

AETIOLOGICAL PROFILE OF CASES OF HAEMOPTYSIS ATTENDING A TERTIARY CARE CENTRE IN SOUTH INDIA

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ABSTRACT

BACKGROUND

Haemoptysis is a common but alarming symptom. The causes are numerous and may vary depending on the population studied. This study aimed to find the cause of haemoptysis among patients attending a tertiary care setting in south India. To assess the mortality rate attributable to haemoptysis and the relation between disease and severity of haemoptysis.

MATERIALS AND METHODS

A prospective cross-sectional study was done. 409 patients with haemoptysis were evaluated by careful history taking, clinical examination, and investigated as per conventional methods and in selected cases using fiberoptic bronchoscopy and CT scan of chest.

RESULTS

The commonest cause of haemoptysis in the study group is pulmonary tuberculosis and its sequelae (n=206, 50.3%). Lung tumours (n=58, 14.9%) formed second major cause of haemoptysis. Among them 51 were proven cases of carcinoma lung (12.5 bronchiectasis of non-tuberculous origin (n=16, 3.9%), pneumonias (n=18, 4.4%) lung abscess (n=16, 3.9%), among 409 patients there was a total mortality of 4.8% (n=20). Death attributable to haemoptysis was 2.4% (n=10). Among them 80% (n=8) had massive haemoptysis and 20% (m=2) had moderate haemoptysis at the time of presentation.

CONCLUSION

Pulmonary tuberculosis with its sequelae was the commonest cause of haemoptysis (50.6%), followed by carcinoma lung (14.9%) in this study. Among the total patients who expired (n=20) 40% patients had massive haemoptysis. 114 patients with haemoptysis had a CXR which appeared normal or non-localizing (27%). In 69 patients (16.8%) it could be considered as cryptogenic haemoptysis, in whom no diagnosis could be obtained in spite of adequate investigation.

KEYWORDS

Bronchiectasis, Causes, Haemoptysis, Mortality.

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BACKGROUND

Haemoptysis is defined as coughing out of blood from lower respiratory tract. It is an important and alarming symptom and often indicates serious disease. The causes of haemoptysis are numerous, and the causes vary depending on this setting where study is done. In approximately one third of cases no obvious cause for the haemoptysis can be found.¹

Vankralingen K.W et al reported the commonest cause of haemoptysis as pulmonary TB and its sequelae accounted for 65% of their cases.² In developed countries, commonest cause of haemoptysis was bronchiectasis (20%) followed by lung cancer (19%) Bronchitis (18%) and Pneumonia (16%).³ Coss Bu J.A et al reported that among 228 children, 149 belonged to the cystic fibrosis group, 37 in congenital

heart disease group.⁴ Cremaschi P, et al conducted the study on therapeutic embolization where the causes of haemoptysis reported was bronchiectasis (46%) and tuberculosis (31%) cystic fibrosis (15%) lung cancer (4%) and aspergilloma (3%).⁵

Massive haemoptysis is an uncommon but life-threatening event. Death from massive haemoptysis is usually due to choking following aspiration of blood, very rarely due to exsanguination.⁶

A mortality rate of 85% was described by Vankralingen K.W et al.² Hirshberg B et al (1997) reported mortality rates of 38% for massive haemoptysis and much lower mortality rate for mild and moderate haemoptysis of 2.5% and 6% respectively.³ Japanese Survey in 1994 reported rapid progression of pulmonary tuberculosis as the increased cause of death (20.9%), Complications like haemoptysis were attributed as a cause of death in 12.1%.⁵

The causes of haemoptysis are numerous. The origin of bleeding can be anywhere from pharynx to lung pleura and a precise history and meticulous physical examination are essential in narrowing the search for the aetiology. In doubtful cases of URT bleed ENT evaluation is done. After conventional investigation including CXR, CT scan and FOB are done in indicated cases.

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Chest radiography is the most indispensable investigation to a pulmonologist. But in more than a quarter case chest radiograph tend to be normal. CT scan of chest helps in detecting lesions not visualized in CXR. CT has shown to be accurate in diagnosis of a wide range of bronchial abnormalities including both central and peripheral abnormalities especially bronchiectasis^{7,8} FOB helped in visualizing the bronchial tree and detecting endobronchial lesions and is an indispensable tool in the evaluation of patients with haemoptysis.

This study was done to evaluate the causes of haemoptysis in our setting and to find the causes of mortality among haemoptysis patients in a tertiary care center in south India.

Aims and Objectives

Aim

- To find out the cause of haemoptysis among patients attending a tertiary care setting in south India.

Objectives

- To find out the mortality rate attributable to haemoptysis.
- To find the relation between disease and severity of haemoptysis.
- To find out percentage of total patients with normal CXR.

MATERIALS AND METHODS

Materials

409 consecutive patients with complaints haemoptysis (defined as coughing out of blood from LRT) attending outpatient department of Respiratory medicine, Medical College, Trivandrum from 1.12.99-30.06.2000 satisfying the inclusion criteria and exclusion criteria were included.

Inclusion Criteria

All cases with haemoptysis (defined as coughing out of blood from LRT) attending the outpatient department.

