

Evaluate the patients of hemoptysis with apparently normal chest x-ray by various modalities

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Abstract

Introduction: Hemoptysis is defined as expectoration of blood that originates from tracheo-bronchial tree or pulmonary parenchyma (lower respiratory tract) and mostly bronchial artery is responsible. A large number of patients presenting hemoptysis with normal chest radiographs may have serious underlying disorders. In such patients we required CT scanning with contrast and High resolution and fiber-optic bronchoscopy.

Materials and methods: A total 50 patients had been registered OPD/IPD for study, patients had hemoptysis with apparently normal x-ray chest and patients exclude with having pseudo hemoptysis, spurious hemoptysis, hemtemesis. Sputum for AFB and gram staining, pyogenic culture sensitivity (if needed), Sputum for fungal smear (if needed), Routine Blood examination, Blood biochemistry, Mantoux Test, HRCT. FOB, ECG, if needed 2D ECHO.

Results: In the present study a definite diagnosis was made in 37 patients (74%). The diagnosis was made by HRCT, broncheactisis in 26(52%) of patients, by FOB in another 10(20%). In one patient (2%) the diagnosis was made by the other means (ECHO etc).

Keywords: Hemoptysis, bronchoscopy, x-ray

Introduction

Hemoptysis is defined as expectoration of blood that originates from tracheo-bronchial tree or pulmonary parenchyma (lower respiratory tract) and mostly bronchial artery is responsible for hemoptysis unless proved otherwise. is classified based on the rate of hemorrhage, Massive hemoptysis is >600 of expectoration blood with in 24 hour to 48 hour and frank or gross hemoptysis is expectoration of blood less than 600ml in 24 to 48 hour but more than blood streaking. Hemoptysis may be pseudohemoptysis

(expectoration of blood other than the lower respiratory tract) For centuries, hemoptysis was considered pathognomonic of pulmonary tuberculosis 40% (TB)¹ but other important cause of hemoptysis also present eg bronchiectasis 30%, necrotizing pneumonia 10%, lung abscess 5%, fungal infection 5%, lung cancer and arteriovenous malformation 10%. There may be some itrogenic causes of hemoptysis are after endotracheal intubation, upper air way trauma during suction ,pulmonary arteries catheterisation and pulmonary infract. A

large number of patients presenting hemoptysis with normal chest radiographs, may have a serious underlying disorders. However, in a significant proportion, varying between 3 and 22% of the patients, the cause remains undetermined². The diagnosis is more difficult in patients presenting with normal chest radiographs. Here is required evaluation of patients for diagnosis. The initial approach to the evaluation of a patient with hemoptysis. The evaluation begins with routine tests. The site, etiology and extend of bleeding be evaluate .Identifying the site of bleeding requires visualization of the airways including the nasopharnx and oropharnx x-ray chest in apparently normal chest x-ray. In such patients we required CT scanning with contrast and High resolution and fiberoptic bronchoscopy (with bronchial wash, bronchial biopsy)^{3,4,5}.Patients with hemoptysis and apparently normal chest x-ray required CT Chest, Fiber optic bronchoscopy, Hemoptysis is a well-known indication for flexible bronchoscopy, CT chest with and without contrast, HRCT Chest

Materials and methods

The Study was an observational study which was conducted in patients who have Hemoptysis with apparently Normal Chest X-Ray attending the outpatient clinics or indoor patient of Department of Respiratory Medicine, S P Medical College Bikaner. Patients includes are having hemoptysis with apparently normal chest x-ray and patients exclude with having pseudo hemoptysis, spurious hemoptysis, hemtemesis Patient having evident lesion in chest x ray. After a careful detail history and general physical examination, A thorough examination of respiratory and CVS was done and the following investigation were done to evaluate the cause of hemoptysis. digital Chest X-ray PA view, Sputum for AFB X 2 sample, (direct smear) ,Sputum for gram staining, pyogenic culture sensitivity

(if needed),Sputum for fungal smear (if needed),Blood examination – CBC, ESR, BT, CT ,Blood biochemistry – random blood sugar, LFT, RFT ,Mantox Test will be done in all patients who are sputum smear negative for AFB but who are suspected of pulmonary tuberculosis on clinical and on basis of HRCT. FOB was done with bronchial aspirate/brushing- for AFB, Gram staining, pyogenic C/S, malignant cytology,bronchial biopsy (in case any visible lesion is present) for histopathological examination,Post FOB sputum – AFB and malignant cytology, ECG, if needed 2D ECHO and,HRCT was done in all patients.

