RESULTS

This study was done to detect the efficacy of CT in determining the pleural lesion and make a comparison study between plain chest x-ray and CT in detection of pleural tumor

This study was done on thirty patients with pleural lesions, 18 of them were male and 12 were female.

Age of patients ranged from 9 years to 73 years.

All patients were subjected to full history taking, clinical examination, and CT examination for the entire patients and plain x-ray chest PA and /or lateral views were done. CT guided biopsy was done for 10 cases and cytological examination was done for 17 cases to confirm the diagnosis.

Statistically:

Statistical data of the study was done. It's represented in table (2).

The plain x-ray appearance and CT appearance are also represented in different tables according to the type of pleural lesions.

Pleural lesions	Total no.	Mean age	Laterality			Sex	
			Rt.	Bilat	Lt.	M	F
Pleural effusion	10	40	7		3	6	4
Pneumothorax	2	40	2				2
Pl. thickening &calcification	2	55	1		1	1	1
Pl. thickening	1	42			1	1	
1ry pl. tumor	2	50	1		1	1	1
2ry pl. tumor	13	55	8	3	2	9	4

Table No. (2) Number, age, sex and laterality of cases

Percentage:

According to the results of CT: 10 cases of them were pleural effusion in percentage 33.3%, 2 cases were pneumothorax in percentage 6.7%, 2 cases were mixed pleural thickening and calcification in percentage of 6.7%, 1 case was pleural thickening in percentage 3.3%. 15 cases were pleural tumors -whether primary or secondary- in percentage 50%. This is represented in table (3), Chart (1) and chart (2).

Pleural lesion	Number	Percentage
Pleural effusion	10	33.3%
Pneumothorax	2	6.7%
Pleural thickening and calcification	2	6.7%
Pleural thickening	1	3.3%
Pleural tumors	15	50%
Total	30	100%

Table No. (3) Number of cases and percentage

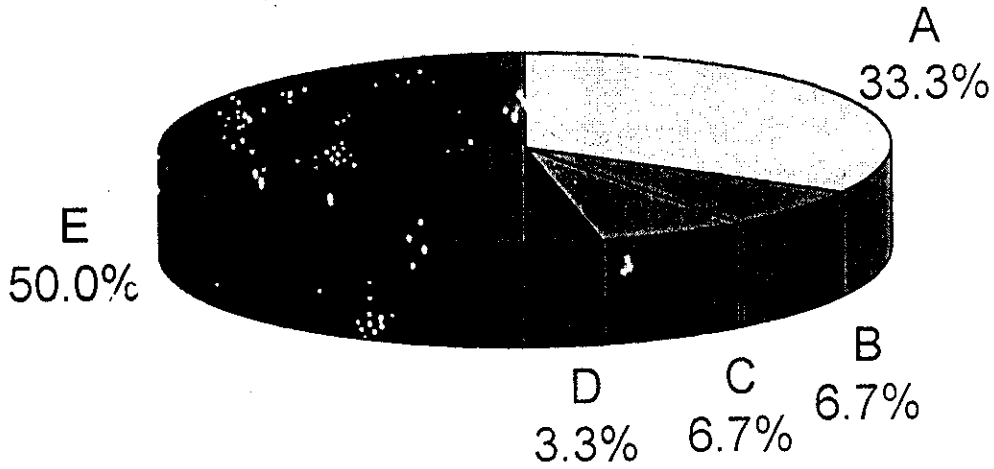

Chart (1): Pie chart showing the different percentage of pleural lesions detected by CT.
A: Pleural effusion
B: Pneumothorax
C: Pleural thickening & calcification
D: Pleural thickening
E: Pleural tumors