Exclusion Criteria

1. Iatrogenic haemoptysis (Induced by procedures like FNAC lung, bronchoscopy, pleural aspiration etc.)
2. Spurious haemoptysis (self-induced bleeding seen malingering patients, URT bleeding in patients with no lung pathology).
3. Traumatic (following fall, RTA etc.)

Methodology

Design of Study– Cross sectional study.

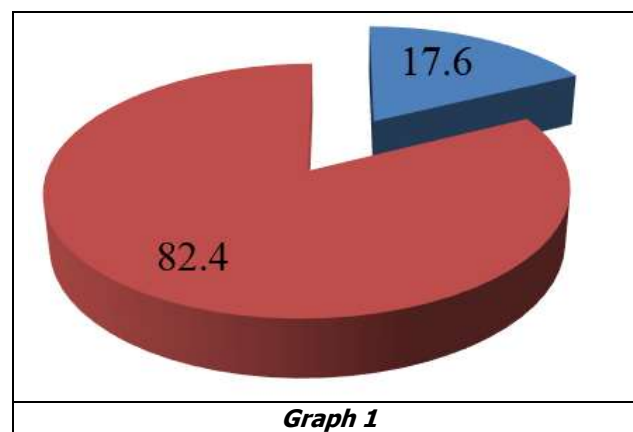
All patients satisfying the inclusion and exclusion criteria were included. A careful history using a questionnaire and a through clinical examination was done. Hematemesis and URT bleed have to be ruled out. In doubtful cases of URT, bleed ENT examination was done. A probable diagnosis was arrived at. The severity of haemoptysis was categorized in 4 groups. Coughing out of streaks of blood with sputum was categorized as blood streaking, mild haemoptysis< 30 ml/24

hours, massive haemoptysis >500 ml in 24 hours or >200 ml/bout. The group in between was moderate haemoptysis. The clinical diagnosis supplemented by chest radiograph. Routine investigations were done like Sputum AFB x 2 days, sputum cytology x 5 days, sputum gram staining Hb, TC, DC, ESR, Routine urine analysis, LFT, RFT, Bleeding time, clotting time & peripheral smear. ECG and ECHO done in selected cases. Fiberoptic bronchoscopy and CT scan were done in patients where no diagnosis was obtained by conventional methods.

Data collection done using a questionnaire consisting of 2 parts –first part to assess the history and second part consist of clinical examination and investigation. Data Entry was done in D-base and analysis done using SPSS.

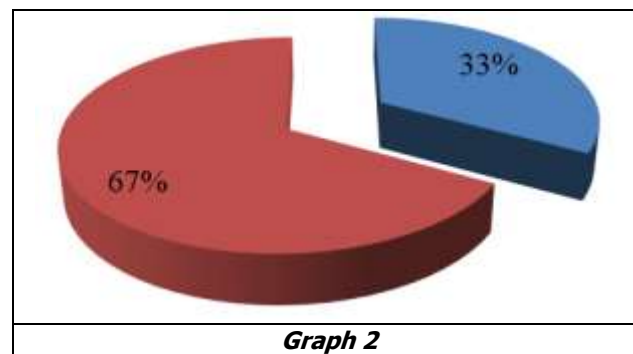
RESULTS

Participants of the Study



Graph 1

Total no. of patients with haemoptysis included the study were 409 which constituted 17.6% of the Total IP of 2323 during study period, December 99 to June 2000.



Graph 2

Sex Distribution

There was a predominance of males in the study with the M:F ratio of 2.03:1.

| Age | Male n=275 | | Females n=134 | | Total n=409 | |
|-------|---------------|--------|------------------|--------|----------------|--------|
| | No. | % | No. | % | No. | % |
| 10-25 | 19 | (6.9) | 13 | (9.7) | 32 | (7.8) |
| 25-40 | 45 | (16.4) | 36 | (26.8) | 81 | (19.8) |
| 40-55 | 94 | (34.2) | 45 | (33.6) | 139 | (34.7) |

| | | | | | | |
|-------|-----|--------|----|--------|-----|--------|
| 55.70 | 100 | (36.4) | 37 | (27.6) | 137 | (32.8) |
| >70 | 17 | (6.2) | 3 | (2.3) | 20 | (4.9) |

Table 1. Distribution by Age and Sex

Majority of patients were in the age group 40-70 (67.5%). No significant difference was noticed between males and females in various age group with exception of 25 – 40 y where a female predominance was seen.

| Age | Age of Initiation | Smoking Index |
|---------|-------------------|---------------|
| Minimum | 1 | 9 |
| Maximum | 30 | 1800 |
| Mean | 18.39 | 500.24 |
| Median | 19 | 420 |

Table 2. Frequency of Age of Initiation of Smoking and Smoking Index

In the study group the minimum age of initiation of smoking was 10 years maximum 30. The mean smoking index was 500.

| | Male n= 275 | | Females n=134 | | Total n=409 | |
|--------------|----------------|--------|------------------|------|----------------|------|
| | No. | % | No. | % | No. | % |
| Smoker | 225 | (81.8) | 0 | (0) | 226 | (55) |
| Non – Smoker | 50 | (18.2) | 134 | (33) | 184 | (45) |

