

Surgery for Hemoptysis - one year experience of 72 patients

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Objective: To determine aetiology of patients presenting with hemoptysis and evaluate their management and outcome.

Study Design: An observational prospective descriptive study. **Place and Duration:** Department of Cardiothoracic Surgery, Postgraduate Medical Institute, Lady Reading Hospital from 1st Jan 2003 to 31st December 2003. **Materials and Methods:** This prospective study included 72 patients; 51(71%) were males and 21(29%) were females. Male: female ratio was 2.5:1 Age range was from 7 years to 81 years with a mean age of 36.3 years. All the patients had hemoptysis on presentation while 25(35%) also experienced dyspnoea. Chest radiograph was obtained in all, CT Thorax in 60 (83%) while pulmonary function tests were performed in 68(94%) patients. Out of 72 cases 09 patients had to undergo immediate surgery, 27 underwent surgery within one week after initial stabilization and 36 were operated upon electively. All patients, except 6 paediatrics cases, had one lung ventilation during surgery. **Results:** The mean operative time was 55(±20) minutes. Out of 72 patients 30 had lobectomy, 24 had hydatid cystectomy, 9 had wedge excision, 3 had pneumonectomy and 6 had thoracoplasty. Mortality was 2/72 while morbidity was 6/72 comprising 4 wound infections (in the emergency group) and 2 each had persistent air leak and empyema. Hospital stay ranged from 7 – 36 days with mean of 12.6 days. Pathological break up of the 72 cases was bronchiectasis 30, mycetoma 2, lung abscess 9, hydatid cysts 24, carcinoma 6 and AV malformation 1. **Conclusion:** Inflammatory lung disease, especially TB and its sequelae is the commonest cause of hemoptysis. Elective surgery with one lung ventilation after initial stabilization in a well equipped & well staffed cardiothoracic unit (OT & ICU) is a safe option for hemoptysis, not responding to medical management.

Key words: Haemoptysis, surgery

Hemoptysis has been quantified into moderate, severe and massive. Massive hemoptysis is blood loss greater than 600ml/24 hrs. Severe hemoptysis is more than 200ml/24hrs. Massive hemoptysis has a fatal outcome in 85% patients when managed only medically¹. Coughing up of blood, irrespective of the amount, is an alarming symptom and must always be assumed to have a serious cause, until appropriate investigations have excluded common causes. More common causes for hemoptysis are bronchiectasis, tuberculosis, bronchial carcinoma and lung abscess. Less commonly aspergilloma, hydatid disease and AV malformation are responsible for hemoptysis². In vast majority of cases, however, the hemoptysis itself is not life threatening and it is possible to follow a logical sequence of investigations. Chest radiographs may give clear evidence of a localized resectible lesion including bronchiectasis, aspergilloma, hydatid disease or bronchogenic carcinoma. Bronchoscopy is required in urgent and elective cases because it plays paramount role in locating site and source of haemorrhage³. CT scan is particularly useful in investigating peripheral chest radiograph lesions, which may not be accessible to bronchoscopy⁴.

Hemoptysis in third world countries is mainly caused by tuberculosis, bronchiectasis, lung abscesses and aspergillomas⁵. Resectional surgery for tuberculosis became increasingly common around 1940s. However thoracoplasty remained the most popular treatment of choice, until the introduction of effective antituberculosis agents. With the development of rifampicin in 1966, surgery was seldom needed except for the occasional massive hemoptysis, bronchopleural fistula and empyema

or to rule out cancer. With the rise of MDR-TB; mycetomas lodged in apical tubercular cavities and with post-tubercular bronchiectasis, resectional procedures are again being needed⁶. Depending upon the extent and location of disease, resectional procedures range from wedge resection to pneumonectomy to exise the source of haemorrhage. Our study was aimed to observe various aetiologies of hemoptysis² and evaluate the various surgical procedures used to treat them.