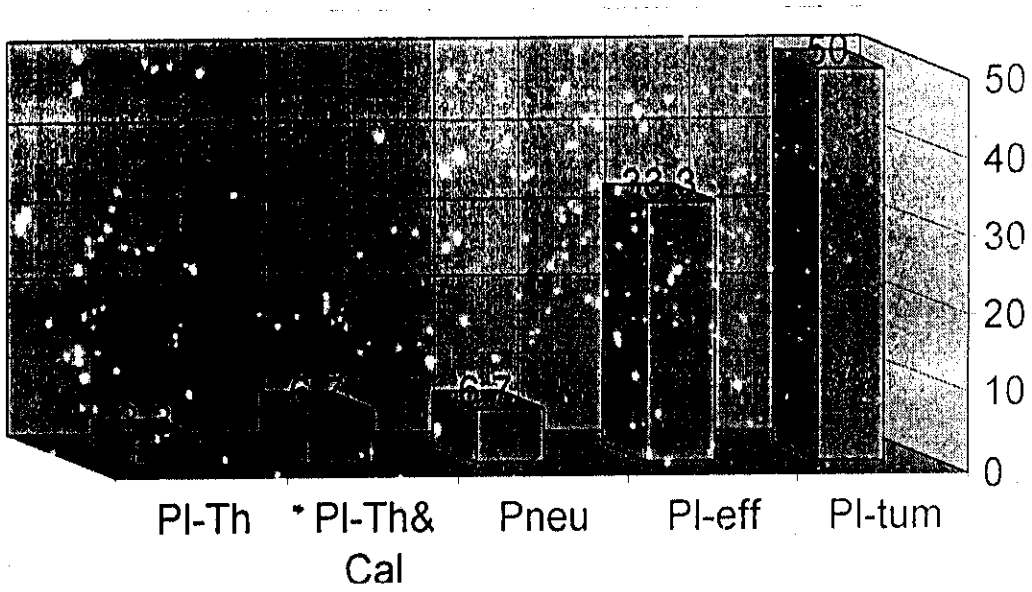

Chart (2); Histogram showing the different percentage of pleural lesions detected by CT

Laterality

In this study 3cases were bilaterally affected, 8cases were left sided affection and 19cases were right sided affection. The following charts will present the different percentage of laterality. This is represented in chart (3) and (4).

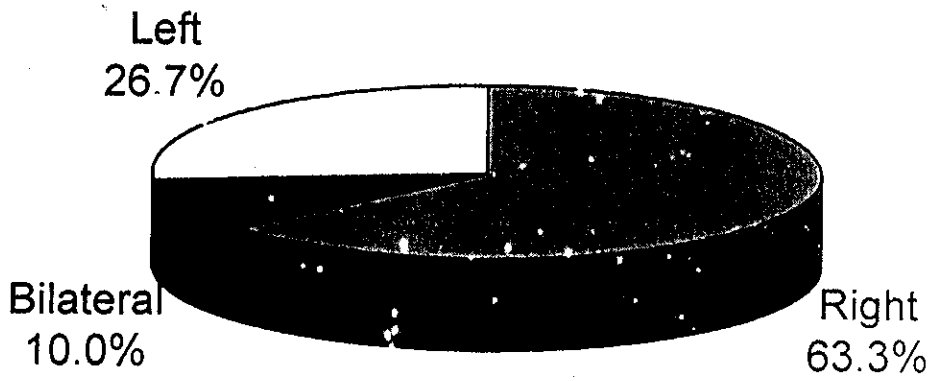

Chart (3): Pie chart showing the laterality of pleural effusion in the study

IV contrast injection

In this study 24 cases were injected by ionic contrast media (Urographin) and 6 cases were not injected.

Invasive technique

In this study CT guided biopsy was done for 10 cases to detect the primary or secondary lesion that revealed 2 cases of primary malignant mesothelioma and 8 case were metastatic. Cytological examination was done for 17 patient to detect the nature of effusion that revealed inflammatory cells in 6 cases, no cells in 3 cases and malignant cells in 8 cases.