Table 3. Distribution by Age and Sex

81.8% of males were smokers, none of the females were smokers. The ratio of smoker: Non – smoker 1.2:1

| | No. | % |
|------------|-----|------|
| D.M. | 60 | 14.7 |
| AIDS | 2 | 0.5 |
| HTN | 52 | 12.7 |
| IHD | 28 | 6.8 |
| Alcoholism | 53 | 13 |

Table 4. Frequency of Comorbidities

The commonest comorbidity seen was diabetics (14.7%) followed by (alcoholism) daily intake of alcohol was seen in 13% and hypertension in 12.7% of patients.

| | B.S. | Mild | Moderate | Massive | Total |
|--|------------|------------|-----------|-----------|------------|
| Infection (Pneumonic and Lung Abscess) | 17 (12.8) | 15 (11.7) | 1 (1.3) | 1 (1.43) | 34 (8.3) |
| P.T. (Active) | 29 (22) | 30 (23.6) | 35 (45) | 30 (42.9) | 124 (30.3) |
| Sequelae of PT | 13 (9, 8) | 20 (15.7) | 18 (22.5) | 31 (44.3) | 82 (20) |
| Bronchiectasis Non–TB Aetiology | 1 (9.8) | 6 (4.7) | 5 (6.3) | 4 (5.7) | 16 (3.9) |
| Lung Tumour | 38 (28.8) | 17 (13.3) | 3 (3.8) | 0 | 58 (14.9) |
| COPD | 8 (6.06) | 13 (10.2) | 0 | 0 | 21 (5.1) |
| Miscellaneous | 3 (2.3) | 2 (1.56) | 0 | 0 | 5 (1.2) |
| No Diagnosis | 24 (18.1) | 25 (19.5) | 16 (20.3) | 4 (5.7) | 69 (16.8) |
| Total | 132 (32.3) | 128 (31.3) | 79 (19.3) | 70 (17.1) | 409 (100) |

Table 8. Showing Distribution of Aetiology and Severity

| Severity | Frequency (n) | Percentage (%) |
|--------------------------------|---------------|----------------|
| Blood Streaking | 132 | 32.3 |
| Mild (<30 ml in 24 hours) | 128 | 31.3 |
| Moderate (30-500 ml / 24 hrs.) | 79 | 19.3 |
| Massive (.500 ml / 24 hrs.) | 70 | 17.1 |

Table 5. Distribution of Severity of Haemoptysis

The severity of haemoptysis is graded in to 4 groups. Higher proportion of patients had mild (n=132, 32.3%) and moderate haemoptysis (n=128, 31.3%). 19.3% (n=79) had moderate haemoptysis while massive haemoptysis was seen in last number of patients (n=70, 17.1%).

| Age | B.S. | Mild <30 ml / day | Moderate 30 – 500 ml / day | Massive >500 ml / day |
|-------|------|-------------------|----------------------------|-----------------------|
| 10-25 | 13 | 8 | 9 | 3 |
| 25-40 | 28 | 19 | 20 | 14 |
| 40-55 | 45 | 39 | 27 | 28 |
| 55-70 | 41 | 52 | 20 | 24 |
| >70 | 5 | 10 | 3 | 1 |
| Total | 132 | 128 | 79 | 70 |

Table 6. Distribution by Age and Severity of Haemoptysis

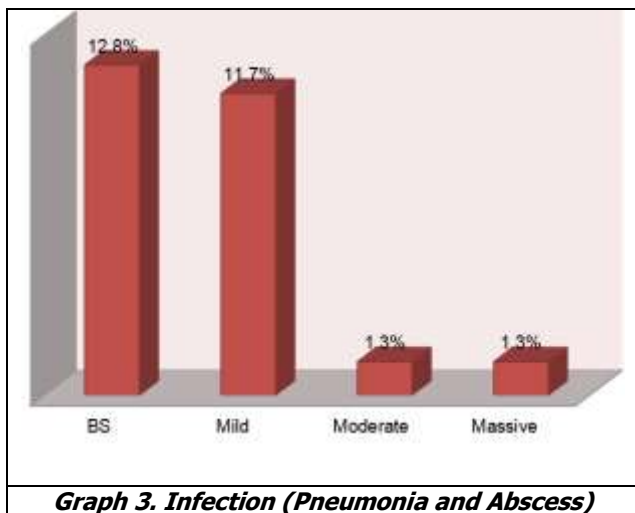
No significant difference was noticed in the severity of haemoptysis in various age groups.

| Age | Male N=275 | | Females N=134 | |
|----------|---------------|--------|------------------|--------|
| | No. | % | No. | % |
| BS | 94 | (34.5) | 37 | (27.5) |
| Mild | 87 | (31.8) | 40 | (30.0) |
| Moderate | 44 | (16.2) | 35 | (26.2) |
| Massive | 48 | (17.5) | 22 | (16.3) |

