RESEARCH ARTICLE

EVALUATION OF PATIENTS WITH HEMOPTYSIS ATTENDING THE DEPARTMENT OF PULMONOLOGY SANTHIRAM MEDICAL COLLEGE.

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Objective: To evaluate hemoptysis among patients who attended the department of pulmonary medicine, Santhiram medical college and general hospital.

Material And Methods: This was a descriptive cross sectional study done on patients with at least one episode of hemoptysis attending to the Department of pulmonary medicine, Santhiram medical college and general hospital from January 2015 to August 2016. All the patients are evaluated by -Chest x-ray pa-view, CT-chest, Sputum for culture and sensitivity, Sputum for KOH mount, Sputum for AFB, Bronchoscopy, Upper airway and nasal examination, Complete blood picture, Coagulation profile, ECG, Complete urine examination, ICTC, 2d-Echo (if necessary).The final diagnosis is noted and the data will be statistically analysed.

Results: The age of the patients ranged from 21-75 years with a mean age of 49.42 years. Predominant age group was 41-60 years accounting for 49%.48% had history of smoking and all the smokers in the study were males. Hypertension was the most common associated medical condition (27%) followed by Diabetes Mellitus (22%).Tuberculosis was the most common underlying lung disease from the history (36%). Consolidation was the most common radiographic feature in 39% patients. Suspected clinical diagnosis was made in most of the cases. Tuberculosis was the most common final diagnosis of our study. Out of 34 cases, 21 cases were diagnosed by sputum for AFB and remaining 13 cases were diagnosed with the help of Fibre-optic bronchoscopy. 5 cases out of tuberculosis patients were retro-viral positive. All the retroviral positive cases (5%) were diagnosed as Tuberculosis. Of all the 20 cases of bronchiectasis 16 cases were confirmed by HRCT and remaining 4 showed characteristic clinical features and changes of bronchiectasis on chest radiographs. 13 cases (13%) were diagnosed as lung cancer, out of which 6 cases were squamous cell carcinoma, 2 cases were small cell carcinoma, 2 cases were secondaries in the lung, 1 case was adeno carcinoma, 1 case was poorly differentiated cell carcinoma and 1 case was carcinoid. Pneumonia was present in 9 cases (9%) and bacterial infection was the most common cause. 6 cases (6%) were diagnosed as Chronic bronchitis. All the cases were males with positive history of smoking. Diagnosis was made based on clinical history, chest radiograph, chest...
CT findings and spirometry. In 5 cases hemoptysis was unexplained by chest radiograph, chest CT and fibre-optic bronchoscopic evaluation and was diagnosed as idiopathic hemoptysis. 3 cases (3%) were diagnosed as lung abscess and diagnosis was confirmed by chest CT in all the cases. 1 case was diagnosed as adenoma, 1 case was diagnosed as pulmonary embolism based on CT pulmonary angiogram, chest CT, bilateral lower limb venous colour Doppler, 2D-Echo and 1 case had foreign body. Out of 100 cases, 26 cases had streaky hemoptysis. Mild hemoptysis was present in 38 cases. Moderate hemoptysis was present in 25 cases. Severe hemoptysis was present in 9 cases. Life threatening hemoptysis was present in 3 cases. Out of the 3 cases with life threatening hemoptysis, 2 were sputum positive tuberculosis and 1 had bilateral bronchectasis. Out of the 100 cases 80 cases were managed conservatively. Ventilator support was provided to 19 cases. 1 bilateral bronchiectasis case with recurrent hemoptysis was referred for therapeutic embolization.

**Conclusion:** Tuberculosis was the most common final diagnosis in our study. It is also evident that Squamous cell carcinoma was the most common malignancy surfaced out in our study. Most of the cases presented with mild hemoptysis. Tuberculosis is the most common cause of life threatening hemoptysis.