Material and methods

From January 2003 to December 2003, seventy two patients with hemoptysis were studied. This comprised of referral from pulmonology department and medical units of three teaching hospitals as well as direct referral from district hospitals. Patients with only surgically amenable etiology, unresponsive to medical treatment were included in the study while patients having hemoptysis of predominant medical origin, inoperable carcinomas and unfit medically were excluded. All these patients were admitted to the hospital and after immediate emergency management history and examination were done. Chest radiographs were obtained in all and CT Thorax was ordered in sixty patients. Patients with FEV1, FVC, FEV1/FVC less than 60% of predicted values required vigorous chest physiotherapy and other supportive measures to improve their pulmonary function. Condition of the opposite non diseased lung was assessed both clinically and radiologically. Anesthesiologist and pulmonologist were consulted. Emergency bronchoscopy was arranged to locate the site of bleeding. Patients were thus grouped into those requiring immediate surgery; and

those who needed initial stabilization and elective surgery. Stabilization and preparation for surgery included physiotherapy; antimicrobials, bronchodilators, transamine and blood transfusion depending on hematocrit values.

The principal indication for surgery was hemoptysis of surgically manageable etiology. One lung ventilation with Robert Shaw double lumen tube was used in all except six paediatrics cases. The operation was mostly performed through fifth space posterolateral thoracotomy, while for thoracoplasty a high parascapular incision along the vertebral border of scapula was made. Monitoring with pulse oximetry and frequent suction was done throughout the operation. Once the pleural space was entered whole of the lung was inspected. Early clamping of main bronchus was done to protect the opposite lung. The lung was mobilized depending upon proposed extent of resection. For lobectomy interlobar fissure was developed. In case of lobectomy pulmonary arterial branches were individually ligated and divided and bronchial stump was closed with 2/0 prolene using interrupted horizontal mattress sutures. Pulmonary artery; superior and inferior pulmonary veins were individually ligated. Transfixing sutures were used both for pulmonary artery and pulmonary veins. Enucleation of intact cyst, and captionnage to obliterate residual cavity was done for hydatid cysts while upper lobectomy was the usual procedure for mycetoma situated in the upper lobe tubercular cavity. Extra pleural paravertebral thoracoplasty sparing the first rib was the procedure for this with poor PFT's major resection was hazardous.

Postoperatively patients were monitored in intensive care unit. Oximetry, x-ray, suction, physiotherapy, adequate analgesics and early mobilization were done for prompt recovery. Continuous low pressure suction aided lung expansion and obliteration of residual pleural space. Post operative complications, analgesic requirements, duration of chest drains and length of hospitalization were recorded.

Results

A total of seventy two patients were studied. There were 51(71%) males and 21(29%) female patients with male to female ratio of 2.5:1. Sixty percent of the patients were in their 03rd and 04th decade of life, the youngest being of 07 years and the oldest being 81. The most common presently symptoms were hemoptysis in 72(100%) patients, while dyspnea in 25(35%) and chest pain was present in 20(28%) patients in addition to hemoptysis.

On physical examination anemia was noticed in 27(38%) clubbing in 22(30%) patients. Chest examination revealed wheezing in 20(28%) and crackles in 30(42%) patients (Table 1). Chest radiographs were obtained in all patients while CT Thorax was requested in 60(83%) patients. CT Thorax provided information about the lesion in 95% of the cases. Pulmonary function tests were obtained 68(94%) patients.

Table 1. Symptoms and signs of patients (n=72)

Symptoms	n=	%age
Haemoptysis	72	100
Dyspnoea	25	35
Chest pain	30	28
Signs		
Anemia	27	38
Clubbing	22	30
Wheeze	20	28
Crackles	30	42

Surgical procedures are shown in Table 2. Lobectomy was done in 30 patients to excise the lesion causing hemoptysis. Hydatid cystectomy was done in 24(33%) patients. These cysts were mostly located in the middle and lower lobes. Mycetomas were removed from the upper lobe either by lobectomy or by wedge resection 9(13%), depending upon the size of the cavity. Pneumonectomy for a destroyed bronchiectatic lung was done in 3(4%) patients while thoracoplasty was required in 6(8%) patients. Histopathologic results are depicted in Table 3

Table 2. Surgical procedures (n=72)

Procedure	n=	%age
Lobectomy	30	42
Hydatid cystectomy	24	33
Wedge resection	09	13
Pneumonectomy	03	04
Thoracoplasty	06	08

Table 3. Histopathology of specimens (n=72)

Pathological findings	n=	%age
Bronchoectasis	30	42
Mycetoma	02	03
Lung abscess	09	13
Hydatid cyst	24	33
Carcinoma	06	08
AV malformation	01	01

Bronchiectasis was reported in 30(42%) and mycetoma in 2(3%) resected specimens. Hydatid cyst was reported in 24(33%), carcinoma in 6(8%) and AV malformation in 1patient. There were 2(3%) post operative deaths. One patient developed respiratory failure and was ventilated for 3 days while the other, an elderly male expired suddenly on fourth post operative day, probably due to thromboembolic episode. Minor complications occurred in nine patients while one patient required chest drain for post-lobectomy empyema (Table 4).