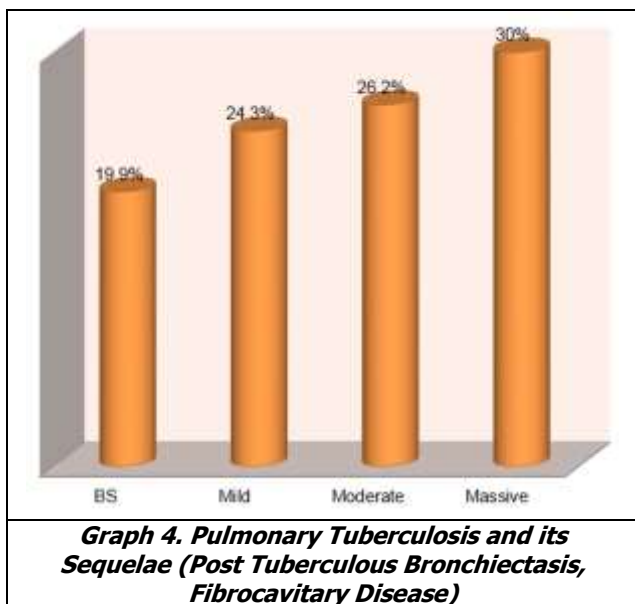
Table 7. Correlation of Severity of Haemoptysis and Sex

No significant difference was notices in severity of haemoptysis among males and females.

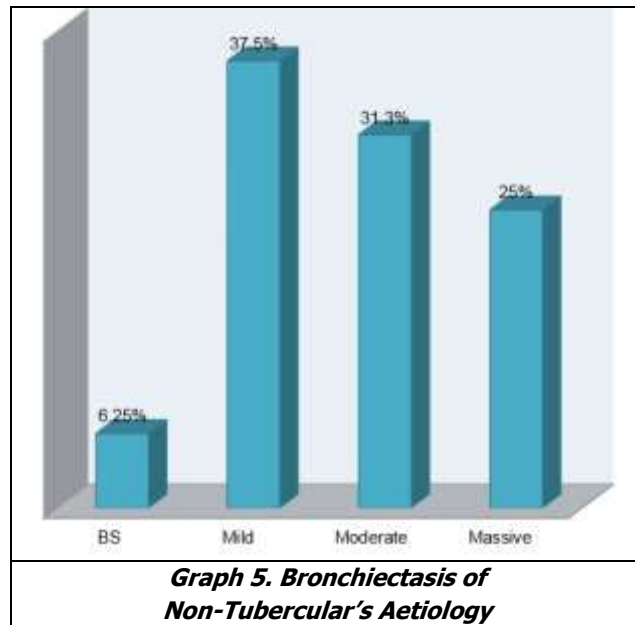
Graphs Showing Distribution of Aetiology and Severity of Haemoptysis



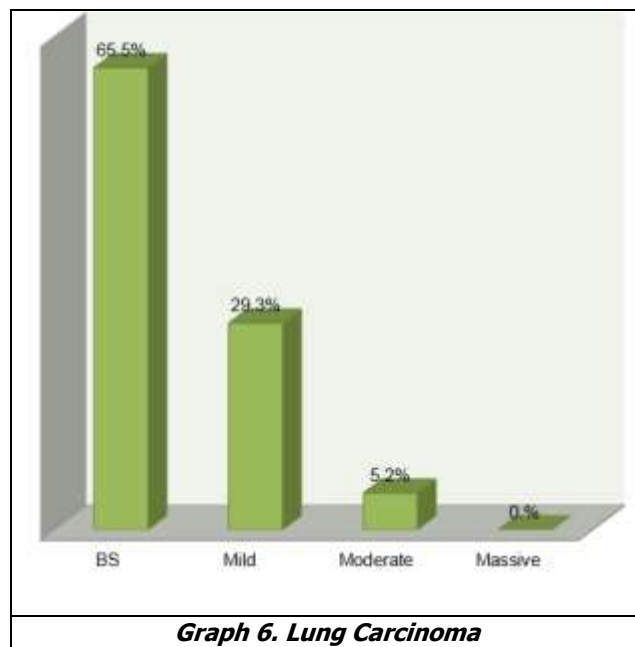
Among 34 patients (8.3%) in the category infection higher proportion (n=32, 94%) had blood streaking/mild haemoptysis. Moderate/massive haemoptysis was rare (n=2, 2.6%)



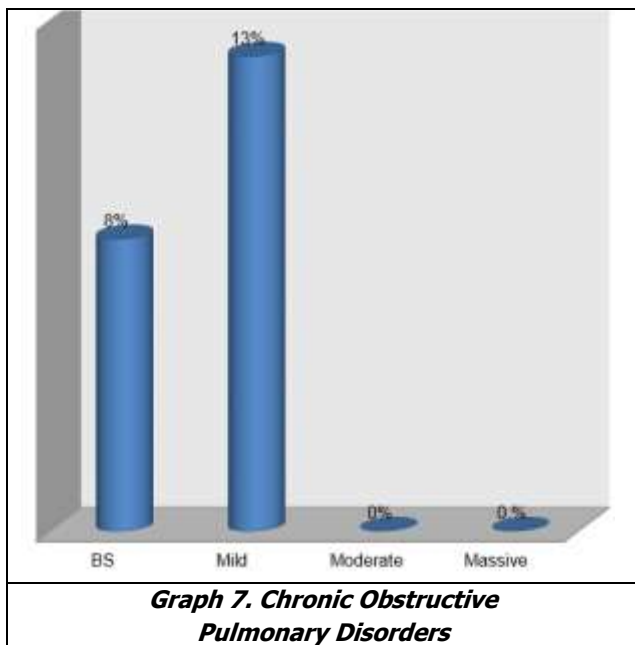
Among 206 patients (50.3%) in the category pulmonary Tuberculosis and its sequelae higher proportion (n =54, 26.2%, mild haemoptysis (n=50, 24.3%) and blood streaking (n=41, 19.9%).