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**Introduction:**
The coughing up of blood is termed as hemoptysis. Hemoptysis is defined as the expectoration of blood that originates from the lower respiratory tract. Bleeding from the upper airways is to be excluded. Spectrum of hemoptysis varies from blood streaked sputum to coughing out large amount of blood. Hemoptysis is a common clinical problem reported to be the cause of attendance in 7-15% of patients coming to chest clinics. In most cases hemoptysis is a self-limiting event but in fewer than 5% it may be severe or massive, representing a life-threatening condition that warrants urgent investigations and treatment. The severity of haemoptysis has been arbitrarily divided depending upon the amount of bleeding into

- **Mild:** Hemoptysis of less than 100ml blood loss per day.

- **Moderate:** Hemoptysis of 100-150ml blood loss per day.

- **Severe:** Hemoptysis of 150-200ml blood loss per day.

- **Massive:** Hemoptysis of >500ml blood expectorated per day or rate of blood loss >150ml /hr or 100ml blood loss per day for more than 3 days.

Because of the practical difficulties of quantifying the volume of expectorated blood, others have proposed the term life-threatening hemoptysis to indicate hemoptysis accompanied by measurable parameters, such as abnormal gas exchange and hemodynamic instability, for patients in need of urgent resuscitation and treatment. Asphyxia due to the flooding of the airways rather than exsanguination is usually the cause of death, and it is commonly accompanied by cardiovascular collapse. Fortunately, massive hemoptysis is rare, occurring in 1% to 4% of patients with hemoptysis. However, mortality rates as high as 80% suggest that all hemoptysis, regardless of amount, should be taken seriously.

In hemoptysis, the blood generally arises from the bronchial circulation, except when pulmonary arteries are damaged by trauma, by erosion of a granulomatous or calcified lymph node or tumour, or, rarely, by pulmonary arterial catheterization or when pulmonary capillaries are affected by inflammation. Bleeding from the pulmonary veins is best characterized in cardiac disease such as mitral stenosis or mitral regurgitation.
Differential Diagnosis of Hemoptysis:
Source other than the lower respiratory tract: Upper airway (nasopharyngeal) bleeding, Gastrointestinal bleeding

Tracheobronchial source:
Neoplasm (bronchogenic carcinoma, Endobronchial metastatic tumour, Kaposi’s sarcoma, Bronchial carcinoid, Bronchitis (acute or chronic), Bronchiectasis, Broncholithiasis, Airway trauma, Foreign body Pulmonary parenchymal source: Lung abscess, Pneumonia, Tuberculosis, Mycetoma (“fungus ball”), Good pasture’s syndrome, Idiopathic pulmonary hemosiderosis, Wegener’s granulomatosis, Lupus pneumonitis, Lung contusion.

Primary vascular source: Arteriovenous malformation, Pulmonary embolism, Elevated pulmonary venous pressure (especially mitral stenosis), Pulmonary arteries rupture secondary to balloon-tip pulmonary artery catheter manipulation.

Miscellaneous and rare causes: Pulmonary endometriosis, Systemic coagulopathy or Use of anticoagulants or thrombolytic agents.

Hemoptysis is usually considered as an indication of pulmonary tuberculosis, but may be associated with various other causes. Present study will draw attention towards various causes of hemoptysis. Evaluation is to find treatable cause and at times, to reassure the patient.

Review of literature:
In a study conducted by Rajendra Prasad et al66, of the 476 patients with hemoptysis included in this study, 352 were males and 124 were females. Pulmonary tuberculosis was the leading cause of hemoptysis. There were 377 (79.2%) patients in the pulmonary tuberculosis group, 25 (5.7%) in the neoplasm group, 19 (4.0%) in the chronic bronchitis group, 18 (3.8%) in the bronchiectasis group, and 35 (7.3%) patients with hemoptysis due to other causes.

In a study conducted by Conlan AA et al19, the causes of hemoptysis among 123 patients were active pulmonary tuberculosis (47), bronchiectasis (37), chronic necrotizing pneumonia (11), lung abscess (six), lung cancer (six), bronchovascular fistula (five), primary pulmonary fungal infection (four), and miscellaneous (seven).

