Haemoptysis with no radiological evidence of tumour — the value of early bronchoscopy

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Summary

Thirty-two patients who presented with haemoptysis were studied, ranging in age from 34 to 90 years. Bleeding from the nose and gastro-intestinal tract was excluded, and no patient had symptoms or signs suggestive of pulmonary thrombo-embolism or acute respiratory tract infection. One patient had previously been diagnosed as having idiopathic pulmonary haemosiderosis (Ceeelen’s disease). Twenty-nine of the patients had smoked 20 cigarettes a day or more for at least 17 years; 3 had never smoked. In no case was there any suggestion of the presence of a tumour on chest radiography; however, it may be almost invariably be investigated further. If the chest radiograph shows no evidence of a tumour, however, it may be deemed adequate for the patient to be re-evaluated on a subsequent occasion, or not at all. Questioning the soundness of this approach, we reviewed the records of all patients investigated at the Respiratory Unit of the Johannesburg Hospital from January 1977 to June 1980 with haemoptysis as the presenting symptom, but no evidence of a tumour on chest radiography, and in whom bronchoscopy was subsequently performed.

Subjects and methods

Thirty-two patients (22 men) presenting with haemoptysis were studied, ranging in age from 34 to 90 years. Bleeding from the nose and gastro-intestinal tract was excluded, and no patient had symptoms or signs suggestive of pulmonary thrombo-embolism or acute respiratory tract infection. One patient had previously been diagnosed as having idiopathic pulmonary haemosiderosis (Ceeelen’s disease). Twenty-nine of the patients had smoked 20 cigarettes a day or more for at least 17 years; 3 had never smoked. In no case was there any suggestion of the presence of a tumour on the chest radiograph, i.e. there was no pulmonary or hilar mass, obstructive pneumonitis or atelectasis, pleural effusion, or...
any skeletal abnormality compatible with metastatic malignant deposits. Cardiomegaly, prominence of the pulmonary arteries, hyperinflation of the lungs, evidence of an old healed granulomatous lesion, pleural thickening and localized bronchiectatic or fibrotic pulmonary changes were not considered to be reasons for exclusion from this study.

In 30 patients bronchoscopy was performed with a flexible fibre-optic bronchoscope. In 27 of these the procedure was performed under local anaesthesia, while in the other 3 general anaesthesia was used at the patients' request. In 2 cases rigid bronchoscopy was performed under general anaesthesia.

Cytological examination of the sputum was performed routinely.

**Results**

Bronchoscopy revealed the presence of bronchogenic carcinoma in 6 patients and an adenoid cystic tumour of the trachea in 1. Short case histories of these patients are given below. In a further 4 cases the site of the bleeding could be localized by the presence of blood in a segmental or lobar orifice, but no lesion was seen. In 1 patient biopsy of an oedematous left lower lobe bronchial orifice showed infiltration with normal lymphocytes. In 20 cases the bronchoscopic examination was completely negative. Cytological examination of the sputum was negative in all patients. Final diagnoses made in the 32 patients with haemoptysis are shown in Table I.

**Case reports**

**Case 1**

A 69-year-old male smoker came to his general practitioner complaining of recurrent haemoptyses for 2 months. He was treated with bronchodilators and expectorants for 1 month and was referred to the Johannesburg Hospital when the haemoptysis persisted.

Physical examination revealed slightly diminished breath sounds over the right hemithorax. The chest radiograph was normal. Fibre-optic bronchoscopy performed under general anaesthesia revealed almost complete occlusion of the right main bronchus at the level of the carina by a tumour which proved to be a squamous carcinoma.

The site of the lesion made it inoperable, and the patient was given radiotherapy. He died 6 months later of disseminated carcinoma.

**Case 2**

A 49-year-old male smoker came to the Johannesburg Hospital complaining of recurrent haemoptyses for 3 weeks.

Physical examination and chest radiography were negative (Fig. 1). The patient initially refused bronchoscopy, but consented 10 days later when he suddenly experienced a haemoptysis of 200 ml of fresh blood. Rigid bronchoscopy was performed under general anaesthesia and revealed a tumour in the right main bronchus at the level of the carina, which proved to be a squamous carcinoma. Since the site of the tumour precluded surgery, the patient was referred for radiotherapy. He is still alive 5 months later.

**Case 3**

A 52-year-old male smoker was treated at a number of hospitals for recurrent haemoptyses over a 2-year period. Chest radiographs were repeatedly normal and bronchoscopy was not performed.

He was finally referred to the Johannesburg Hospital. Physical examination and the chest radiograph were negative. Fibre-optic bronchoscopy performed under local anaesthesia revealed a tumour partially occluding the left upper lobe bronchus, which proved to be a squamous carcinoma.

Left upper lobectomy was performed, but 3 years later the patient died of disseminated carcinoma.

**Case 4**

A 49-year-old female smoker presented with haemoptysis. The chest radiograph showed no suggestion of tumour and a course of antibiotics was prescribed. The bleeding ceased but recurred after 6 months, at which time she was referred to the Johannesburg Hospital.

Physical examination revealed mild, diffuse wheezing during both inspiration and expiration. The chest radiograph showed prominence of the main pulmonary artery. Fibre-optic bronchoscopy performed under local anaesthesia revealed a tumour partially occluding the right main bronchus and involving the carina and left main bronchus, which proved to be...
a squamous carcinoma. The tumour was inoperable, and the patient was referred for radiotherapy. She is still alive 4 months later.