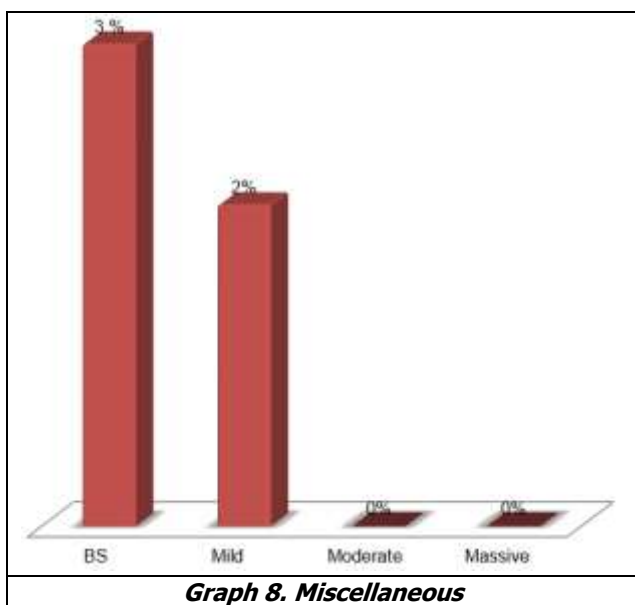
Among 16 patients (3.9%) with bronchiectasis of non-tuberculous aetiology, Higher proportion had blood streaking/mild haemoptysis (n=7, 43.7% and (n= 5, 31.3%) moderate haemoptysis and (n=4, 25%) had massive haemoptysis.



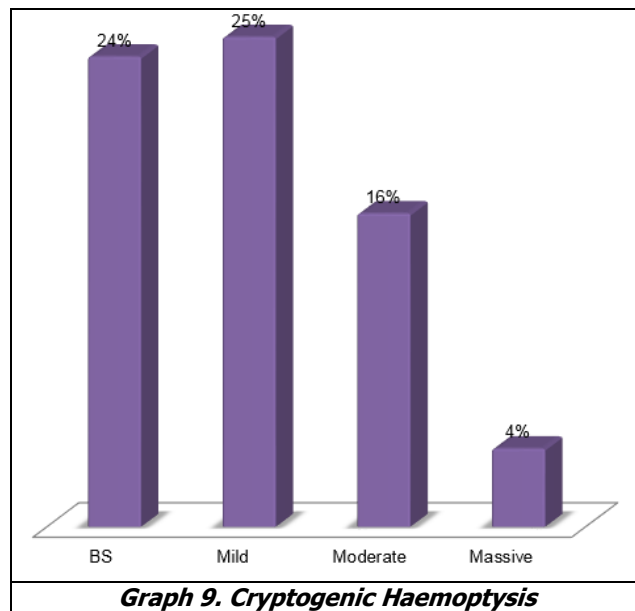
Among 58 patients (14.9%) in the category lung tumours (proven cases of carcinoma lung and benign tumours). Higher proportion had blood streaking (n=38, 65.5%) and mild haemoptysis (n=17, 29.3%). None had massive haemoptysis. Three patients (5.2%) had moderate haemoptysis.



All cases of COPD had either blood streaking or mild haemoptysis.

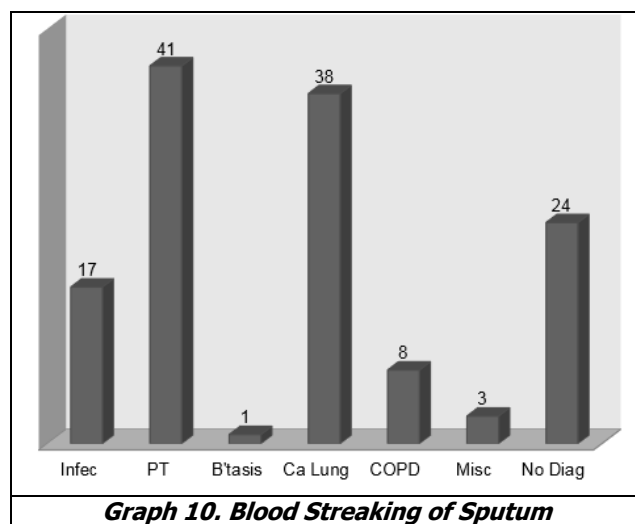


In the miscellaneous category (n=5) 3 patients (cases of pulmonary infraction, well's disease and ABPA) had blood streaking 2 patients with mitral stenosis had mild haemoptysis.

