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Pulmonary Medicine

Effect of Pleural Effusion and Thoracentesis on PFT

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Abstract: Pleural effusion is a very common cause of dyspnoea in many patients due to chest pain and restricted respiratory mechanics. Irrespective of underlying etiology, patients get significant relief after therapeutic thoracentesis. The aim of this study was to evaluate effects of unilateral moderate pleural effusion on PFT and to establish objective evidence for symptomatic improvement after thoracentesis. This was a prospective and cross-sectional study comprising 12 patients, aged above 13 years. Stable Patients with unilateral moderate pleural effusion of included while those with Severe Respiratory distress, Hemoptysis, Cardiovascular disease and Recent history of major surgery were excluded. Spirometry was performed on 12 patients before and after thoracentesis. In all 12 patients mean FVC improved from 0.93 Lit (33% Predicted) to 2.45 Lit (59 % Predicted) and mean FEV_1 improved from 0.53 Lit/Sec (24% predicted) to 1.76 Lit/Sec. while pleural effusion causes dyspnoea by chest pain and restricted respiratory mechanics, thoracentesis helps in improving lung compliance, FVC FEV_1 as evident by subsequent objective measurement.
Keywords: Pleural effusion, Thoracentesis, PFT, Restrictive defect, Compliance, FVC FEV1.

INTRODUCTION

Pleural effusion is a very common cause of dyspnoea. Patients get significant immediate relef after therapeutic thoracentesis, irrespective of infection or tuberculous or malignant etiology. Despite underlying lung parenchymal disease. There is significant improvement in commonly measured spirometric parameters after thoracentesis.

The present study evaluates effect of moderate unilateral Pleural effusion [1] on PFT and establishes objective evidence for symptomatic improvement after thoracentesis [2].

Aims and Objectives

- To study the effect of pleural effusion on PFT
- To establish objective evidence for symptomatic improvement after thoracentesis.

MATERIALS AND METHODS

This was a prospective and cross-sectional study conducted on 12 patients who visited Government General Hospital, Nizamabad with clinical and radiological evidence of pleural effusion. Ultrasonogram chest was done to quantify pleural effusion. PFT was performed before and after thoracentesis and FEV_1 and FVC were calculated as percentage of normal predicted values [3].

Inclusion Criteria

- Patients with moderate pleural effusion and SPO_2 more than 92% at room air
- Adult patients aged above 13years

Exclusion Criteria

- Severe Respiratory distress
- Hemoptysis
- Cardiovascular disease
- Recent history of major surgery

RESULTS

Table-1: Patient - wise Quantity of Pleural fluid and % FVC

Sl.No.	Diagnosis	Age/Sex	Smoking	Side	Quantity of PLEF	FVC%
1	Tuberculous PLEF	20/F	-	Rt	800 ml	52
2	Tuberculous PLEF	25/F	-	Rt	1 Lit	54
3	Tuberculous PLEF	32/F	-	Lt	850 ml	50
4	Tuberculous PLEF	40/M	+	Rt	900 ml	48
5	Tuberculous PLEF	42/M	+	Lt	800 ml	52
6	Tuberculous PLEF	45/M	+	Rt	900 ml	50
7	Malignant PLEF	65/M	+	Rt	950 ml	36
8	Malignant PLEF	63/M	+	Lt	1 Lit	37
9	Malignant PLEF	55/M	+	Rt	1 Lit	59
10	Synpneumonic PLEF	24/M	-	Rt	800 ml	58
11	Synpneumonic PLEF	22/F	-	Lt	800 ml	48
12	Synpneumonic PLEF	60/M	+	Rt	800 ml	42

Table-2: Measured FVC & FEV1 and % of Predicted FVC & FEV1

Parameter	Units		Before	After	p-value
FVC	Liters	Range	0.68-1.18	1.12-2.9	
		Mean +/- SD	0.93+/- 0.15	2.45+/- 0.79	< 0.01
	%	Range	26-40	42-76	
		Mean +/- SD	33+/-4	59+/- 3	< 0.01
FEV_1	Liters/Sec	Range	0.38-0.89	0.85-2.17	
		Mean +/- SD	0.53+/- 0.19	1.76+/- 0.37	< 0.01
	%	Range	19-38	44-78	
		Mean +/- SD	24.74 +/- 3.3	61+/- 6.3	< 0.01

DISCUSSION AND SUMMARY

The present study includes 12 patients. The study group consists of stable patients with unilateral moderate Pleural effusion in whom FEV_1 and FVC [4] are measured with spirometry before and after thoracentesis [5]. In all 12 patients mean FVC improved from 0.93 Lit (33% Predicted) to 2.45 Lit (59 % Predicted) and mean FEV_1 improved from 0.53 Lit/Sec (24% predicted) to 1.76 Lit/Sec.

CONCLUSIONS

It is well known that expansion of pleural space is accommodated by passive atelectasis of ipsilateral lung and distortion of chest wall [6], restricting mechanics of respiration. Pleuritic chest pain may also contribute to restrictive defect in some patients. Unlike other common restrictive lung diseases like IPF [7], FEV_1 and FVC significantly improved after thoracentesis. Improvement in FVC may be due to increased lung compliance by newly recruited alveoli which in-turn can cause increased FEV_1.

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