Associated pathology

Associated pathology were detected in 27 cases, 19 of them were associated with pulmonary pathology in percentage of 63.3%, e.g. pneumonic consolidation, compression collapse of the ipsilateral lung, shift of the mediastinum or any other pulmonary pathology. 8 cases were associated with extrapulmonary pathology in percentage of 26.7% e.g. hepatoma, ascites, pericardial effusion, extrapulmonary metastasis for the cases of secondary metastatic pleural lesion. 3 cases were not associated with any pulmonary pathology. This is represented in chart (5)

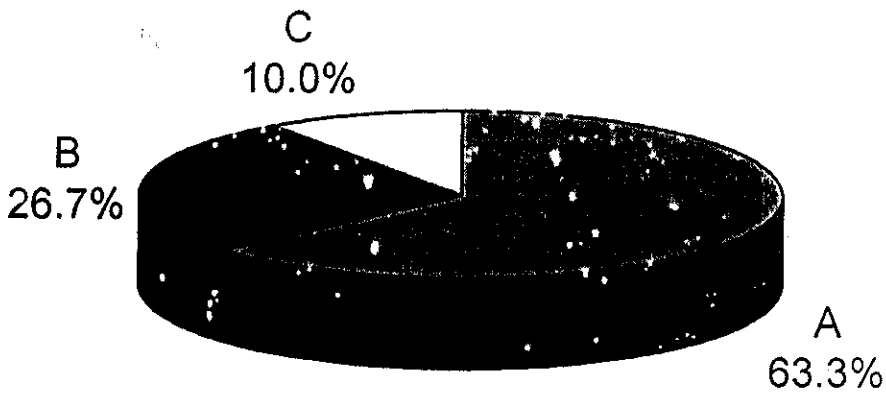

Chart (4): Pie chart showing the percentage of associated pathology with pleural lesions

A: Associated pulmonary pathology
B: Associated extrapulmonary pathology
C: Non associated pathology

PLEURAL EFFUSION

This group compromised 10 cases representing 33.3% of all cases of pleural lesions, their mean age is 40 years, 6 males and 4 females. Most of these cases present with shortness of breathing, dull aching pain on the affect side, 4 cases present with associated fever, cough with expectoration and loss of weight.

By CT we detect the type of the effusion as free or encysted, underlying pulmonary affection and mediastinal changes

Types of pleural effusion

In this study 10 cases were pleural effusion, 5 cases of them were free pleural effusion (44.5%), 2 cases were encysted pleural effusion (22.2%), 2 cases were hydropneumothorax (22.2%), 1 case was pyopneumothorax (11.1%). They are represented in chart (6) and table No. (4) and (5).

Type of effusion	No.	Laterality			Sex		Percentage
		R	Bil.	L	M	F	
Free effusion	5	4		1	4	2	44.5%
Encysted effusion	2	1		1	1	1	22.2%
Hydropneumothorax	2	1		1	1	1	22.2%
Pyopneumothorax	1	1			1		11.1%
Total	9	9			9		100%

Table No. (4) showing the percentage type & laterality of pleural effusion

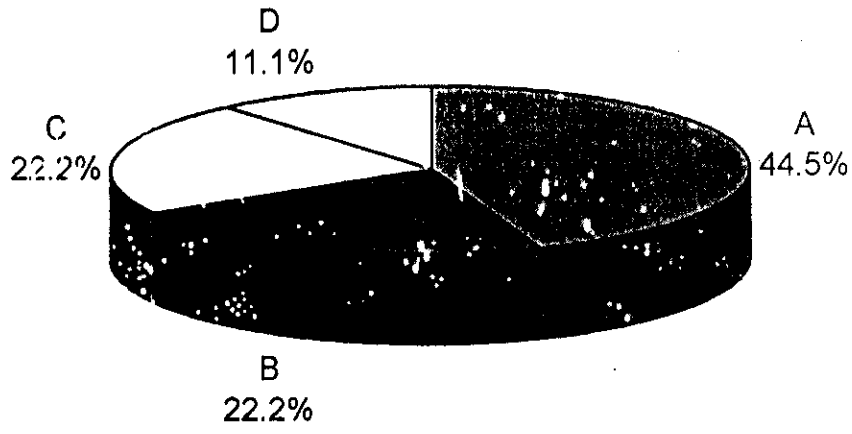

Chart (5): Pie chart showing the percentage type of pleural effusion
A: Free pleural effusion
B: Encysted pleural effusion
C: Hydropneumothorax
D: Pyopneumothorax

Effusion	X ray appearance	%	CT appearance	%
Number	7	70%	10	100%
Relaxation collapse of the underlying lung	2	20%	7	70%
Shift of the mediastinum to contralateral side	4	40%	5	50 %
Hilar and mediastinal LN enlargement	0	0	1	10%