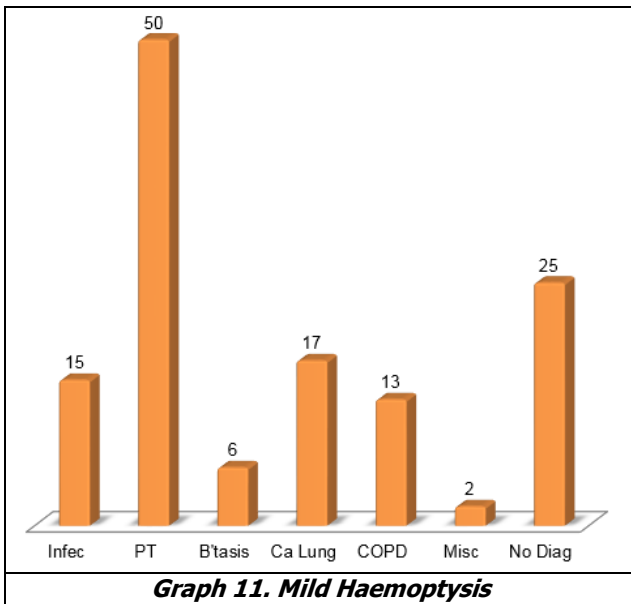


In 69 patients (16.8%) no diagnosis could be obtained. Higher proportion (n=49, 71%) had blood streaking / mild haemoptysis. 13 patients (18.8%) had moderate haemoptysis. Massive haemoptysis was seen in least number of patients (n=4, 5.8%). Among these four patients 18 patients had hypertension (26.08%). None had any bleeding diathesis or features suggestive of Uraemia. 14 patients (20.34%) were chronic alcoholics.

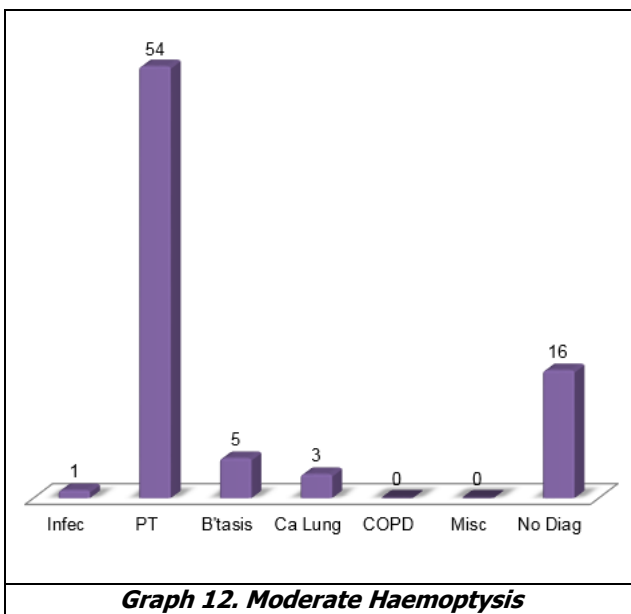
Graph Showing Distribution of Various Aetiology in Relation to Severity of Haemoptysis



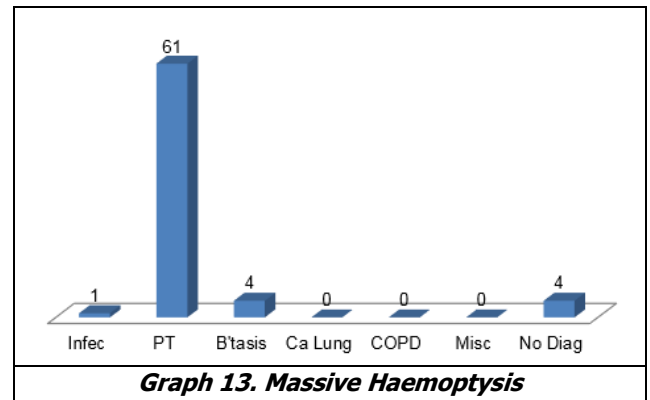
Among the 132 patients with blood streaking 17 patients (12.8%) were due to infections, 41 patients (31.1%) due to pulmonary tuberculosis and its sequelae, 1 (0.75%) due to bronchiectasis, 38 (28.8%) due to lung tumours, 8 (6.06%) COPD, 3 (2.3%) miscellaneous and 24 (18.1%) where no diagnosis was reached.



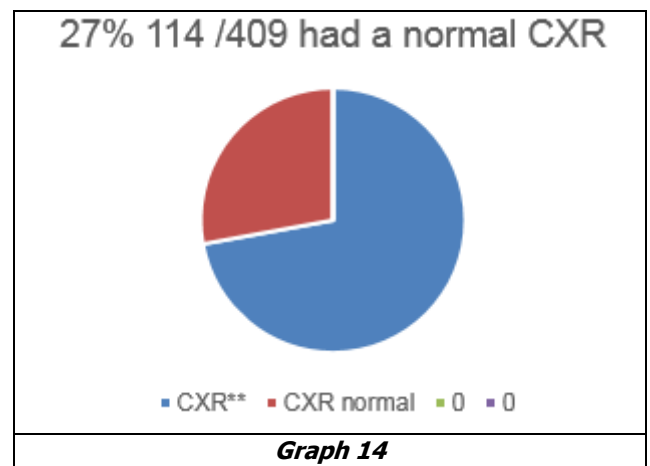
Among 128 patients with mild haemoptysis, 15 patients (11.7%) was due to infections, 50 (39%) due to pulmonary tuberculosis and its sequelae, 6 (4.7%) due to bronchiectasis, 17 (13.3%) due to lung tumours, 13 (10.15% COPD, 2 (1.56%) miscellaneous and 25 patients (19.5%) no Diagnosis group.