**Case 5**

A 68-year-old male smoker being treated with warfarin for cerebrovascular disease came to the Johannesburg Hospital with massive haemoptysis of about 600 ml of fresh blood. At this time his prothrombin index (PI) was 16%.

Physical examination showed evidence of airway obstruction, and the chest radiograph was normal except for hyperinflated lungs. Following correction of the PI with cessation of the bleeding, fibre-optic bronchoscopy was performed under local anaesthesia and revealed a tumour partially occluding the left main bronchus, which proved to be a squamous carcinoma.

Surgery was contraindicated by the patient's poor pulmonary function, and he was referred for radiotherapy. One year later he developed dysphagia due to oesophageal compression and died shortly thereafter.

**Case 6**

A 60-year-old female non-smoker presented at the Johannesburg Hospital with recurrent haemoptyses of 6 weeks' complaining of recurrent haemoptyses of 2 years' duration.

Physical examination showed evidence of severe hyperinflation of the chest and airways obstruction. The chest radiograph showed marked hyperinflation of the lungs with bilateral upper lobe fibrotic pulmonary changes. Rigid bronchoscopy under general anaesthesia revealed a circumferential lesion in the trachea which proved to be an adenoid cystic tumour. Surgery was contraindicated by the patient's poor pulmonary function, and she was referred for radiotherapy. She is still alive 20 months later.

**Case 7**

A 60-year-old female non-smoker presented at the Johannesburg Hospital with recurrent haemoptyses of 6 weeks' duration. A Starr-Edwards mitral valve had been inserted 6 years previously for severe mitral valve disease, with good results.

Physical examination showed atrial fibrillation, cardiomegaly and soft mitral and tricuspid regurgitant murmurs. The PI was 70%. The chest radiograph showed cardiomegaly but no evidence of pulmonary oedema. Fibre-optic bronchoscopy under general anaesthesia revealed a tumour partially occluding the right middle-lobe bronchus, which proved to be an adenocarcinoma. The patient refused specific therapy and died 6 months later of disseminated carcinoma.

**Discussion**

It is not unusual for a patient with bronchogenic carcinoma to present with haemoptysis but no evidence of tumour on the chest radiograph. Sommer et al.1 mentioned 5 such cases in their article on rigid bronchoscopy in 1958, and in 1959 Schneider2 reported another 5 patients in whom haemoptysis had initially been ignored because of a negative chest radiograph. More recently, in an article on flexible bronchoscopy, Zavala3 reported the finding of bronchogenic carcinoma in 9 of 55 patients (16%) presenting with haemoptysis and normal chest radiographs.

In our series 21,8% of patients with haemoptysis and no radiological suggestion of a tumour had malignant lesions of the tracheobronchial tree. This high percentage cannot be attributed to the inclusion in the study of patients with the various abnormalities on the chest radiograph listed above, none of which was causally related to a tumour in any instance.

How should these patients be managed? The policy of serial clinical and radiological re-evaluation has serious disadvantages. Patients may fail to return for reassessment, resulting in the diagnosis of a tumour being missed. In addition, Poole and Stradling4 found only 1 patient out of 281 (0,35%) with haemoptysis and a normal chest radiograph in whom a repeat radiograph after 1 month led to a diagnosis of malignant tumour.

Observation will therefore be necessary over a much longer period, which may cause considerable inconvenience and protracted anxiety on the part of the patient.

Bronchoscopy, on the other hand, is a rapid method of excluding a tumour of the tracheobronchial tree as the cause of haemoptysis, thus avoiding a delay in diagnosis such as occurred in some of our cases. The advent of the flexible fibre-optic bronchoscope has made the procedure a relatively minor one, which is safe and easy to perform under local anaesthesia. In addition a considerably greater extent of the bronchial tree can now be visualized and biopsied with the flexible fibre-optic bronchoscope than previously when only the rigid instrument was available.5

We recommend that, in the absence of a specific contraindication, every patient presenting with haemoptysis should undergo flexible bronchoscopy as soon as possible, regardless of the findings on chest radiography, unless a site of bleeding outside the tracheobronchial tree is identified or a non-neoplastic condition can be diagnosed as the cause with a high degree of confidence. In patients who are bleeding heavily at the time of bronchoscopy the rigid bronchoscope, with its wider suction channel, remains the instrument of choice.

Weaver et al.6 have recently suggested that bronchoscopy need not be performed in patients with haemoptysis and a normal chest radiograph if they are under 40 years of age and the bleeding stops in less than 1 week. While few cases of bronchogenic carcinoma will be missed using these criteria, sporadic cases do occur in patients under the age of 40 years and the duration and intensity of the smoking habit must always be taken into consideration. In addition, adenomas of the trachea and bronchi tend to occur at an earlier age than bronchogenic carcinoma7 and may be missed if this policy is followed.

While cytological examination of sputum is often useful in the diagnosis of bronchogenic carcinoma, it is noteworthy that malignant cells were not detected in the sputum of any of the patients with tumours in this series. We have no explanation for this, but suggest that bronchoscopy should never be omitted or deferred on account of negative cytological studies when haemoptysis is being investigated. In addition, as demonstrated in 2 of our patients, haemoptysis should never be attributed to anticoagulant therapy or overdosage before a comprehensive search for other causes has been made.

The policy of early bronchoscopy in patients with haemoptysis should facilitate the rapid diagnosis of otherwise occult respiratory tract tumours. This is of great importance if patients are to have a chance of a cure in a group of diseases in which the prognosis is usually so poor.

**REFERENCES**