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Medicine

Clinico Radiological Assessment of Suppurative Lung Disorder's

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Original Research Article

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Abstract: Suppurative lung disorders (SLD) is a clinical syndrome with symptoms indicating chronic endobromchial suppuration and includes bronchiectasis, lung abscess and empyema(1). Though its spectrum is wide there is evidence that early diagnosis and treatment can improve the outcome and also reduce pulmonary decline. Early recognition of SLD through a myriad of clinical and radiological findings have been studied including demographic details.
Keywords: Suppurative lung disorders (SLD), empyema, exertionaldyspnoea.

INTRODUCTION

Suppurative lung disorders (SLD) is described as a clinical syndrome in which there are symptoms indicating chronic endobronchial suppuration with or without radiological evidence on c-HRCT scans[1]. It is seen that the symptoms of chronic endobronchial suppuration are a continuous, wet or productive cough for a period of more than 8 weeks[2], with or without other features, such as exertionaldyspnoea, symptoms of reactive airway disease[2,3], recurrent chest infections, growth failure, clubbing, hyperinflation or chest wall deformity[3,4]. However, absence of symptoms (other than wet cough) and signs does not reliably exclude SLD[4,5].

SLD is important given (i) the spectrum of disease; (ii) the increasing evidence that early diagnosis and treatment improves outcomes and reduces pulmonary decline[5,6]; and (iii) the difficulties of providing robust definitions.

The spectrum of SLD includesbronchiectasis , lung abscess, empyema[8,9].

Early diagnosis of SLD requires thorough clinical assessment of patients including history of symptoms and radiological assessment including chest-X ray, chest CT, etc. which helps to confirm the diagnosis and assess the severity and extent of disease.

Patients with symptoms and/or signs of CSLD require a c-HRCT scan to confirm the diagnosis and to assess severity and extent of bronchiectasis[10,11]. Prevalence of suppurative lung disorder is very much common in Indian population. The study aims to identify constellation of demographic symptoms and signs that portend a diagnosis of CSLD and mandate further investigations.

METHODOLOGY

The present study was conducted at the outpatient department of Medicine of tertiary care hospital in Kolhapur, from May 2015 to August 2017. Inclusion criteria were all patients suffering from clinically diagnosed suppurative lung disorder, age 18 to 70 years, both genders, given informed written consent. Exclusion criteria were patients suffering from COPD, ILD, Pleural effusion and those unwilling to participate. This observational cross sectional study followed simple consecutive sampling with a sample size of 50 patients.

At the time of registration baseline information was taken with respect to sociodemographic factors, clinical findings, and other investigations. Each patient was followed up in Medicine department till discharge. The data thus collected was then analyzed using SPSS V20.0

RESULTS

A total of 50 patients satisfying the inclusion and exclusion criteria were studied. The mean age of patients was 51±14.85 (range 20 to 60 years) with male: female ratio of 3:1. Of the patients 30 (60%) were farmers, 11 (24%) were housewives and 09(20%) had other profession e.g. driver, carpenters, students etc.(Fig 1).

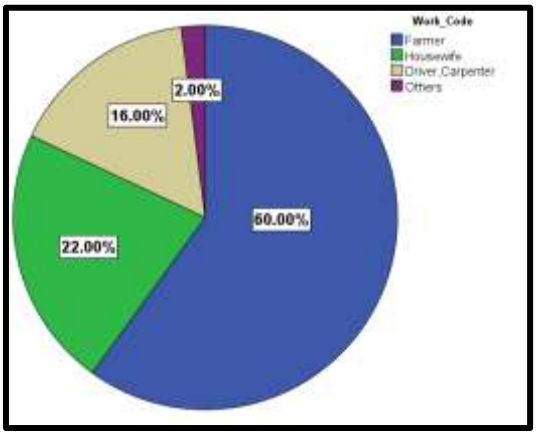

Fig- 1: Occupation Profile

56% were smokers (n=28). Of the 28 farmers, 22 were smokers. The mean age of both smokers and non-smokers did not show any significant difference (p>.05). History of Kochs was noted in 38% (n=19).