Table 3. Mortality and morbidity (n=72)

Mortality and morbidity	n=	%age
Deaths	02	03
Complications		
Wound infection	04	06
Persistent air leak	02	03
Empyema	02	02

Discussion

Hemoptysis has diverse etiology requiring either medical or surgical intervention or both. Among, the common

causes which need surgery are bronchiectasis, pulmonary tuberculosis and its sequelae; hydatid disease and bronchial carcinoma; pulmonary tuberculosis and its sequelae are commonest causes where surgical intervention is required⁷. Most patients have more than one symptom. However hemoptysis is always of serious concern to the patient. Generally the hemoptysis is bright red, homogenous and self limited. Persistent blood streaking of the sputum is unusual and should arouse the suspicion of bronchogenic carcinoma. Chest pain is pleuritic and is effected by deep breathing and cough⁸. In our study, dyspnea in association with hemoptysis was noticed in 35% cases while chest pain was recorded in 28% cases. Computed tomography is essential in delineating the parenchymal lesion and its extent⁹. CT Thorax was obtained in 83% of our patients.

In catastrophic acute hemoptysis the patient should be nursed on the side of suspected source of bleeding, hemodynamically resuscitated and then bronchoscoped ideally under general anesthesia using a rigid bronchoscope which allows optimal bronchial suction and which can be used to maintain ventilation during anesthesia. The site of massive hemoptysis must be localized to prepare adequately for possible surgical excision¹⁰. Bronchoscopy has both diagnostic and therapeutic role in these patients and will also provide tissue diagnosis in other cases of suspected bronchogenic carcinoma. Immediate surgery is needed in massive continuous hemoptysis. Nine patients out of 72 in our study underwent immediate surgery while twenty seven cases required initial stabilization and preparation for surgery. This included optimization of hemotocrit, antimicrobials to treat infection, chest physiotherapy and bronchodilators. This initial stabilization reduces preoperative complications especially hypoxic arrest during surgery.

One of the absolute indications for one lung ventilation is massive hemoptysis. Double lumen endotracheal intubation prevents spilling from the diseased lung to the non-involved lung^{11,12}. One lung ventilation and monitoring was used in all our patients except paediatrics cases. One lung double lumen tube also provides technical benefits in performance of the operation. Thus the surgeon may expect better exposure for a procedure such as an upper lobectomy, pneumonectomy when the lung in the operative field is non-ventilated.

Surgery still plays an important role in the management of patients with Mycobacterium tuberculosis. Different procedures including lobectomy, pneumonectomy and thoracoplasty are needed to effect cure¹³. Surgery for tuberculosis has been of major concern particularly with respect to pneumonectomy. Pneumonectomy for post-tuberculosis bronchiectasis and destroyed lung requires meticulous surgical technique to avoid operative complications^{14,15}. In our study 42% of patients needed lobectomy and 4% underwent

pneumonectomy for post tuberculosis bronchiectasis and destroyed lung. Surgery therefore constitutes a valid option for the treatment of certain clinical pictures of PTB that do not respond to medical treatment occasionally patients with hydatid cyst and pulmonary aspergilloma present with hemoptysis. Hydatid cysts are mostly located in the lower lobes while aspergilloma are situated in apical tuberculosis cavities^{16,17}. Hydatid cysts were reported in 33% mycetoma in 3% of cases while carcinoma was reported in 8% cases in our study. Postoperative mortality is rare. Mortality has been reported as 2% in different studies^{18,19}. Mortality in our study was 3% i.e. 2 deaths. Mebendazole was started postoperatively to patient who underwent hydatid cystectomy while for excised aspergilloma no further treatment was required.

Conclusion

Massive hemoptysis is a life threatening situation which requires immediate medical attention and intervention. The most common causes of hemoptysis are pulmonary tuberculosis, and post tuberculous bronchiectasis in our circumstances. Our results support the role of surgery in these patients as well as in other surgically treatable pathologies resulting in hemoptysis like hydatid cysts.

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