Final diagnosis will be established by consensus after all investigation, clinical findings and expert opinion from Radiation oncologist, general physician, cardiologist, Radiologist.

Results

According to table no. 1, out of total 50 patients, 18 were females and 44.4%(8) female were found normal another44.4%(8) having Bronchiectasis 11.1%(2) were suffering pulmonary TB, while in 32 males, 15.6%(5) males were found normal, 31.3%(10) were bronchiectatic, 13.3%(10) males were suffering from pulmonary TB, 18.8%(6) male patients were found lung cancer and3.1%(1) patient was having mitral stenosis. On applying chi square test the difference was found significant ($\chi^2 = 10.121$; $p < 0.05$).

In table 2 distribution of cases according to their residential (19 rural and 31 urban) area in relation to final diagnosis. Out of them, 26% (13) patients were found normal, Broncheactisis were present in total 36% (18) patients and out of them 26.3% (5) from rural area and 41.9% (13) patients belonged urban area. CA lung were present in 12% (6) patients and out of them21.1% (4) form rural area and 6.5% (2) patients belonged to urban area. Mitral stenosis was present in 2% (1) rural patient.

Table 1: Distribution of cases according to sex in relation to final diagnosis.

Final Diagnosis	Sex				Total	
	Female		Male			
	No.	%	No.	%	No.	%
Broncheactisis	8	44.4	10	31.3	18	36.0
CA Lung	0	-	6	18.8	6	12.0
Mitral Stenosis	0	-	1	3.1	1	2.0
Normal	8	44.4	5	15.6	13	26.0
Pulmonary TB	2	11.1	10	31.3	12	24.0
Total	18	100	32	100	50	100
χ^2	10.121					
p	0.038					

Table 2: Distribution of cases according to residential area in relation to final diagnosis.

Final Diagnosis	Residential Area				Total	
	Rural		Urban			
	No.	%	No.	%	No.	%
Broncheactisis	5	26.3	13	41.9	18	36.0
CA Lung	4	21.1	2	6.5	6	12.0
Mitral Stenosis	1	5.3	0	-	1	2.0
Normal	3	15.8	10	32.3	13	26.0
Pulmonary TB	6	31.6	6	19.4	12	24.0
Total	19	100	31	100	50	100
χ^2	6.485					
p	0.166					

Table 3: Distribution of cases according to occupation in relation to final diagnosis.

Final Diagnosis	Occupation											
	Aaganbari		Banking		Farmer		House Wife		Labour		Shopkeeper	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Broncheactisis	1	100	1	100	9	31.0	6	42.9	0	-	1	100
CA Lung	0	-	0	-	6	20.7	0	-	0	-	0	-
Mitral Stenosis	0	-	0	-	1	3.4	0	-	0	-	0	-
Normal	0	-	0	-	5	17.2	8	57.1	0	-	0	-
Pulmonary TB	0	-	0	-	8	27.6	0	-	4	100	0	-
Total	1	100	1	100	29	100	14	100	4	100	1	100

Pulmonary tuberculosis was present in 24% (12) patients and out of them 31.6% (6) females and 19.4% (6) males each belonged to rural and urban area. On applying chi square test the difference was found statistically insignificant ($p > 0.05$).

According to occupation, out of total 18 broncheactisis patients, 1 each was aaganbari, banking and shopkeeper occupation while 9 patients were farmer and 6 patients were housewives. Out of total 6 CA lung patients, all belonged farmer occupation while mitral stenosis patient was

also belonged to farmer occupation. Out of total 12 pulmonary tuberculosis patients, 8 and 4 belonged to housewives and labour occupation.