Among 75 patients with moderate haemoptysis, majority that is 54 patients (67.5%) was due to pulmonary tuberculosis and its sequelae, 1 patient (1.3%) due to infection, 5 patients (6.3%) bronchiectasis, 3 (3.8%) lung tumours, 16 patients (20.3%) no diagnosis could be obtained



Among the total 70 patients with massive haemoptysis, 61 patients (87.1%) was due to pulmonary tuberculosis and its sequelae, 1 case (1.43%) due to infection that is lung abscess, 4 patients (5.7%) bronchiectasis and in 4 patients (5.7%) no diagnosis was reached.



- 114 patients with haemoptysis had a CXR which appeared normal or non-localizing. 27% of patients in this study had a normal CXR.

| | | |
|---|---|-----------|
| Pneumonia | - | 18 (4.4) |
| Lung abscess | - | 16 (3.9) |
| Active PT (smear positive & negative) | - | 94 (23.2) |
| Post TB Bronchiectasis & fibro cavitary d/s | - | 69 (19.3) |
| Relapse | - | 11 (2.7) |
| Defaulters | - | 18 (4.4) |
| MDR – TB | - | 4 (1) |
| Bronchiectasis (non tuberculous) | - | 16 (3.9) |
| COPD | - | 21 (5.1) |
| Carcinoma lung | - | 51 (12.5) |
| Benign tumours | - | 7 (1.7) |
| Mitral stenosis | - | 2 (0.5) |
| Pulmonary infarction | - | 1(0.2) |
| Weils disease | - | 1 (0.2) |
| ABPA | - | 1(0.2) |
| No Diagnosis | - | 69 (16.8) |

Table 9. Frequency of Final Diagnosis in the Study

The commonest cause of haemoptysis in the study group is pulmonary tuberculosis and its sequelae (n=206, 50.3%). This category included fibrocavitary disease, post tuberculosis bronchiectasis, aspergilloma, relapse, defaulters, MDR TB. Lung tumours (n=58, 14.9%) formed second major cause of haemoptysis. Among them 51 were proven cases of carcinoma lung (12.5%), 7 (1.7%) benign lung tumours like adenoma. Other causes identified included bronchiectasis of non-tuberculous origin (n=16, 3.9%), pneumonias (n=18, 4.4%) lung abscess (n=16, 3.9%), COPD (n=21, 5.1%). 5 miscellaneous conditions were identified, 2 cases of mitral stenosis, 1 case each of pulmonary infarction, ABPA, Weil's disease.

| Severity | Alive | Death (Other Cause) | Death due to Haemoptysis |
|--------------------------|---------------|---------------------|--------------------------|
| Blood streaking n=132 | 130 | 2 | -- |
| Mild n=128 | 125 | 3 | -- |
| Moderate N=79 | 76 | 2 | 2 |
| Massive n=70 | 59 | 3 | 8 |
| Total n=409 | 389 (95.1) | 10 (2.4) | 10 (2.4) |

Table 10. Correlation of Mortality and Severity of Haemoptysis

Among 409 patients there was a total mortality of 4.8% (n=20). Death attributable to haemoptysis was 2.4% (n=10). Among them 80% (n=8) had massive haemoptysis and 20% (n=2) had moderate haemoptysis at the time of presentation. None belonged to the group of blood streaking / mild haemoptysis.

Among the patients with massive haemoptysis (n=70), 84.3% (n=59) survived. 5 patients under went bronchial artery embolization, all of them survived. 11.4% (n=18) died following massive haemoptysis and 4.3% (n=3) died of causes other than haemoptysis. One patient who has IHD died of cardiac arrest, 2 had bilateral extensive pulmonary tuberculosis and cor-pulmonale.

10 patients (2.4%) who died of causes other than haemoptysis the cases attributed were respiratory failure, extensive pulmonary tuberculosis, and cardiac arrest.

| | Alive | Death Due to Other Caused | Death Due to Haemoptysis |
|------------------------|-------|---------------------------|--------------------------|
| Infection n=134 | 34 | -- | -- |
| Active PT n=124 | 122 | 2 | -- |
| Sequelae of PT n=82 | 71 | 2 | 9 |

| | | | |
|------------------------|------------|-----------|-----------|
| Lung Tumours n=58 | 58 | -- | -- |
| Bronchiectasis n=16 | 15 | -- | -- |
| COPD n=21 | 17 | 6 | -- |
| Miscellaneous n =5 | 5 | -- | -- |
| No Diagnosis n=69 | 67 | -- | -- |
| Total | 389 | 10 | 10 |

Table 11. Correlation of Aetiology and Mortality

Total death attributed to haemoptysis was 2.4% (n=10) 9 patients had sequelae of pulmonary tuberculosis (fibro cavity disease, aspergilloma, post tuberculosis bronchiectasis). One patient had bronchiectasis of non-tuberculous aetiology. Among the mortality due to other causes 60% (n=6) were cases of COPD, cor-pulmonale, 2 patients had active pulmonary tuberculosis (bilateral extensive PT), 2 cases of post tuberculosis bronchiectasis /sequelae of pulmonary tuberculosis with cor-pulmonale.

