

## **Differential Diagnosis of Hemoptysis in the medical out-patient clinics**

التشخيص التفريقي للنفث الدموي في العيادات الطبية الخارجية

Dr.Kadhim.A.Al-Hilali ;FRCP(Glasgow)

Ass.Prof.of Medicine, College of Medicine, University of Karbala

### **Background:**

Hemoptysis is a common and significant symptom in respiratory Medicine. The patient as well as his relatives are frequently frightened, because of the possible life-threatening etiology or consequences.

### **Objective:**

To determine the prevalence of the various causes of hemoptysis.

### **Methods:**

The study involved (161)patients , (94) males and (67) females , complaining of hemoptysis attending the medical out-patient clinics for 5.5 years .Evaluation of each case was done and the results were analyzed to reach the final diagnosis .

### **Results:**

Male to female ratio is (94/67 = 1.4:1) . The average age is (42) years . The diagnosis was undetermined in 45 cases (28%) of the total , Pulmonary Tuberculosis (PTB) 32 (20%) , Bronchitis (acute and chronic) 29 (18%) , Lung cancer 19 (11.8%) , Bronchiectasis 13 (8%) , Miscellaneous 13 ( 8%) and pneumonia and lung abscess 10 (6.2%).

### **Conclusion:**

High prevalence of PTB in this country as a cause of hemoptysis . The prevalence of bronchitis and lung cancer comes next . All attempts should be sought to control these diseases.

### **Keywords:**

Hemoptysis , medical out-patient clinics , prevalence , undetermined.

### **الخلاصة:**

**تمهيد:** النفث الدموي هو مرض شائع و مهم في طب الجهاز التنفسي . غالباً ما يكون المريض و اقاربه متخوفين منه بسبب احتمال وجود سبب مهّد للحياة أو بسبب نتائجه .

**الهدف:** لمعرفة مدى انتشار مختلف أسباب النفث الدموي .

**الطرق:** تحوي الدراسة على ١٦١ مريض . ٩٤ رجل و ٦٧ امرأة يشكون من نفث دموي و يراجعون العيادات الخارجية لمدة ستة سنوات مضت . جرى تقييم كل مريض و حُلّت النتائج للوصول الى تشخيص كل حالة .

**النتائج:** نسبة الرجال الى النساء هو ١٤ الى ١ و معدّل العمر ٤٢ سنة . بقي التشخيص غير معروف السبب عند ٤٥ حالة (٢٨%) من المجموع الكلي ، التدرن الرئوي ٣٢ حالة (٢٠%) ، التهاب القصبات ٢٩ (١٨%) ، سرطان الرئة ١٩ (١١ و ٨%) ، توسع القصبات ١٣ (٨%) ، متفرقات ١٣ (٨%) ، ذات الرئة و خراج الرئة ١٠ (٦ و ٢%) .

الاستنتاج : ظهر أن التدرن الرئوي كمُسبب للنفث الدموي لديه أنتشار عالي في هذا البلد و يليه التهاب القصبات ثم سرطان الرئة . لهذا السبب يجب أن نبذل كل الجهود و المحاولات لمكافحة هذه الأمراض .

**Introduction:**

Hemoptysis is coughing up of blood that originates below the vocal cords<sup>(1,2,3,4)</sup>.

It is a significant clinical presentation in respiratory medicine and often life threatening<sup>(5)</sup>.

The word Hemoptysis comes from the Greek word " haim" meaning blood and " ptysis" meaning

spitting<sup>(3)</sup>

Hemoptysis may be mild when it is a blood streaked sputum.or the daily loss of blood is below 20 ml. When the blood loss is more than 20 ml per day it is a frank hemoptysis or moderate one . In cases where the blood loss exceeds (200-600) ml per day then it is severe or massive <sup>(1),(6)</sup>.

Hemoptysis is quite frightening to the patients and causes them to seek emergent evaluation <sup>(2)</sup>.