Table No. (5) showing the difference in the ability of x-ray and CT in detection of associated pulmonary and extra pulmonary pathology in cases of pleural effusion

PNEUMOTHORAX

This group compromised 2 cases representing 6.7% of all cases of pleural lesions, their mean age was 40 years, all were females. These cases present with shortness of breathing, dull aching pain on the affect side, 1 case presents with associated fever and cough with expectoration

By CT we detect the type of pneumothorax either free or encysted, underlying pulmonary affection and mediastinal changes. All cases are secondary spontaneous pneumothorax

	No.	Laterality			Sex		Percentage
		R	Bil.	L	M	F	
Pneumothorax	2	2	-	-		2	6.7%
Total	2	2			2		6.7 %

Table No. (6) showing the percentage type, sex & laterality of pneumothorax

Pneumothorax	X- ray appearance	%	CT appearance	%
Number	1	50%	2	100%
Relaxation collapse of underlying lung	1	50%	2	100%
Shift of thee mediastinum	0	0	1	50%
Bullae within the lung	1	50%	2	100%
Encysted	0	0	1	50%

Table No. (7) showing the difference in the ability of x-ray and CT in detection of associated pulmonary and extra pulmonary pathology in cases of pneumothorax

PLEURAL THICKENING AND CALCIFICATION

This group compromised 2 cases representing 6.7% of all cases of pleural lesions, their mean age is 55 years, I case was male and the other was female. These cases present with mild shortness of breathing and history of recurrent empyema with treatment

By CT we detect the underlying pulmonary affection, site, level of extension and mediastinal changes.

	No.	Laterality			Sex		Percentage
		R	Bil.	L	M	F	
Pl. thickening &pl. calci.	2	1	-	1	1	1	6.7%
Total	2	2			2		6.7 %

Table No. (8) showing the percentage type, sex & laterality of pleural thickening and pleural calcification

Pl. thick. &Pl. calc.	X ray appearance	%	CT appearance	%
Calcification	**2**	**100%**	**2**	**100%**
Decrease volume of the lung	**1**	**50%**	**2**	**100%**
Shift of the mediastinum	**1**	**50%**	**2**	**100%**
Pleural thickening	**1**	**50%**	**2**	**100%**

Table No. (9) showing the difference in the ability of x-ray and CT in detection of associated pulmonary and extra pulmonary pathology in cases of pleural thickening and calcification

PLEURAL THICKENING

This group compromised 1 case representing 3.3% of all cases of pleural lesions, his age was 42 years, and the case was male. This case presents with mild shortness of breathing and cough.

The patient has history of recurrent chest infection.

PLEURAL TUMORS

In this study, 15 cases were diagnosed as pleural tumors, 2 of them were primary and 13 were secondary pleural metastasis. This is represent in chart (7) and (8).

	Total No.	Sex		Laterality		
		M	F	R	Bil.	L
1ry pl. tumor	2	1	1	1		1
Total	2	2		2		

Table No. (10) showing the etiology, number, sex and laterality in the primary pleural tumor

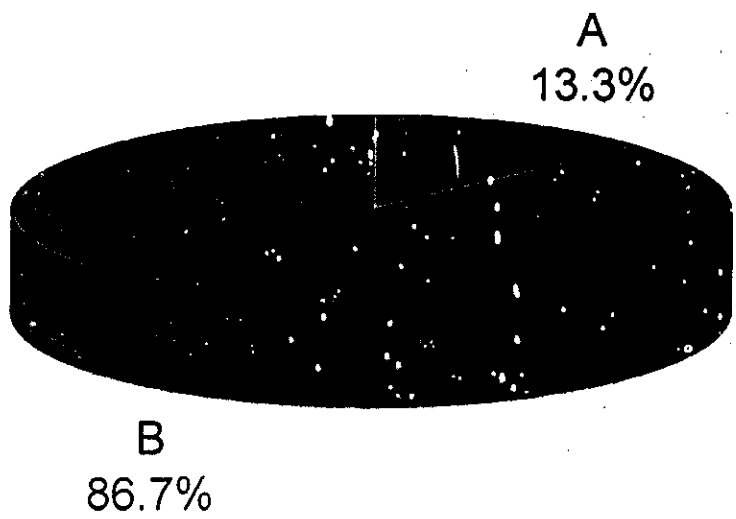

Chart (6): Pie chart showing the percentage of the pleural tumors.