Out of total 18 broncheactis patients 18 had cough and 18 had hemoptysis while 17 patients had expectoration, 1 patient had breathlessness and 1 had chest pain. All CA Lung patients had cough and hemoptysis, 3 patients had expectoration, 2 patients had breathlessness and 4 patients chest pain. Mitral stenosis patient had cough, expectoration and hemoptysis while all

pulmonary tuberculosis patients had cough, expectoration and hemoptysis present.

According to age group, out of total 18 broncheactis patients, 3, 13 and 2 belonged to ≤ 20 , 31-50 and > 50 years age group respectively. Out of total 6 patients of CA lung all the six patient are of > 50 years age group respectively. In pulmonary tuberculosis patients, 3, 6 and 3 belonged to age group ≤ 30 , 31-50 and > 30 years respectively. On applying chi square test the difference was found statistically significant ($p < 0.01$).

Table 4: Distribution of cases according to presenting symptoms in relation to final diagnosis.

Presenting Symptoms	Final Diagnosis									
	Broncheactis		CA Lung		Mitral Stenosis		Normal		Pul TB	
	No.	%	No.	%	No.	%	No.	%	No.	%
Cough	18	100	6	100	1	100	13	100	12	100
Expectoration	17	94.4	3	50.0	1	100	6	46.2	12	100
Breathlessness	1	5.6	2	33.3	0	-	0	-	0	-
Wheezing	0	-	0	-	0	-	0	-	0	-
Chest Pain	1	5.6	4	66.7	0	-	0	-	0	-
Chest Tightness	0	-	0	-	0	-	0	-	0	-
Hemoptysis	18	100	6	100	1	100	13	100	12	100
Drug Association	0	-	0	-	0	-	0	-	0	-
Food Particles	0	-	0	-	0	-	0	-	0	-

Table 5: Distribution of cases according to age group in relation to final diagnosis.

Final Diagnosis	Age Group (years)						Total	
	≤ 30		31-50		> 50			
	No.	%	No.	%	No.	%	No.	%
Broncheactis	3	23.1	13	56.5	2	14.3	18	36.0
CA Lung	0	-	0	0.0	6	42.8	6	12.0
Mitral Stenosis	0	-	0	-	1	7.1	1	2.0
Normal	7	53.8	3	13.0	3	21.4	13	26.0
Pulmonary TB	3	23.1	6	26.1	3	21.4	12	24.0
Total	13	100	23	100	14	100	50	100
χ^2	22.502							
p	0.004							

Table 6: Distribution of cases according to history of smoking in relation to final diagnosis.

History of Smoking	Final Diagnosis									
	Broncheactis		CA Lung		Mitral Stenosis		Normal		Pul TB	
	No.	%	No.	%	No.	%	No.	%	No.	%
Bidi	3	16.7	5	83.3	0	-	0	-	6	50.0
Chillam	1	5.6	1	16.7	0	-	0	-	1	8.3
Hukka	0	-	0	-	0	-	0	-	0	-
Cigar	0	-	0	-	0	-	0	-	0	-
Cigarette	2	11.1	0	-	0	-	0	-	0	-

Table 7: Distribution of cases according to bronchoscopy/HRCT test in relation to final diagnosis.

Final Diagnosis	FOB/HRCT Test	No. of Cases	%
Broncheactis	HRCT	18	36.0
Pulmonary Tuberculosis	HRCT+FOB*	8+4*=12	24.0
CA Lung	FOB/Biopsy/Brushing	6	12.0
Mitral Stenosis	ECHO	1	2.0
Undiagnosed	HRCT/FOB	13	26.0

Table 7 shows distribution of cases according to history of smoking in relation to final diagnosis. Out of total 18 patients of broncheactis 3, 1 and 2 patients had history of Bidi, Chilam and Cigarette respectively, 5 and 1 patients of CA lung had history of bidi and chilam respectively, while 6 and 1 patients of pulmonary tuberculosis had history of bidi and chilam respectively patients HRCT and FOB tests were performed.