The causes of hemoptysis differ in different geographical areas <sup>(7),(8)</sup> . In adults of industrialized countries (70-90%) of cases are caused by bronchitis , lung cancer , bronchiectasis pulmonary tuberculosis(PTB) , and pneumonia <sup>(9)</sup> . Chest infection causes about (60-70%) of hemoptysis. <sup>(10)</sup> Pulmonary tuberculosis is a common cause and should always be considered <sup>(11)</sup> . Hemoptysis occurs as an initial symptom in up to 50% of patients with lung cancer , and in a smoker over the age of 40 years is an indication for bronchoscopy even in the absence of radiological abnormality <sup>(12)</sup> . The most common causes of hemoptysis depend on geographical areas , but bronchial carcinoma , Bronchiectasis and PTB <sup>(9)</sup> are the commonest . Hemoptysis may be massive in cystic fibrosis of the lung and can be life-threatening <sup>(13),(14)</sup> . Massive hemoptysis needs urgent assessment and management <sup>(15)</sup>.

The first step in the diagnosis of the cause of hemoptysis is a careful history taking and complete medical examination to rule out "Pseudohemoptysis" due to hematemesis and bleeding from nasopharynx , the next step is to do a chest x-ray which is an essential investigation helping the diagnosis , and in cases where the diagnosis still remains uncertain computerized tomography (C-T) of the chest can provide further information as well as bronchoscopy <sup>(16),(17),(18),(19)</sup> . Laboratory investigation such as sputum for acid fast bacilli , cytology or culture , or hematological and biochemical test may be needed.

**Methods:**

This study is a prospective observational one , conducted in Al-Hussain teaching hospital , the only general hospital in the city receiving the referred cases from different health centers . The data collection was done in the medical out patients from March 2005 to September 2010 ;seeing patients in fact, two days per week &examining approximately(100)patients per week or(400-420) patients per month and nearly(5000)per year .The approximate number of hemoptysis patients seen was nearly(6)per one thousand total medical patients and nearly(30)per year.The study included 161 adult persons complaining of hemoptysis out of nearly(27500)total medical patients attending the out patient.They were 94 males and 67 females .The data sheet was designed to include age , sex , duration of hemoptysis , quantity of blood expectorated , smoking status , clinical findings like clubbing of fingers and chest findings e.g bilateral basal coarse crepitations , investigations done , and final diagnosis for each patient. History in details was taken as well as physical examination . The investigations done depended on each case but mainly chest x-ray , (postero-anterior) and lateral. Depending on the results of chest x-ray other investigations were done e.g. sputum for acid fast bacilli (AFB) and. cytology .Each patient was taught how to collect his sputum (to cough up and not to spit saliva) into two containers given to him by the laboratory each morning for three days and before breakfast, one for (AFB) using Ziehl-Nielsen technique.The second specimen is sent for cytology mainly to exclude malignant cells.Other investigations such as Complete blood count &.ESR , blood sugar , coagulation profile and platelet count may be needed in selected cases.If the diagnosis remains uncertain other investigations were done e.g. computerized tomography (C-T) and Bronchoscopy. Polymerase Chain Reaction(PCR) which is helpful in the

diagnosis of Tuberculosis and ventilation- perfusion scan,helpful in the diagnosis of pulmonary embolism were unavailable at the time of doing this study. Finally the data were tabulated and analyzed aiming to reach a definitive diagnosis .

### **Results :**

Patients age ranged from 20-70 years with an average of 42 . Thirty eight patients (23.6% of the total) lie in the age group 20-30years , 48 (29.8%)in the age group 31-40 year, 23 (14.3%) in the age group 41-50year , 15 (9.3%) in the age group 51-60 and 37 (23%) in the age group 61-70 table (1) . The total number of patients was 161(:94 males and 67 females) with a ratio of( 1.4 to 1 ) . The duration of hemoptysis ranged from 1-10 days (average 4days) . Diagnosis was arrived at, in 116 patients (72% of the total), and in 45 (28%) the diagnosis remained obscure or undetermined, because of negative clinical findings,as well as negative investigations.The unavailability of PCR and ventilation-perfusion scan,might have some effect on the results above. The known causes were : Pulmonary tuberculosis (PTB) 32 (20%) , acute and chronic bronchitis 29 (18%) , lung cancer 19 (11.8%) , bronchiectasis 13 (8%) , pneumonia and lung abscess 10 (6.2%) and miscellaneous cases 13 (8%) table (2) .

