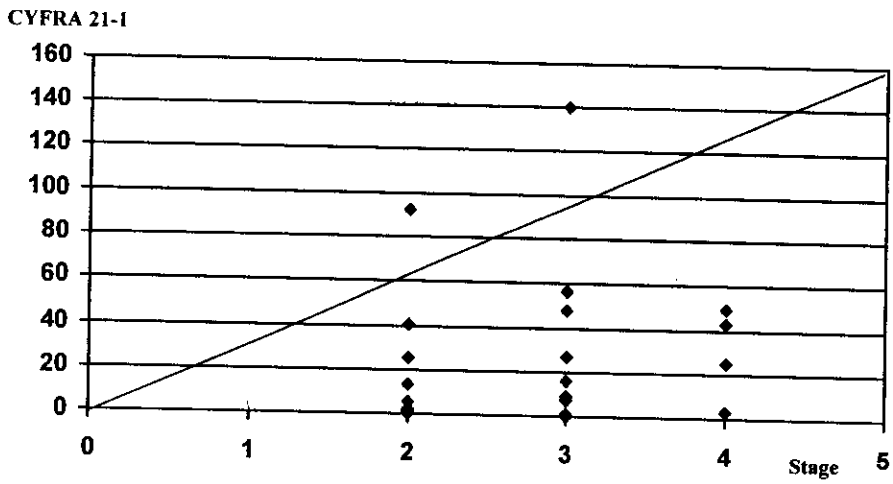

Figure (11) : *Correlation between CYFRA 21-1 (ng/ml) and stage of lung cancer. (r=0.4392) significant positive correlation.*

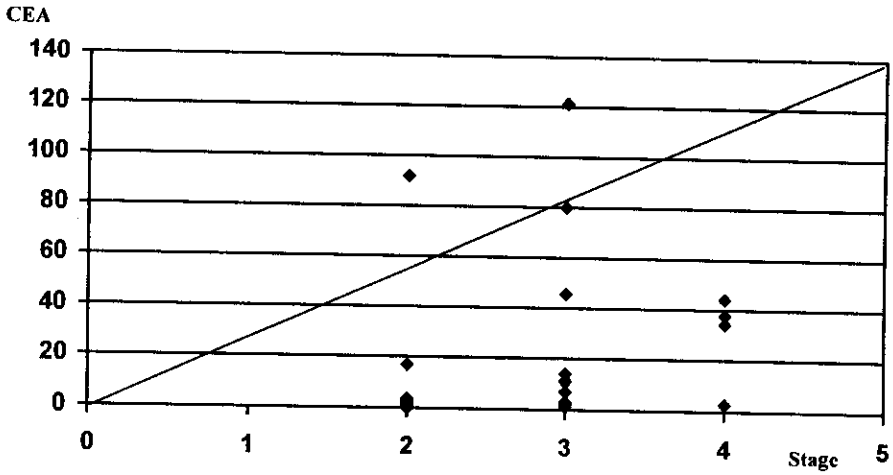

Figure (12) : *Correlation between CEA (ng/ml) and stage of lung cancer. (r=0.3511) significant positive correlation.*

Table (20) : *Master sheet for cases of lung cancer.*

Lung cancer

No.	Sex	Age	CYFRA 21-1	CEA	Smoker	Diagnosis	Pathology	Stage
1	Male	71	2.3	0	Smoker	NSCLC	LCLC	2
2	Male	68	0.1	121.1	Smoker	NSCLC	Adenocarcinoma	3
3	Male	72	5.5	2.6	Smoker	NSCLC	Adenocarcinoma	2
4	Male	70	7.7	45.3	Smoker	NSCLC	Adenocarcinoma	3
5	Male	60	9.1	1.2	Smoker	NSCLC	Adenocarcinoma	3
6	Male	63	7.2	7.1	Smoker	NSCLC	Adenocarcinoma	3
7	Male	60	1	11	Smoker	SCLC	SCLC	3
8	Male	72	13.3	3.6	Smoker	NSCLC	Adenocarcinoma	2
9	Male	70	25.2	44.2	Smoker	NSCLC	Adenocarcinoma	4
10	Male	73	16.1	3.1	Smoker	NSCLC	Adenocarcinoma	3
11	Male	63	50.1	34.3	Smoker	NSCLC	Squamous	4
12	Male	57	0.8	14.1	Smoker	SCLC	SCLC	3
13	Male	60	43.2	37.8	Smoker	NSCLC	Squamous	4
14	Male	63	1.1	2.2	Smoker	SCLC	SCLC	2
15	Male	55	1.1	1.4	Smoker	SCLC	SCLC	2
16	Female	33	140	3	Non-smoker	NSCLC	Squamous	3
17	Male	63	56.6	80	Non-smoker	NSCLC	Squamous	3
18	Male	67	27.3	11.5	Non-smoker	NSCLC	Squamous	3
19	Male	50	0.2	2	Non-smoker	NSCLC	LCLC	2
20	Male	60	1.4	0.8	Non-smoker	NSCLC	Adenocarcinoma	2
21	Male	60	40.8	92	Non-smoker	NSCLC	Squamous	2
22	Female	80	92.5	17	Non-smoker	NSCLC	Squamous	2
23	Female	60	3	2.9	Non-smoker	SCLC	SCLC	4
24	Male	67	47.8	2.2	Non-smoker	NSCLC	Squamous	3
25	Male	63	25.6	2.5	Non-smoker	NSCLC	Adenocarcinoma	2
26	Female	59	74.4	39.8	Non-smoker	NSCLC	Squamous	4
27	Male	68	1.1	8.4	Smoker	SCLC	SCLC	2
28	Male	66	54.6	28.7	Smoker	NSCLC	Squamous	4
29	Male	52	1	3.1	Smoker	SCLC	SCLC	2
30	Male	64	61.8	34.9	Smoker	NSCLC	Squamous	4

Table (21) : *Master sheet for cases of benign chest diseases.*

Benign chest diseases

No.	CYFRA 21-1	CEA	Diagnosis
1	1.8	0	COPD
2	0.1	0.4	TB
3	0.1	0.5	TB
4	0.4	0.7	TB
5	0.3	1.1	TB
6	1.3	1.3	COPD
7	0.4	1.4	COPD
8	0.4	1.5	TB
9	0.3	2.3	TB
10	0.1	2.3	TB
11	1.3	2.8	COPD
12	0.8	2.8	TB
13	0.1	3.2	COPD
14	0.6	4.3	COPD
15	0.1	4.3	COPD
16	5.6	4.5	COPD
17	0.1	5.1	COPD
18	1.3	5.4	COPD
19	0.1	5.5	TB
20	0.1	5.6	TB

Table (22) : *Master sheet for control cases.*

Control

No.	CYFRA 21-1	CEA
1	0.2	0.6
2	0.2	0.3
3	0.1	0.3
4	0.2	0.8
5	0.1	0.7
6	0.2	0.8
7	0.8	0.8
8	0.1	1.3
9	0.1	1.1
10	0.1	1.5
11	0.1	1.6
12	0.1	1.8
13	0.1	2
14	0.1	2
15	0.1	1.9
16	1	2.2
17	0.1	1.9
18	0.1	2.1
19	0.1	2.2
20	0.1	3