Cross tabulation of occupation of patients with their smoking status, layered for history of Kochs was performed.

Table-1: Occupation * Smoker * Kochs_HistoryCrosstabulation

Count						
Kochs_History			Smoker		Total	P value
			Smoker	Non-smoker		
No Kochs	Occupation	Carpenter	1	0	1	
		Driver	2	1	3	.001
		Farmer	12	5	17	
		Housewife	0	10	10	
	Total		15	16	31	
H/O Kochs	Occupation	Autorikshaw	1	1	2	.297
		Carpenter	1	0	1	
		Driver	0	1	1	
		Farmer	10	3	13	
		Housewife	0	1	1	
		Student	1	0	1	
	Total		13	6	19	
Total	Occupation	Autorikshaw	1	1	2	.000
		Carpenter	2	0	2	
		Driver	2	2	4	
		Farmer	22	8	30	
		Housewife	0	11	11	
		Student	1	0	1	
	Total		28	22	50	

Above cross-tabulation revealed that of the 11 housewives who had CSLD, 10 were non-smokers and had no history of Kochs (p=.001). Farmers (n=30) reported a higher history of smoking (n=22) and 10 of the 22 farmers also had history of Kochs.

All patients had cough (100%). Expectoration was present in 48 (96%) of the patients however 70% of the patients had white expectoration.

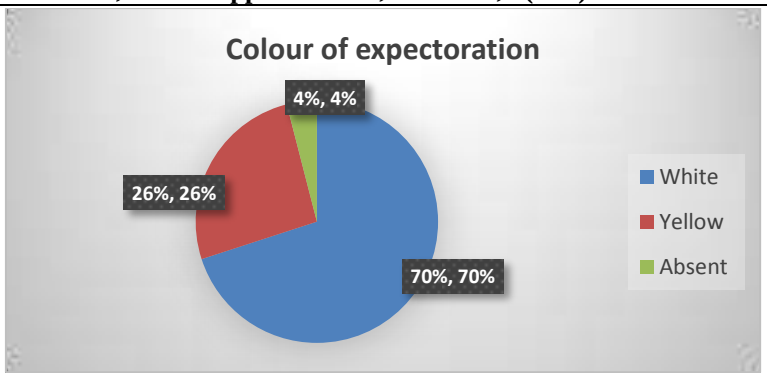

Fig 2: Expectoration in study patients

Fever was the second commonest symptoms (76%) followed by weight loss (26%). Haemoptysis was noted in only 2% of patients. Mean duration of symptoms was24.66 ± 4.76 with64% (n=32) of patients having symptoms for more than 20 days.

Clinical Examination revealed pallor 18%(n=9), cyanosis 22% (n=11),clubbing 58% (28). Of those patients with clubbing(n=27), 12 patients were smokers with mean duration of smoking of 14.11 ± 8.07 years (p=0.005).

All the patients underwent X ray chest (PA) view on presentation. Patients with suspicion of CSLD based on presentation and plain X-ray Chest PA were further referred for HRCT.HRCT findings showed that 90% (n=45)of patients had bronchiectasis and lung abscess was diagnosed on 10% (n=5) .

HRCT revealed that 5 patients had only traction type, cystic changes were seen in 07 (14%) patients, tubular in 1 (2%) patients, and fibrocavitorychanges were seen in n=13 (26%) patients with 6 patients having mixed findings. Lung abscess was seen in 5 patients. (Fig 3).