Table (3) shows the various causes of the miscellaneous group . Regarding the severity of hemoptysis, it was mild in 102 (63.4%) , moderate in 52 (32.3%) and severe in 7(4.3%) . The degree of severity was gauged as follows: mild , when the sputum .is streaked with blood , moderate when there is frank hemoptysis , and severe when it is massive table(5) .

### **Discussion :**

The study shows that more than half of the cases of hemoptysis (53.4%) lie in the age group (20- 40 year ) , compared with (23.6%) who are in the age group (41-60) . There is no definite explanation for this discrepancy , but probably the younger age groups are more exposed to pulmonary infection , which is the most common cause of hemoptysis <sup>(9)(10)</sup> .

There is another increase in the number of cases (23%) in the age group (61-70 years) , this may be due to the increased number of chronic bronchitis and lung cancer , the late consequences of smoking. <sup>(20)</sup> .

The study also shows male dominance over female (94 to 67 ) or (1.4:1) which is nearly comparable with western figures (60/40 or 1.5/1) . Other clear sex differences are related to lung cancer (15/4) and bronchitis (18/11) Shown in table(2).This is probably because male smokers exceed female smokers.

Considering the various causes of hemoptysis : the western study reports (Scott Moses) <sup>(10)</sup> show that infection contributed to (60-70%) of the total causes of hemoptysis , distributed as follows : Bronchitis (26%) , pneumonia (10%) , PTB (8%) , Bronchiectasis and lung abscess the rest (16-26%) , and lung cancer (23%) . Young WF&Stava JM

mentioned in the text book :Emergency Medicine,chapter pulmonary emergency,hemoptysis,that retrospective meta-analysis of six prior studies of hemoptysis <sup>(2)</sup> , found that infection other than PTB causes (25%) , PTB (5%) , lung neoplasia(26%) , miscellaneous (13%) and undetermined causes (28%) . The last two figures (13%) & (28%) are comparable to the study results (table 2) .Western studies show low figures for PTB , while this disease is endemic in this country and shows high prevalence rate (20%) i.e. one fifth of the cases of hemoptysis .

This study as well as other international studies <sup>(9,21,22,23)</sup> showed that up to 30% of the total cases of hemoptysis,the etiology remained undetermined despite extensive workup.In

Pakistan PTB is a major cause of hemoptysis <sup>(5)</sup> , and in Thailand,It is common to the extent tha it constitutes (41.6%) of cases of massive hemoptysis <sup>(24)</sup> .

The other difference in comparison with western studies is lung cancer . It is lower in this study (11.8%) compared with figures of the western ones e.g (26%)<sup>(2)</sup> &(23%)<sup>(10)</sup> . The same is applied for

bronchitis . Table(4) show some comparison of this study with western ones in terms of percentages of the causes of hemoptysis .

**In the majority of cases , hemoptysis is mild and self limited <sup>(25)</sup> .In this study it constituted (63.4%) of the cases .Moderate hemoptysis forms(32.3%),while (4.3%) of the total cases,were massive. .**

Unfortunately national or international figures for comparison are unavailable.