In a study conducted by Pragati Rao et.al21 out of 140 patients with haemoptysis 121(86.42%) were Males and 19(13.5%) were Females. Amongst the known causes Pulmonary tuberculosis was highest 91(65%), followed by lung neoplasm 14(10%), pneumonia 9(6.4%), bronchiectasis 6(4.2%), lung abscess 4(2.8%), COPD. Tropical pulmonary eosinophilia and Iatrogenic causes are 2 cases each (1.4%). Other causes like pulmonary embolism, bronchiolitis obliterans, systemic sclerosis, invasive aspergillosis, allergic broncho pulmonary aspergillosis (ABPA), kartagener’s syndrome, small airway disease are 1 case each (0.7%). 3 patients (2.1%) from total study had unknown aetiology.

During the 10-year study period by Xiao-Dong Xia et.al94 out of 112 patients, etiology of hemoptysis included bronchiectasis in 50 patients (44.6%), tuberculosis in 16 patients (14.3%), lung cancer in 5 patients (4.5%), bacterial pneumonia in 25 patients (22.3%), and aspergillosis in 4 patients, (3.6%). In 12 of 112 patients, the etiology remained cryptogenic, including 11 male and 1 female. The mean age was 44.67 ± 17.70 years (range 21-85 years) with a mean smoking consumption of 18.50 ± 11.15 pack-years (range 5-40 years).

In a study conducted by Santiago et.al77 out of 264 patients who underwent fiberoptic bronchoscopy for unexplained hemoptysis to determine the various causes of hemoptysis, bronchogenic carcinoma (29%), bronchitis (23%), and idiopathic hemoptysis (22%) accounted for the majority of causes of hemoptysis.

A retrospective analysis of 208 patients with hemoptysis by Hirshberg B et.al37 bronchiectasis (20%), lung cancer (19%), bronchitis (18%), and pneumonia (16%) accounted for most causes of hemoptysis. In contrast to older studies, active tuberculosis was a rare finding (1.4%). Bronchiectasis and bleeding diathesis were major causes of moderate to severe hemoptysis while bronchitis and lung cancer were commonly associated with milder degrees of bleeding. CT scan was the most sensitive diagnostic test when employed alone, with a positive yield of 67%. However, it failed to locate at least three cases of lung cancer. When combining a CT study together with a bronchoscopy, the positive yield increased to 93%.
According to a study by Abal AT et al. who evaluated 52 patients with haemoptysis, there were 42 males (80.8%) and 10 (19.2%) females, with a mean age of 42.2 (16-86) years. Of these, 26.9% were Kuwaiti nationals, 36.5% were Arab non-Kuwaiti nationals, 34.6% were Asians and 1.9% were other nationals. The aetiologies of haemoptysis were bronchiectasis (21.2%), old pulmonary tuberculosis with bronchiectasis (17.3%), active pulmonary tuberculosis (15.4%), bronchitis (5.8%), aspergilloma, rheumatic heart disease and carcinoid (1.9%). Aetiology could not be identified in 25% of patients.

A retrospective analysis of 108 patients by admission to the hospital for hemoptysis was done by Fidan A et al. in the year 2000. Of the cases, 79 were men and 29 were women, and the mean age was 51.74 +/- 17.51. In 77 of the cases it was the first attack, while in 31 it was recurrent. Lung cancer was the leading cause of hemoptysis (34.3%) followed by bronchiectasis (25.0%), tuberculosis (17.6%), pneumonia (10.2%) and pulmonary embolism (4.6%).

A study conducted by Bo Ram Lee et al. regarding the hemoptysis, 70 cases out of 221 cases were mild (31.5%), 36 cases moderate (16.2%), and 115 cases massive hemoptysis (52.0%). As for the causes, 72 cases were bronchiectasis (32.6%), 41 cases active pulmonary tuberculosis (18.5%), 24 cases fungus ball (10.8%), 13 cases lung cancer (5.9%), 45 cases other causes (20.3%), and 26 cases unknown cause (11.7%). Other causes included lung abscess, necrotizing pneumonia, pulmonary thromboembolism, pulmonary sequestration, arteriovenous malformation, catamenial pneumothorax, etc. As for the causes of 115 massive hemoptysis patients, 39 cases were bronchiectasis (39.9%), the highest frequency, followed by 24 cases of active pulmonary tuberculosis (20.9%), 16 cases of pulmonary fungus ball (13.9%), 7 cases of lung cancer (6.1%), 18 cases of other causes (15.7%), and 11 cases of unknown causes (9.6%).