A: primary pleural tumors.
B: secondary pleural tumors.

Pleural thickening	0	0	2	100%
Pleural effusion	2	0	0	100%
Loss of volume	0	0	2	100%
Shift of mediast-inum to contra-lateral side	1	50%	1	50%
Involvement of the contra-lateral side	0	0	1	50%
Chest wall invasion	0	0	0	0

Table No. (11) showing the difference in the ability of x-ray and CT in detection of associated pulmonary and extra pulmonary pathology in cases of primary pleural tumors

Sources	Total No.	Sex		Laterality		
		M	F	R	Bil.	L
Bronchogenic carcinoma	5	5		3	1	1
Cancer breast	2		2	2		
Ovarian carcinoma	2		2	2		
Cancer thyroid	2	1	1	1		1
Hypernephroma	1	1				1
Liposarcoma	1	1		1		
Total	13	8	5	9	1	3

Table No. (12) showing the primary, number, sex and laterality in the secondary pleural tumors

Sources of metastasis	Malignant effusion	Pleural thickening	Pleural seeding	Parenchymal involvement	Rib involvement	Lymph node involvement	Pericardial effusion
Bronchogenic carcinoma	4	2		2			1
Cancer breast	1	1		2			
Ovarian carcinoma	2	1				1	
Cancer thyroid	2		1				
Hyperne phroma	1			1	1		
Liposarcoma	1	1					
Total	11	5	1	5	1	1	1

Table No. (13) showing chest findings of secondary pleural tumors

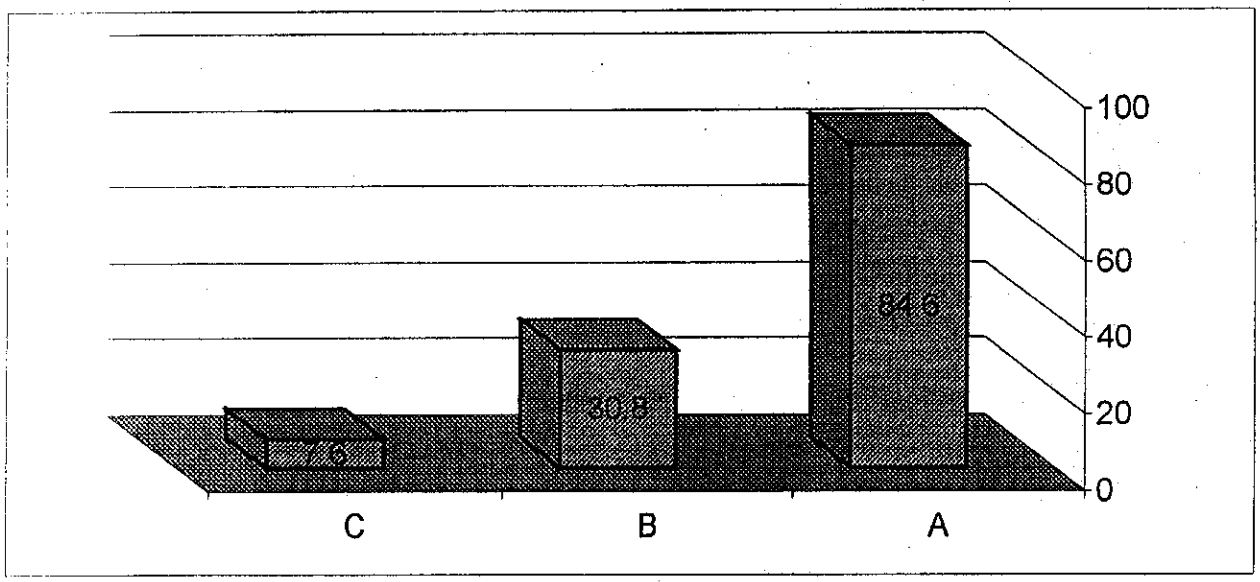

Chart (7): Single bar chart showing the percentage of pleural findings of secondary pleural tumors.

