Research Article

Clinical and radiological signs of acute exacerbation of interstitial lung diseases

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Abstract
Acute exacerbation of interstitial lung diseases (ILD) is an acute, clinically significant respiratory deterioration, typically less than 1 month in duration, together with high resolution computerized tomography(HRCT) imaging showing new bilateral glass opacity and/or consolidation superimposed on a background pattern consistent with fibrosing ILDs. **Aim of the work**: To illustrate the clinical and radiological features of acute exacerbation of interstitial lung diseases. **patient and Methods:** 50 ILDs patients with acute exacerbation and 30 stable ILDs patients were included. History ,Spirometry, arterial blood gases(ABGs) and HRCT chest were done for all subjects. **Results:** there was a significant worsening in respiratory signs and symptoms (including dyspnea , hypoxemia and fever), also there was decline in forced vital capacity (FVC) and partial pressure of oxygen (PaO2) in acute exacerbation of ILDs. **Conclusions:** The diagnosis of AE in ILDs is reliant on clinical and radiological findings.
Keyword: ILDs, acute exacerbation, HRCT.

Introduction
An acute exacerbation of idiopathic pulmonary fibrosis (AE-IPF) has been defined as an acute clinical worsening of dyspnea which develops within less than 1 month without an alternative etiology[1]. Since an Acute exacerbations of interstitial lung disease (AE-ILD) in non-IPF patients resembles AE-IPF, in the clinical setting it might be reasonable to apply the definition of AE-IPF to all AE-ILD[2].

There are clinical features such as an increased oxygen requirement and new bilateral infiltrates on high-resolution computed tomography (HRCT) e.g. ground-glass pacification/ consolidation[3].

Acute exacerbation of ILDs have considerable impact on morbidity, mortality, and quality of life. serial lung function testing is generally used to monitor disease activity and/or predict the prognosis in patients with ILDs[4].

Aim of work
To illustrate the clinical and radiological features of acute exacerbation of interstitial lung diseases.

Patients and methods
observational study has been carried out on 80 subjects at chest department, Minia university hospital, during the period from August 2018 to June 2019,thirty patients with stable ILDs while fifty patients with acute exacerbation of ILDs. The study was approved by Faculty of Medicine Ethics Committee, Minia University. All patients provided a written informed consent.

Inclusion criteria: Group 1: Patients with stable ILDs including: IPF diagnosis as UIP pattern on HRCT, Connective tissue related ILD and Hypersensitivity pneumonitis. **Group II:** Patients with AE-ILD.
Exclusion criteria: Pulmonary diseases other than ILDs (asthma, bronchiectasis, pneumonia, lung abscess, tuberculosis), Pulmonary and extra pulmonary malignancies, Pulmonary embolism, fluid overload or left sided heart failure.

All subjects were subjected to the following: history taking, general and local chest examination, plain chest X-ray (PA view), HRCT, ABGs and spirometry, Routine laboratory

investigations including: (CBC, Renal and liver function tests, C-Reactive Protein, ESR).

Results

There was no significant difference in age, sex or smoking between stable and exacerbating groups. Group II had more fever than group I (p value: 0.001). A statistically significant difference between stable and exacerbating groups as regard mMRC dyspnea scale was evident (p value: 0.002). Group II had a significantly decrease in (FVC and PaO_2) than group I. (p value: 0.001 and <0.001 respectively). Ground glass, reticulation and honey combing were more evident in exacerbation group (p value: 0.02,0.001 and0.003 respectively).