Methodology:
This is a descriptive cross sectional study done on patients with at least one episode of hemoptysis attending to the Department of pulmonary medicine, Santhiram medical college and general hospital from January 2015 to August 2016.

Sample size:
100 patients were included in the study.

Inclusion criteria:
All the patients with at least one episode of hemoptysis attending the department of pulmonary medicine were included in the study.

Exclusion criteria:
1. Patients with hematemesis were excluded from the study.
2. Patients with hemoptysis from upper airway bleed were excluded from the study.

Data analysis:
The following softwares were used for the data analysis:
1. Microsoft Excel-2013 for entering the data.
2. SPSS version 21 for cross tabulation and analysis.

PATIENTS WERE EVALUATED BY Chest x-ray pa-view, CT-chest, Sputum for culture and sensitivity, Sputum for KOH mount, Sputum for AFB, Sputum for malignant cells, Bronchoscopy, Upper airway and nasal examination, Complete blood picture, Coagulation profile, ECG, Complete urine examination, ICTC, 2d-Echo (if necessary), USG guided FNAC.
Results:-
100 Patients were included in our study. Out of 100 patients 25% were in 21-40 year age group, 49% were in 41-60 year age group and 26% were in >60 year age group. The mean age of the patients was 49.42 years with a range of 24-75 years. Out of 100 patients 68% were males and 32% were females. Out of 100 patients history of smoking was present in 37%, 11% were ex-smokers. All the smokers in the study were males. 52% patients did not have smoking history. History of alcohol intake was present in 33%. In our study out of 100 patients 36% had history of pulmonary tuberculosis, 16% had history of COPD, 11% had history of asthma and 37% did not have any history of underlying lung disease. Among 100 patients of the study, 22% were known diabetics and 27% were known hypertensives. Chest X-ray PA view were done on all the 100 patients in which pulmonary lesions were detected in 75%. Chest CT scan was done in 71% of patients of which it was helpful for the diagnosis in 62% (87.32%) of
patients. Bronchoscopy was performed on 57 cases. In our study sputum for AFB was done in all the patients and in the suspected case, with sputum for AFB negative, bronchoscopy was done and BAL was collected for microscopic examination of stained smears for AFB. Among the 100 patients with hemoptysis, pulmonary tuberculosis (34%) was the most common cause of hemoptysis followed by bronchectasis (20%), lung cancer (13%), pneumonia (9%), aspergilloma (7%), chronic bronchitis (5%), lung abscess (3%), pulmonary embolism (1%), foreign body (1%), adenoma (1%). Idiopathic hemoptysis was present in 5% of cases. Out of 100 cases with hemoptysis 34 were diagnosed with tuberculosis. 21% showed positive result in sputum test for AFB and 13% were diagnosed with the help of Fiber optic bronchoscopy (FOB). BAL for AFB was positive in 13 cases. Among the 34 cases diagnosed with tuberculosis 5 patients were retroviral positive. In our study, Consolidation was the most common (38.33%) radiographic feature among tuberculosis patients. 20 among 100 cases of the study were diagnosed with bronchectasis. Out of 20 (20%) patients, diagnosis of bronchectasis was done with HRCT in 16 (16%) patients and in 4 (4%) patients based on clinical examination and Chest radiograph. Among 13 patients with lung cancer, all of them showed abnormalities from chest CT. Bronchoscopy was performed in all the 13 cases and in 12 cases it was helpful for the diagnosis. Positive results for malignant cytology were seen in 9 cases. Among 9 cases, 2 cases were diagnosed by bronchoalveolar lavage, 3 cases were diagnosed with bronchial brushings and remaining 4 cases were diagnosed with bronchial biopsy. 4 cases were diagnosed by USG guided FNAC. Most of the patients were found to have primary lung cancer and the squamous cell carcinoma was the predominant histological type. 2 cases among 13 cases had metastasis to lung. One case had cervical carcinoma as primary and the histology type was squamous cell carcinoma. Another case had pancreatic lung carcinoma as primary and the histological type was adenocarcinoma. All the 7 (7%) cases of fungal ball were diagnosed with chest CT. Bronchoscopy was performed among 4 cases of which 2 were having active bleeding from bronchus. Among 6 cases diagnosed as chronic bronchitis, detailed history was taken, clinical examination and evaluation with chest radiograph, spirometry, chest CT, bronchoscopy and relevant blood and sputum investigations were done to confirm the diagnosis. All the 6 cases were males with positive history of smoking. In our study among 5 cases, chest CT, bronchoscopy and other relevant investigations showed no evidence of any clear cause and were diagnosed as idiopathic hemoptysis. 17 among 100 patients had history of recurrent hemoptysis. In our study higher rate 47.05%, of recurrent, hemoptysis was seen in patients with bronchectasis. Out of 100 cases, 26 cases had streaky hemoptysis. Mild hemoptysis was present in 38 cases. Moderate hemoptysis was present in 24 cases. Severe hemoptysis was present in 9 cases. Life threatening hemoptysis was present in 3 cases. Among 34 tuberculosis patients with hemoptysis, streaky hemoptysis was present in 6 cases, mild hemoptysis was present in 12 cases, moderate hemoptysis was present in 26 cases. Severe hemoptysis was present in 8 cases. Life threatening hemoptysis was present in 3 cases.