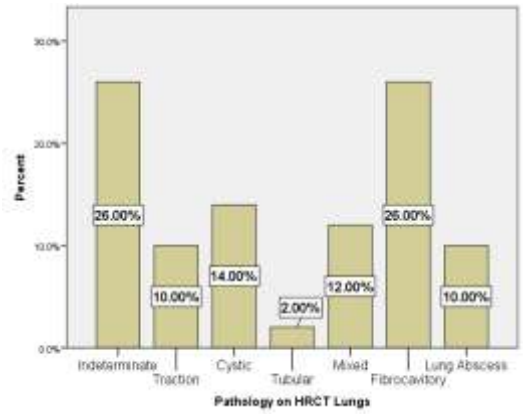

Fig 3: Pathological findings on HRCT lungs

Unilateral involvement was noted on 65% of cases .Lobar distribution of involvement is shown in Figure 4 below.

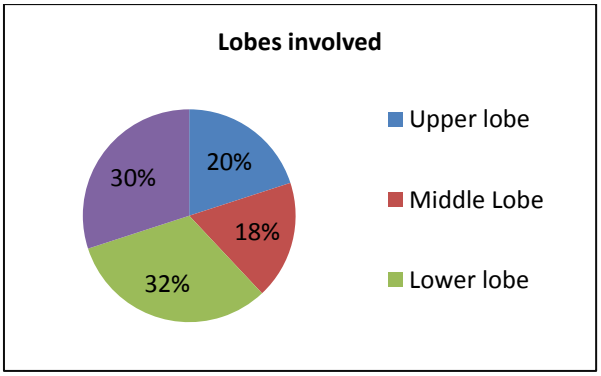

Figure 4: Lobar Distribution of involvement

Significantly patients with unilateral involvement had higher mean duration of smoking (p=.005) (Table-2).

Table-2: Comparison of Smoking duration with lung involvement

	Side	N	Mean	Std. Deviation	Std. Error Mean	P value
Smoking	Unilateral	30	11.10	9.622	1.757	.005
	Bilateral	20	3.95	6.411	1.434	

Association between clinical profile and radiological findings among the study population was studied using Chi Square test. (Table-3). No statistically significant correlation was noted (p>0.05).

Table-3: Clinical profile/ radiological findings

Clinical profile/ radiological findings	Traction	Cystic	Tubular	Fibro cavity
Fever	4	6	3	11
Hemoptysis	0	0	0	0
Weight loss	3	1	1	8

Regression Analysis:

Regression analysis of factors to identify a model predicting the traction type of bronchiectasis was performed (Table-1).

After applying multiple logistic regression it was seen that only age as an independent variable showed significance in predicting the traction type in presence of other independent variables (Table-5 above).

Regression model for predicting cystic type of bronchiectasis

Table-4: Regression model for predicting traction type of bronchiectasis

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	Age	.337	.178	3.591	1	**.05**	1.400
	Expectoration	15.926	28420.737	.000	1	1.000	8254017.578
	Smoking	-.577	1.645	.123	1	.726	.562
	Sex	1.657	1.776	.870	1	.351	5.243
	Fever	-.006	1.493	.000	1	.997	.994
	H/OKochs	-1.493	1.464	1.041	1	.308	.225
	Constant	-54.646	56841.474	.000	1	.999	.000

a. Variable(s) entered on step 1: AGE, expectoration, SMOKING, SEX, Fever, H/OKOCHS.

Table-5: Variables in the Equation

Variables in the Equation							
		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	Age	.002	.039	.002	1	.966	1.002
	Sex	-1.394	1.075	1.682	1	.195	.248
	Colour	-1.659	1.461	1.290	1	.256	.190
	Fever	.730	1.360	.288	1	.592	2.074
	Hokochs	-.183	.920	.040	1	.842	.833
	Smoking	.587	.929	.400	1	.527	1.799
	Clubbing	2.002	.992	4.073	1	**.044**	7.402
	Cyanosis	-2.978	1.463	4.145	1	**.042**	.051
	Pallor	-1.082	1.248	.751	1	.386	.339
	Expectoration	22.183	28420.694	.000	1	.999	4303033009.784
	Constant	-39.841	56841.388	.000	1	.999	.000

A. Variable(S) Entered On Step 1: Age, Sex, Colour Of Expectoration , Fever, H/Okochs, Smoking, Clubbing, Cyanosis, Pallor, Expectoration.

