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Chest High Resolution Computed Tomography in AIDS Patients

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Abstract

HRCT was performed on 10 homosexual men with acquired immunodeficiency syndrome (AIDS). All had bronchoscopically proven pneumocystis carinii pneumonia (PCP). Five patients were re-scanned following treatment and symptomatic recovery.

Introduction

HIGH resolution computed tomography (HRCT) has been used increasingly for the assessment of diffuse lung disease, particularly in early inflammation and infiltrative processes when chest radiography may be within normal limits. The role of narrow section CT in detection of AIDS in the acute phase and subsequent monitoring response to treatment are clarified in this study.

Material and Methods

Ten homosexual men, seropositive for Human Immuno Deficiency Virus-1 (HIV) underwent narrow section thoracic CT scanning. Their mean age was 34 years, range 26 to 46 years. All had pulmonary symptoms suggestive of pneumonitis with varying degrees of cough, dyspnoea and fever and all had PCP proven on bronchoscopy which was performed within 24 hours following CT scan.

Only patients with documented PCP as the sole pathogen were studied, two patients with additional diseases were excluded from the series.

Five patients were followed up with repeat CT scans after an interval of 4 and 8 weeks from the initial scans.

These patients had undergone treatment with high dose intravenous co-trimoxazole and were clinically asymptomatic.

Results

The CT of all ten patients were reviewed according to four preassigned patterns: Alveolar consolidation, bronchial wall thickening and dilatation, interstitial shadowing and cystic air spaces.

Alveolar consolidation was subdivided into pulmonary regions: (a) central, peripheral, widespread; (b) upper zone, lower zone, wide spread (c) unilateral, bilateral, and also degree of severity (grade I-IV).

The presence and absence of lymphadenopathy was recorded.

The most common CT finding was widespread bilateral alveolar consolidation which was seen in eight of the 10 patients.

Minimal CT changes were (inspected in patients with normal CXR (fine alveolar consolidation, table 1). Unilaterality was also seen in one case. In nine cases bronchial wall thickening was noted in association with alveolar consolidation, but unrelated to the degree of consolidation (Fig3). Two of these patients showed evidence of additional bronchial dilatation (Figs. 1,3).

Multiple cystic air spaces were noted in one patient who had marked consolidation, with subpleural sparing (Fig. 4).

The five patients followed up after treatment showed a reduction in the degree of consolidation which was not related to length of time which had elapsed since initial scan. Two patients who had previously demonstrated minimal bilateral consolidation showed complete resolution from bilateral diffuse consolidation to unilateral peripheral changes. Another patient displayed new bronchial wall dilatation in follow-up.

No patient had significant mediastinal or hilar lymph node enlargement.

No pleural effusions were identified.

Discussion

Opportunistic infection with pneumocystis carinii occurs in up to 60% of primary presentations and 80% of AIDS patients overall develop PCP at some stage during the course of the disease [1].

The appearance of PCP on chest radiograph has been described [2] as bilateral

pre-hilar shadowing, which evolves forming diffuse ground glass opacification and finally progresses to complete pulmonary consolidation.

Following treatment of PCP, the chest radiograph appearance is variable, some improvement is usually seen in 10 days, but marked abnormalities may persist for months in absence of pathology or symptomatology [3].

The appearances of PCP by CT have been widely documented.

All patients in our series had abnormal CT scans including those with normal chest films.

Early findings revealed fine alveolar consolidation sometimes peripheral in lo-

Table (1): CXR and CT Findings in 10 Patients with PCP.

	CXR	CT
Normal	1	0
Alveolar consolidation:	7	8
<i>Distribution:</i>		
Upper Zone	1	4
Lower Zone	1	1
Wide Spread	7	5
Unilateral	0	1
Bilateral	9	9
Central	1	0
Peripheral	0	3
Wide Spread.	6	7
<i>Degree (I-IV):</i>		
I	4	3
II	1	2
III	2	2
IV	1	3
Bronchial wall changes:		
Thickening	0	9
Dilatation	0	2



Fig. (1): Acute PCP scan showing bilateral alveolar consolidation predominantly perihilar distribution. Bronchial wall thickening (arrow heads).

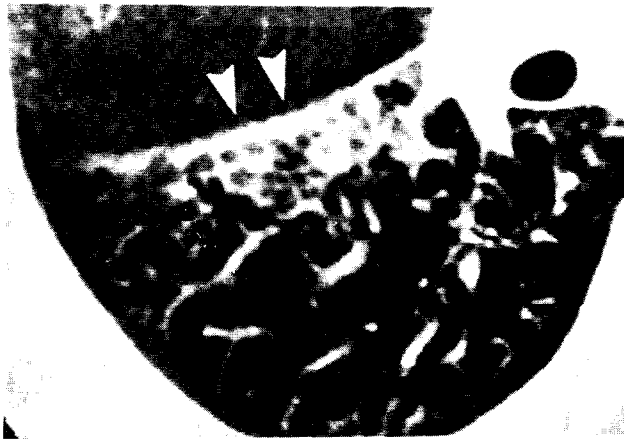


Fig. (2): Early PCP: lobar distribution, consolidation within lower lobe bordered by major fissure (arrow heads).



Fig. (3): Early PCP: peripheral consolidation anteriorly, with bronchial wall thickening and dilatation (arrow heads).



Fig. (4): Advanced PCP: Bilateral cystic air spaces. Marked consolidation at periphery of right upper lobe with subpleural sparing.

cation. Unilaterality was also a feature in one early case. Once the disease has been established, diffuse bilateral consolidation was more centrally than peripherally located. Two from 10 patients displayed evidence of bronchial dilation in association with consolidation during acute event so called "reversible bronchiectasis" [6].

Concomitant finding of bronchial wall thickening in 9 cases suggests that inflammatory processes involve the airways as well as alveolar spaces. These findings are in variance with the bulk of pathological evidence which suggests that PCP is almost exclusively alveolar in distribution [5].

The purpose of repeating CT scans after appropriate treatment was to assess any persistent pathological changes and document their morphology in relation to chest film findings.

In our series, five cases were followed

up, we found that radiological resolution of acute PCP using CT parameters are variable. All patients demonstrated a reduction in extent and severity of consolidation without any relation to length of time elapsed since initial scan.

Healing of PCP with fibrosis has been suggested previously in the context of chest radiograph findings (Fig. 4) and thought to be atypical.

Conclusion:

The radiological manifestations of PCP in AIDS patients in all stages of the disease were studied. The contribution of HRCT reveals consolidation changes before chest radiograph that may become abnormal, a finding which may have implications over patient management.

It is worth mentioning that abnormal CT scan with normal chest radiograph justifies bronchoscopy.

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