**Discussion:**
Male to female ratio of our study was 2.125:1. In the study by Subodh K Nawal et al., male to female ratio was 2.23:1. Mean age of the patients in our study was 49.42 years. Mean age of the patients in the study by Y.J.Lee et al. of 228 patients mean age was 51.6 years and in study by Naveed Nazir Shah et al. the mean age was 58.76 years. In our study we had male preponderance and number of patients above the age of 40 years was more. The possible reason for this is smokers are predominantly males. However our study was conducted in a rural setup where females do not present early in the disease process.
In our study, history of smoking was present in 41% of patients. All the smokers in the study were males. In the study by Agarwala A et al, history of smoking was present in 46.66% (28) of patients and all the smokers were males. In a study conducted by Naveed Nazir Shah et al, history of smoking was present in 60.9% of patients and 90% were males. In our study 17% cases presented with recurrent hemoptysis. In the study conducted by Y.J. Lee et al, recurrent hemoptysis was present in 19.6% of patients. In our study higher rate of recurrent hemoptysis was seen in patients with bronchiectasis. In a study by Fidan A et al, high rate of recurrent hemoptysis was seen in patients with bronchiectasis similar to our study.

Out of 100 patients the most common etiology for hemoptysis in our study was tuberculosis (34%) followed by bronchiectasis (20%), malignancy (13%), pneumonia (9%), aspergilloma (7%), chronic bronchitis (6%), idiopathic (5%), lung abscess (3%), adenoma (1%), foreign body (1%) and pulmonary thromboembolism (1%). In our study, tuberculosis is the most common cause of hemoptysis in (34%) cases. In the study conducted by Naveed Nazir Shah et al, tuberculosis was the most common etiology of hemoptysis and is seen in 27.6% cases. In the study conducted by K.R. Patel et al, tuberculosis was associated in 60% of the patients with hemoptysis. In a study by Rajendra Prasad et al, Pulmonary tuberculosis was the leading cause of hemoptysis and was present in 79.2% of patients.

Bronchiectasis was the second common cause in our study. Among 20 (20%) of cases with bronchiectasis, 16 cases were diagnosed by HRCT and 4 cases were diagnosed based on clinical examination and chest X-ray PA view as the patients were not willing for chest CT. Bronchoscopy was performed in 8 cases with bronchiectasis out of which 5 cases showed abnormality. In a study by Bo Ram Lee et al, all the 72 cases of bronchiectasis were diagnosed by chest CT. Bronchoscopy was performed in 47.2% 34 cases of which 70% 24 cases showed abnormality. Bronchiectasis as a cause of hemoptysis, in a study done by Abal AT et al, was 21.2%, Bo Ram Lee et al was 32.6%, Saunders and Smith was 28.5%, Boaz Hirshberg et al was 20%. The rate of bronchiectasis is very low in the study by Santiago et al and Johnston and Reisz (1%).