After applying multiple logistic regression it was seen that clubbing and cyanosis showed significance in predicting the dependent variable i. e cystic type in presence of other independent variables (both p.

DISCUSSION

The mean age of patients with Suppurative lung disease reflects the indolent course and chronicity of the inflammatory process which results in epithelial damage and permanent irreversible structural changes in the lung tissue.

Present study showed that majority were males 72% in concert with the fact that 56% were farmers 8% were carpenters and 2% were drivers.

Occupation: The possibility of occupation related exposure being the cause of chronic lung disease and traction bronchiectasis is well-known. The considerable numbers of housewives is a reflection of the indoor pollution levels in the rural levels due to use of bio-fuels for cooking since several decades.

History of Koch's : In present study 40% had history of Koch's. No housewife had history of Kochs. This further reinforces the theory that bio-fuels used for cooking contribute to development of bronchiectasis in the female population of this region.

Smoking: All the 28 smokers (56%) were males and of these 86% had duration of over 10 years.Significant association between the occupation and smoking was seen (p=.000). 22 of the 30 farmers were smokers. However no difference in the mean age of the farmers who smoked and did not smoke was noted, raising a question on the contribution of smoking to the genesis of the disease. However, the absence of history of pack-years explains this discrepancy. Significantly patients with unilateral involvement had higher mean duration of smoking (p=.005).

Expectoration : Classically, copious expectoration is described as a hallmark of bronchiectasis and lung abscess in standard texts. The absence of expectoration in 4% of patients is due to patients with partially or almost fully treated lung abscess who were also included.

In present study majority 70% had white coloured sputum and 26% had yellow coloured. This reflects the presence of infection in the subjects with yellow expectoration the others not presenting with clinically apparent secondary infection of the airways.

Matching with the prolonged nature of the disease, majority of the patients (64%) had duration of symptoms more than 20 days.

Examination: The commonest finding was clubbing seen in 58% of the patients. The chronicity of the disease and its association with clubbing is well-known. Presence of pallor in only 8% of patients**c**ould be ascribed to the fact that most patients were under active treatment already.

Indoor Pollution (biofuels), occupational exposure and smoking as causative factors could account for a widespread involvement of both lungs resulting in bilateral clinical findings.

Radiological findings: The entire spectrum of pathological types was seen in this small cohort of the study. Patients with fibrocavitary findings had history of Kochs and also exhibited findings of traction bronchiectasis, accounting for the 'mixed' category. Refer Figure 4.

Present study showed that in majority 32% lower lobe was involved, in 30% more than one lobe, in 20% upper lobe and in 18% middle lobe was involved. The higher involvement of more than one lobe suggests a causation more easily ascribed to smoking, pollution, ILD than to localized factors such as foreign body aspiration, aspiration pneumonia, Kochs etc.

Clinical profile and radiological findings: Present study showed no statistical significance between clinical profile and radiological findings (p=0.42). The classical clinical description of textbooks still serves as a guide for the decision for radiological investigations and clinical treatments. However, the higher incidence of white expectoration in this study reflects the wider and more open-handed use of antibiotics in general practice.

Regression Models: Regression analysis for traction bronchiectasis revealed a significant positive association with age but no other demographic feature could be explained. Cystic bronchiectasis was significantly associated with clubbing and cyanosis in the prediction model created using demographic and clinical features. However, the size of the study population precludes making any conclusions.

CONCLUSION

The global burden of Suppurative lung disease and its impact on health are important to ascertain. High resolution CT scan is the diagnostic gold standard technique. Variables like duration of symptoms, expectoration, clubbing, cyanosis amongst others in addition to the radiological findings lead to a diagnosis of suppurative lung disease. No predictive model could be ascertained in this study to enable a clinical diagnosis without HRCT. Clinico-radiological assessment is the surest way of reaching an early diagnosis which will help to treat them properly with

appropriate management protocol providing good prognosis and better outcomes.

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