A: Malignant effusion

B: Diffuse pleural thickening

C: Pleural seeding.

	X- ray appearance	%	CT appearance	%
Malignant effusion	9	69.2%	11	84.6%
Pleural thickening	3	23.4%	5	38.5%
Pleural seeding	0	0	1	7.7%
Parenchyma involvement	4	30.8%	5	38.5%
Rib involvement	1	7.7%	1	7.7%
Lymph node involvement	0	0	1	7.7%
Pericardial effusion	0	0	1	7.7%

Table No. (14) showing the difference in the ability of x-ray and CT in detection of pulmonary pathology in cases of secondary pleural tumors

In this study, we are documented that CT has the upper hand in the diagnosis of pleural lesions. This is represented in chart (9).

	X- ray percent	CT percent
Pleural effusion	66.7%	100%
Pneumothorax	50%	100%
Pleural thickening and pl. calcification	50%	100%
Pleural thickening	0%	100%
Pleural tumors	46.7%	100%

Table No. (15) showing the difference of the CT and plain x –ray in detection of pleural lesions

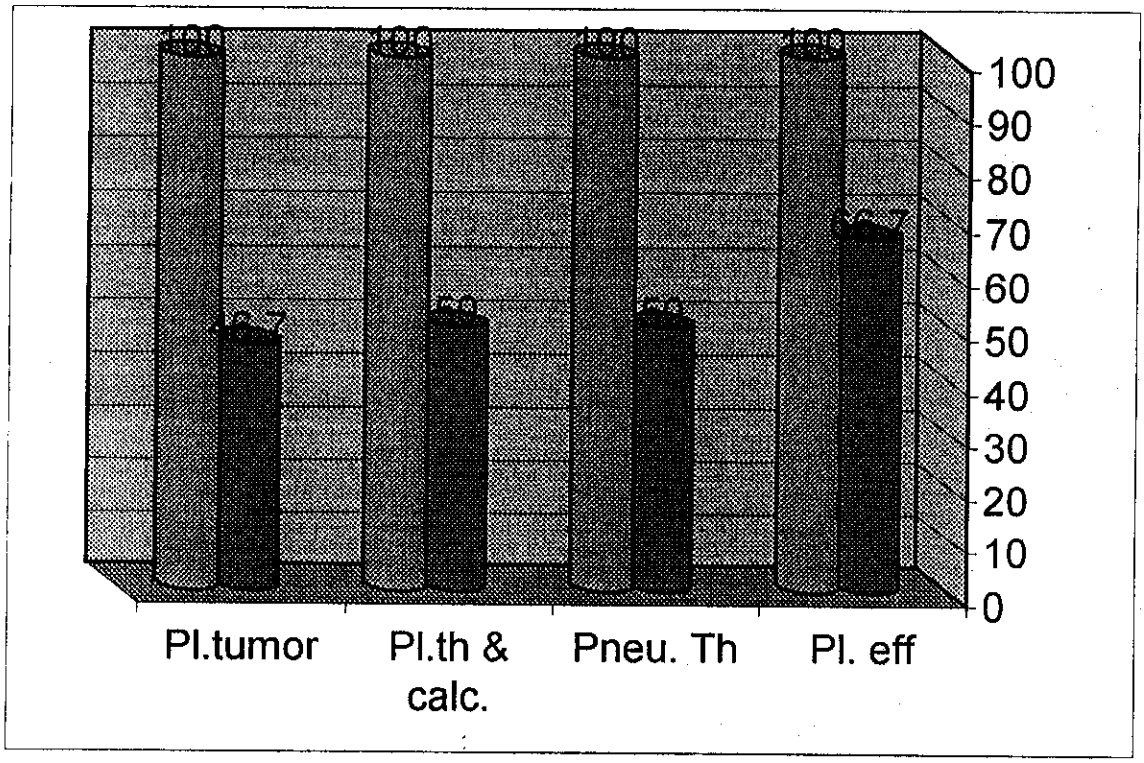

Chart (8): Combination bar charts showing the difference in the ability of CT and plain X-ray in detection of pleural lesions