## **References:**

- 1- Chesnut M.S and Prendergast .T. J : Hemoptysis , in : Mephee S J , Papadakis MA ,Tierney L.M.Current Medical Diagnosis and Treatment , New York, McGraw-Hill 2008 , P:25-26.
- 2- Young W.F , Stava J.M : Pulmonary emergencies , Hemoptysis , in : Tintinalli J.E , Kelen G.D , stapczynski J.S , emergency medicine , sixth edition ,New York, McGraw-Hill , 2004 , P: 465-467.
- 3- Health communities .com : causes of hemoptysis , available at : <http://www.pulmonologychannel.com/hemoptysis/index.shtml>.
- 4- Steven E. Weinberger , Praveen N. Mathur , Helen Hollingsworth : Etiology and evaluation of hemoptysis in adults , available at : [http://www.update.com/patients/content/topic.do?topickey=U\\_P Yaw5bm675GD](http://www.update.com/patients/content/topic.do?topickey=U_P Yaw5bm675GD).
- 5- Ashraf O.H a developing world perspective , BMC pulmonary medicine 2006. , 6.1 available at : <http://www.biomedcentral.com/147/-2466/611>
- 6- Taichman D.B. , Fishman A.P , Approach to the patient with respiratory system ; Hemoptysis , in ; Fishman A.P , Elias J.A , Fishman J.A , Gippi M.A , Senior R.M , Pack A.I , 4<sup>th</sup> edition of Fishman's pulmonary diseases and disorders , Volume one , New York,McGraw-Hill , medical , 2008 , P: 410-413 .
- 7- Santiago S. , Tobias J. , Williams A.J, A reappraisal of the causes of hemoptysis , Arch Intern Med. 1991 ; 151 : 2449-2451 .
- 8- Abal A.T. , Nair P.C. , Cherian J : Hemoptysis , etiology, evaluation and outcome . A prospective study in a third-world country . Resp Med 2001 , 95 : 548-552 .
- 9- The Merck manual online medical library , available at : <http://www.merck.com/mmpe/sec05/ch045f.html.last full review/revision>.  
July 2009 by Noah lechtzin .
- 10- Scott Moses , Family practice Note book,L.L.C:Hemoptysis, causes,available at :<http://www.f.p note book.com/lung/5x/Hmptyes,htm>,last published on 22.3.2010..
- 11- Innes J.A , Reid P.T. : Presenting problems in respiratory medicine , Hemoptysis , in : Boon NA , College NR , Walker B.R , Davidsons Principles and Practice of Medicine, 20<sup>th</sup> edition , Edinburgh, Churchill living stone 2006 . P : 662-663 .
- 12- Fobes C.D , Jackson W.F." , Tumors of the lung.Hemoptysis: in : Color Atlas and Text of Clinical Medicine , 3<sup>rd</sup> edition , Edinburg, Mosby 2003 , . P : 191 .
- 13- Turino G.M , Approach to the patient with respiratory diseases ; Hemoptysis in : Ausiello . D , Goldman . L. , Cecil textbook of medicine 22<sup>nd</sup> edition , Philadelphia, Saunders 2004 , , P : 494-495 .
- 14- Flume P.A. etal : Massive hemoptysis : in cystic fibrosis.chest 2005 Aug. ; 128 (2) : 729-738 .
- 15- Cahill B.C. , Ingbar D.H. : Massive hemoptysis : Assessment and Management. Clin. Chest Med 1994 , 15 : 142-162 .
- 16- Lee Anthony , evaluation of hemoptysis . Available at : <http://www.Lung-disease-treatment.suite101>.  
July 11.2009.
- 17- Tsoumakidou M etal . A prospective analysis of 184 hemoptysis cases : diagnostic impact of chest x-ray , computed tomography , bronchoscopy . Respiration 2006 , 73 (6) : 808-814 .
- 18- Brian I. Glazer M . Kramer M.R. ; Hemoptysis : etiology , evaluation and outcome available at :

[http://www.nlhep.org/books/pul\\_pre/hemoptysis.html](http://www.nlhep.org/books/pul_pre/hemoptysis.html).

19 – Bidwell J.L etal ; Hemoptysis : diagnosis and management: A.M. , Fam Physician 2005 ,. Oct 1 ; 72 (7) : 1253-1260 .

20- Centers for disease control and prevention 2004 Surgeon General's report : The health consequences of smoking , available at :

[http://www.cdc.gov/tobacco,data\\_statistics/sgr\\_2004/highlights/7htm](http://www.cdc.gov/tobacco,data_statistics/sgr_2004/highlights/7htm).

21-National Lung Health Education Program,Fonline Assessment of common pulmonary presentations E.Hemoptysis,available at <http://www.nlhp.org/>

22-Russi EW,Bloch KE,Pulmonary symptoms,Hemoptysis,In:Seigenthaler Walter,Differential Diagnosis in internal Medicine,thieme,Stuttgart, thieme publishing group 2007,p495.