DISCUSSION

A total of 409 consecutive patients with haemoptysis were recruited. Total number of in-patients during this period was 2323. 17.3% of patients attending a tertiary care center in South India complained of haemoptysis.

The study population had a mean age of 49.7. A minimum age 14 and maximum age of 87 years was seen. Haemoptysis may be present in patients both young and old and its causes are numerous. There was a predominance of males in the study group; male to female ratio was 2.03:1.

In the present study, diagnosis could be established in 83.2% cases, while 16.8% remained as cryptogenic haemoptysis.

The commonest aetiologies identified were Tuberculosis and post tuberculous bronchiectasis (50.3%) followed by lung tumours (14.1). Bronchiectasis (3.9%) followed by lung tumours (14.1). Bronchiectasis (3.9%), Pneumonia (4.4%), lung abscess (3.9%). COPD (5.1%) and a miscellaneous group (1.3%) including 2 cases of Mitral Stenosis, 1 each of pulmonary infarction, ABPA and Weil's disease.

The severity of haemoptysis was categorized as blood streaking of sputum seen in 32.3%, mild haemoptysis that is less than 30 ml/day seen in 31.3% and moderate haemoptysis that is more than 30 ml/day and less than 500 ml/day, seen in 19.3%. Massive haemoptysis that is more than 500 ml/29 hours seen in 17.1%. Majority of the patients presented with either blood streaking or mild haemoptysis that is 63%. Massive haemoptysis was less common. The analysis of severity of bleeding with diagnosis obtained showed that Blood streaking/mild haemoptysis was commonly seen in lung tumours, COPD, Pneumonia, lung abscess and miscellaneous conditions like ABPA, pulmonary infarction, Weil's disease. Massive haemoptysis was seen in one case of lung abscess.

Pulmonary tuberculosis and its sequelae had all 4 grades of haemoptysis, majority had massive haemoptysis (n=16) moderate n=54, mild is 50 patients and Blood streaking in 41 patients.

Massive haemoptysis (n=70, 17.1%) is a fatal condition major proportion of patients 87% was due to pulmonary Tuberculosis and its sequelae and 5.7% due to bronchiectasis and 5.7% cases no diagnosis was obtained (in this group 75% were hypertensive).

The mortality depends on underlying aetiology and the magnitude of bleeding. The analysis of mortality and severity and aetiology showed a total mortality of 4.8% (n=20). Mortality attributed to haemoptysis 2.9% (n=10) 9 patients had pulmonary tuberculosis and its sequelae, one patient had Bronchiectasis. Among the patients who died of causes other than haemoptysis, 2 had active patient, 2 post tuberculosis bronchiectasis, 6 had COPD, causes of death was cor-pulmonale, respiratory failure, extensive pulmonary tuberculosis and cardiac arrest.

Among 70 patients with massive haemoptysis 8 (11.7%) expired. It is a condition with high fatality that can be prevented. In the present study 5 patients with massive haemoptysis underwent bronchial artery embolization, all of them survived. Surgery was regarded as the treatment of choice in operable patients with massive haemoptysis. Bronchial artery embolization is an excellent non-surgical alternative, it has proven to be effective and had lesser mortality and morbidity encountered in surgical intervention.⁹

CONCLUSION

- Pulmonary tuberculosis with its sequelae constituted the major proportion among patients with haemoptysis attending the Department of Respiratory Medicine (50.6%). The next commonest cause seen was carcinoma lung (14.9%).
- Carcinoma lung, pneumonia, lung abscess and COPD were observed as common causes of blood streaking and mild haemoptysis.
- Massive haemoptysis was commonly seen in pulmonary tuberculosis with its sequelae and bronchiectasis due to non-tuberculous aetiology.
- Massive haemoptysis was rare in carcinoma lung.
- Overall mortality of 4.8% was seen among patients with haemoptysis, half of which (2.4%) was attributed to

massive haemoptysis and half (2.4%) were due to causes other than haemoptysis.

- Among all patients who expired (n=20), 40% patients had massive haemoptysis. Massive haemoptysis was a fatal condition with a mortality of 11.4% that is 8 of 70 patients with massive haemoptysis died.
- All the five patients with massive haemoptysis who underwent embolization survived.
- 114 patients with haemoptysis had a CXR which appeared normal or non-localizing. 27% of patients in this study had a normal CXR.
- In 69 patients (16.8%) it could be considered as cryptogenic haemoptysis, in whom no diagnosis could be obtained.

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