According to above table, 18 patients had bronchieactis and they all confirmed by the HRCT test. Pulmonary tuberculosis was present in 12 patients and out of them 8 and 4 were confirmed by HRCT and FOB test. CA Lung was present in 6 patients and they all confirmed by FOB/Biopsy/Brushing while mitral stenosis patient was confirmed by ECHO test. 13 patients were remain undiagnosed in these undiagnosed

Discussion

In a patient presenting with hemoptysis and normal chest radiograph, diagnosis of the etiology of hemoptysis is often difficult more so in patients with normal chest X-ray.

Hemoptysis is an important symptom of pulmonary disease reported in 7-15% of patients^{6,7}. In the present study, a definite diagnosis was made in 37 patients (74%). In our study the 26 patients (52%) diagnosis by the HRCT, 10 (20%) by FOB, ECHO Diagnosed (1) 2% case. Study of Magu et al, the definite diagnosis was obtained by HRCT in 53% of patients^{8,9,10,11}. The only disease that was solely diagnosed by HRCT was bronchiectasis (18 patients: 36%). Several studies confirm the efficacy of HRCT in establishing the diagnosis of bronchiectasis^{12,13,14}. The high sensitivity of CT in identifying both the intraluminal and extraluminal extent of central lung cancers in conjunction with its value in diagnosing bronchiectasis suggest that CT should be obtained prior to bronchoscopy in patients with haemoptysis^{15,16}. Naidich et al in a CT-bronchoscopic correlation in 58 cases concluded that HRCT plays an important role in screening patients presenting with haemoptysis¹⁷. FOB does not have a direct role in the diagnosis of bronchiectasis. The overall diagnostic accuracy of FOB in patients presenting with hemoptysis are

(20%; 10 patients) and FOB is also useful in localizing the site of bleeding and evacuation of blood clots. The other studies also support our study low (0 to 17%)^{18,19,20}. Minimal exudative tuberculosis can be missed on a plain chest radiograph, CT often detects occult parenchymal disease or adenopathy when CXR is normal^{21,22}, 'tree in bud' appearance were the most characteristic CT features of tuberculosis disease^{activity23,24}. In our study, the incidence of TB was 24 % which is compatible with study results of Magus et al. Several studies have evaluated the incidence of carcinoma in patients with haemoptysis and a normal chest X-ray^{25,26}. In most series of such patients who underwent bronchoscopes, the incidence of bronchogenic carcinoma has ranged from 0-16% with an average of 5.2%. Zavala *et al* found a significant incidence of tumours in patients with haemoptysis and non-localising chest radiographs²⁷.

In our study, 6 (12%) patients had bronchogenic carcinoma. We believe that the prevalence of malignant neoplasm is low in patients with hemoptysis and normal chest X-ray^{28,29,30,31}. The low probability of finding carcinoma in a patient with haemoptysis and a normal CXR reflects the fact that haemoptysis is usually a late symptom of lung cancer by which time most of the patients would show abnormal chest X-ray findings. In addition, in 1 patient (2%), definite diagnosis was established by using other means (Echocardiography). Finally, there were 13 patients (26%) in whom a definite diagnosis was not made despite all the investigating including FOB and HRCT.

Summary and conclusion

In patients with haemoptysis and normal chest radiograph, it is necessary to use diagnostic tools such as HRCT and bronchoscopy to get on accurate diagnosis. The frequent reports confirm that disease such as tuberculosis, bronchiectasis and lung

cancer are major reason for haemoptysis with normal chest X-ray. In the present study a definite diagnosis was made in 37 patients (74%). The diagnosis was made by HRCT, bronchiectasis in 26(52%) of patients, by FOB in another 10(20%). In one patient (2%) the diagnosis was made by the other means (ECHO etc). In our study, the incidence of tuberculosis was 24%. In our study 6(12%) patients had bronchogenic Carcinoma, Finally there were 13(26%) patients in whom definitive diagnosis was not made despite all the investigations including FOB and HRCT.

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