Table (1): Demographic data of the studied groups

	Group I	Group II	P-value
	N=30	N=50	Group I& II
Age:			0.306
Mean ±SD	50.66±13.69	54.06±14.90	
Range	23-89	21-85	
Sex: n (%)			0.212
Males	4(13.3%)	10(20%)	
Females	26(86.7%)	40(80%)	
Smoking:			0.343
Yes	2(6.7%)	2(4%)	
No	26(86.7%)	42(84%)	
Ex	2(6.7%)	6(12%)	

Table (2): Clinical and spirometric characteristics of the studied groups

	Group I	Group II	p-value
	N=30	N=50	
Fever:			0.001
Yes	1(3.3%)	18(36%)	
No	29(96.7%)	32(64%)	
MMRC:			0.002
II	10(33.3%)	5(10%)	
III	19(63.3%)	31(62%)	
IV	1(3.3%)	14(28%)	
FEV1	71.03±22.01 26-115	63.68±17.14 20-97	0.100
FVC	68.36±20.25 29-101	55.80±13.31 20-94	0.001
FEV1 / FVC %	81.36±9.62 50-97	83.56±8.91 51-100	0.304
PaO_2	78.63±8.25 63-89	48.74±11.81 29-95	<0.001
$PaCO_2$	40.53±4.92 33-63	38.56±8.99 20-67	0.273
O_2 saturation	93.40±6.77 59-98	77.84±10.93 53-96	<0.001

Table (3): Radiological findings of the studied groups

	Group I N=30	Group II N=50	p-value
HRCT			
Reticulation	8(26.7%)	33(66%)	0.001
Ground glass	21(70%)	45(90%)	0.023
Honeycombing	2(6.7%)	18(36%)	0.003

Discussion

In our study, There was no significant difference in age and sex between stable and exacerbating groups this is in agreement with a study by Ohshimo et al.,[5]. On the other hand a study by Olson et al., found that the male gender is a risk factor developing acute exacerbation.[6]

We also found no significant difference between stable and exacerbating groups according to smoking. this is in contrary with Collard et al., who found that AE is more commonly observed in nonsmoking, older patients with more advanced disease[7].

In this study, there was a statistically significant difference between stable and exacerbating groups as regard fever that accord to Olson et al., study which revealed that cough, increased sputum production, fever, and flu-like symptoms are a clinical presentation of AE-ILD[6].

The study also revealed a statistically significant difference between stable and exacerbating groups as regard mMRC dyspnea scale.

In a study of Kim et al., A rapidly progressive dyspnea was the most prominent symptom in patients with AE-ILDs[8].

We found that in patients with AE-ILDs had a significantly decrease in (FVC) in comparison with the stable one. This match up with a study by Kondoh et al., which revealed an association between a recent decline of FVC and an increased risk of AE-IPF[9].

Also Disayabutr et al., found a progressive decline in forced vital capacity (FVC) and diffusing capacity of the lung for carbon monoxide (DLCO) in ILDs that may present a progressive-fibrosing phenotype, AEs are thought to be more likely to show abrupt worsening in both these metrics[10].

The study also discovered a significant difference in PaO_2 and oxygen saturation between stable and exacerbating patients which compatible with a study by Kondoh et al., found that impaired baseline oxygenation is one of the risk factor for developing exacerbation[9].

Collard et al., study showed Since many patients present with a severe hypoxemia in the arterial blood gas analysis and respiratory failure, admission to the intensive care unit and assisted ventilation is often required, Established criteria for a presenting abnormal gas exchange is a PaO_2/FiO_2 ratio <225 or a decrease in $PaO_2$of ≥10 mmHg over time[11].

Ground glass, reticulation and honey combing were more evident HRCT findings in exacerbation group. This agreed with a study by Kim et al., who informed that the All patients displayed newly developed diffuse bilateral ground-glass opacity (GGO) at the time of AE, superimposed on subpleural reticular and honeycombing densities[8].

Conclusion

Fever, decline in FVC, O_2 saturation and new ground glass on HRCT are the most prominent signs of AE of ILDs.

Recommendation

Clinical and radiological findings are helpful , easy and non-invasive diagnostic tools of AE-ILD

Limitations It is known that our study had limited numbers of patients so, we recommend making studies on larger scale.

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