23-Battegay E,Hunziker S and Spinaz GA:causes of hemoptysis In:Seigenthaler Walter Differential Diagnosis in internal Medicine, thieme,Stuttgart ,thieme publishing group 2007,p43.

24- Reechaipichitkal W. , Latong S. : Etiology and Treatment outcomes of massive hemoptysis , South Asian J. Trop Med Public Health 2005 , 36 (2) 474-480

25- Health communities.com. Hemoptysis available at :

<http://www.Pulmonologychannel.com/hemoptysis/causes.schtml>.

published on 1.6.2000 , last review on 4.12.2007 .

**Table (1)**  
**Age and sex distribution of patients with Hemoptysis.**

Age group in years	Sex		Total No.	Percentage of the total
	No. of males	No. of females		
<b>20-30</b>	<b>16</b>	<b>22</b>	<b>38</b>	<b>23.6</b>
<b>31-40</b>	<b>28</b>	<b>20</b>	<b>48</b>	<b>29.8</b>
<b>41-50</b>	<b>13</b>	<b>10</b>	<b>23</b>	<b>14.3</b>
<b>51-60</b>	<b>8</b>	<b>7</b>	<b>15</b>	<b>9.3</b>
<b>61-70</b>	<b>29</b>	<b>8</b>	<b>37</b>	<b>23</b>
<b>Total</b>	<b>94</b>	<b>67</b>	<b>161</b>	<b>100.0</b>

**Table (2)**  
**Causes of Hemoptysis in the study sample**

Causes	No. of males	No, of females	Total no.	Percentage of the total
<b>Undetermined</b>	<b>24</b>	<b>21</b>	<b>45</b>	<b>28</b>
<b>PTB</b>	<b>19</b>	<b>13</b>	<b>32</b>	<b>20</b>
<b>Bronchitis</b>	<b>18</b>	<b>11</b>	<b>29</b>	<b>18</b>
<b>Lung cancer</b>	<b>15</b>	<b>4</b>	<b>19</b>	<b>11.8</b>
<b>Bronchiectasis</b>	<b>8</b>	<b>5</b>	<b>13</b>	<b>8</b>
<b>Pneumonia and Lung abscess</b>	<b>6</b>	<b>4</b>	<b>10</b>	<b>6.2</b>
<b>Miscellaneous</b>	<b>4</b>	<b>9</b>	<b>13</b>	<b>8</b>
<b>Total</b>	<b>94</b>	<b>67</b>	<b>161</b>	<b>100.0</b>

**Table (3)**  
**Distribution of the various causes of the miscellaneous group n=13.**

Name of disease	No. of males	No. of females	Total
Congestive heart failure	2	1	3
Thromboembolism ( pulmonary infarction)	0	3	3
Hydatid cyst	0	3	3
Snake bite	2	0	2
Mitral stenosis	0	1	1
Anticoagulant therapy	0	1	1
<b>Total</b>	<b>4</b>	<b>9</b>	<b>13</b>

**Table (4)**  
**Comparison with western studies in terms of causes of Hemoptysis . The figures are in percentages**

The cause of hemoptysis	The study figures	Western studies		
		No.(1)	No.(2)	No.(3)
Undetermined	28%	20%	28%	15-30%
PTB	20%	5%	5%	8%
Bronchitis	18%	>25%	A	26%
Lung cancer	11.8%	25%	26%	23%
Bronchiectasis	8%	10%	B	Unrecorded
Pneumonia and Lung abscess	6.2%	5%	C	10%
Miscellaneous	8%	Unrecorded	13%	Unrecorded
A+B+C = 25% No.(1) Source reference (23) No.(2) Source reference (2) No.(3) Source reference (10)				

**Table (5)**  
**Categorization of Hemoptysis according to severity.**

Degree of severity	Parameters for severity	No. of Patients	Percentage of the total
Mild	Blood streaked sputum or <20 ml/day	102	63.4
Moderate	Frank hemoptysis 20-200 ml/day	52	32.3
Severe	Massive hemoptysis >200-600 ml/day	7	4.3