In our study, tuberculosis was the cause of hemoptysis in 13% cases and most (84.61%) of the patients were found to have primary lung cancer and the squamous cell carcinoma was the predominant histological type. In a study by F. Soares Pires et al, Lung cancer was diagnosed in 33 patients with hemoptysis and is the 3rd most frequent diagnosis. Most (87.9%) were found to have primary lung cancer, and adenocarcinoma was the predominant histological type.

In our study, among the patients with haemoptysis and normal CXR incidence of malignancy was 1 case (4%). Incidence of malignancy in patients with haemoptysis and normal CXR in study by Adelman et al was 1 (1.4%) and Jackson et al was 2 (4.1%).

In our study, pneumonia was the cause of hemoptysis in 9% of patients and was bacterial in origin in all the cases. In a study by Boaz Hirshberg et al, pneumonia was the cause of hemoptysis in 33(16%) patients and was bacterial in origin in most cases. Pneumonia accounted for 6.4% (9) patients with hemoptysis in the study by D Pragathi Rao et al, 11% in study by Santiago et al. (6) and 5% in study by Johnston and Reisz.

In our study, fungal ball was diagnosed in 7% of cases. All the 7(7%) cases of fungal ball were diagnosed with chest CT. Aspergilloma accounted for 5 (2%) cases among 242 cases in a study by Naveed Nazir Shah et al and 4 cases (3.6%) among 112 patients in the study by Xiao-Dong Xia et al.

In our study bronchitis was present in 6% of cases with hemoptysis. Bronchitis accounts for 37(18%) cases in the study conducted by Boaz Hirshberg et al. In study conducted by Abal AT et al bronchitis was seen in 3 out of 52 patients accounting for 5.8%. Bronchitis was the etiological factor in 19(7.8%).

In our study lung abscess was seen in 3 cases (3%) out of 100 patients with hemoptysis and chest CT was done in all the 3 cases. Staphylococcus aureus was isolated by culture and sensitivity of sputum in 2 cases and 1 case showed mixed growth. In a study by Naveed Nazir Shah et al, lung abscess was seen in 8 (3.3%). In a study by D Pragathi Rao et al, 4 (2.8%) cases were diagnosed to have lung abscess among 140 cases of hemoptysis.

Bronchial adenoma was the cause of hemoptysis in 1% of cases in our study. Bronchial adenoma was seen in 4(2%) out of 208 patients in a study conducted by Boaz Hirshberg et al. In our study pulmonary thromboembolism is
seen in 1% of patients. In the study conducted by D Pragati rao et al21 1 (0.7%) case among 140 cases with hemoptysis was diagnosed as pulmonary embolism.

In our study foreign body was the cause of hemoptysis in 1 (1%) case which presented as atelectasis of lung in chest radiograph. Diagnosis was done with FOB and the foreign body (Analgesic tablet) was removed.

In our study out of 100 cases, 26 cases had streaky hemoptysis. Mild hemoptysis was present in 38 cases. Moderate hemoptysis was present in 24 cases. Severe hemoptysis was present in 9 cases. Life threatening hemoptysis was present in 3 cases.

Out of the 100 cases 80 cases were managed conservatively with supplemental oxygen, fluid resuscitation, positioning of patient on lateral decubitus towards the bleeding site, cough suppressants and styptics.

Ventilator support was provided to 19 cases. 1 case with recurrent hemoptysis was referred for therapeutic embolization.

**Conclusion:-**

Tuberculosis was the most common final diagnosis in our study followed by Bronchiectasis, Malignancy, Pneumonia, Aspergilloma, Chronic bronchitis, Idiopathic, lung abscess, pulmonary embolism, adenoma, foreign body. It is also evident that Squamous cell carcinoma was the most common malignancy surfaced out in our study. Most of the cases presented with mild hemoptysis. Tuberculosis is the most common cause of life threatening hemoptysis.

**References:-**


38. Ibrahim, WH. Massive haemoptysis: the definition should be revised. Eur Respir J2008; 32:1131


