



Anatomical Lung Resections for Infectious Diseases about 182 Cases

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Abstract

Introduction: Anatomical lung resections are practiced primarily for non-small cell lung cancer in developed countries. In countries of low socioeconomic level, the first indication for these surgical procedures remains the infectious and inflammatory diseases whose lead is the parenchymal tuberculosis sequelae. Our goal is to present our experience and surgical outcomes regarding these interventions.

Material and Methods: It was a retrospective and monocentric study including 182 patients all operated by an anatomical lung resection for an infectious or inflammatory pathologies, over a period of 8 years.

Results: Among 182 patients, there were 93 men and 89 women. The average age was 34.55 years old. The pathological antecedents were predominated by tuberculosis in 77 patients (42.30%) all form combined. Hemoptysis was predominant in 104 patients (57.14%). The right side was reached in 96 patients (52.74%). All patients were approached by posterolateral thoracotomy. The extrapleural plane was necessary in 75 patients (40.20%). Lobectomy was practiced in 114 patients (62.63%), followed by pneumonectomy in 36 patients (19.78%), segmentectomy in 27 patients (14.83%), and bilobectomy in 5 patients (2.74%). The etiologies were predominantly bronchiectasis in 46 patients (25.27%), hydatid cyst of the lung in 43 patients (23.62%). The immediate postoperative follow-up was marked especially by bleeding complications in 25 patients (13.73%), and postoperative atelectasis in 20 patients (10.98%). The mortality rate in this study was 2.74%. The mean of follow-up was 2.5 years.

Conclusion: Anatomical lung resections for infectious or inflammatory diseases are practiced with an acceptable rate of mortality and morbidity.

Keywords: Lungs; Resection; Tuberculosis; Thoracotomy; Surgery

Introduction

Tuberculosis remains a significant public health problem, in Morocco and throughout the world, whose determinants are mainly represented by adverse socio-economic conditions. As part of the National anti-tuberculosis Control Program, at the level of the structures of the Ministry of Health in Morocco, a total of 30897 cases of tuberculosis, all forms combined, were reported and put on treatment in 2017 [1]. This rate means a significant number of cases with parenchymal tuberculosis sequelae, especially for patients diagnosed late or with a bad therapeutic observance. There pranchymal sequelae most often require a surgery according to the extent of lesions. Pneumonectomy, lobectomy, bilobectomy and segmentectomy represent the anatomical lung resections whose remain the best surgical option in these cases, especially in bronchiectasis, complex aspergilloma, and others cases like destroyed lung or lobe. On the other hand, hydatidosis is also an endemic pathology in Morocco, and the surgery is based on the preservation of the lung parenchyma. However, some huge or ruptured hydatid cysts cause damage to the underlying lung that requires anatomical lung resections. Unlike our context, these surgical procedures are more practiced for Non Small Cell Lung Cancer (NSCLC). Our aim in this study is to determinate the particularities and the difficulties of anatomical lung resection in infectious and inflammatory diseases according to our experience, and the postoperative complications after these surgical procedures.

Material and Methods

It was a retrospective, descriptive and monocentric study carried out in our department of

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Table 1: Characteristics of patients.

	Patients (percentage)
Patients	182 (100%)
Median age	34.55 years old
Sex :	
Male	93 (51.09%)
Female	89 (48.90%)
Pathological antecedents :	
Tuberculosis	77 (42.30%)
Chronik smoking	12 (6.59%)
Recurrent pneumopathies	10 (5.49%)
Operated hydatid cyst	12 (6.59%)
Situs inversus	2 (1.09%)
Respiratory functional sign :	
Hemoptysis	104 (57.14%)
Bronchorrhea	58 (31.86%)
Hemoptysis + bronchorrhea	25 (13.73%)
Dyspnea	16 (8.79%)
Chest pain	10 (5.49%)
Hydatid memrane rejection	7 (3.84%)
Biliptysia	1 (0.54%)

thoracic surgery in CHU Hassan II of Fez. This study has included 182 patients, over a period of 8 years (from 1 January 2010 to 31 December 2017). We have collected all patients who had benefited of an anatomical lung resection, by pneumonectomy, lobectomy, bilobectomy or a segmentectomy for an infectious or an inflammatory disease. All patients with an incomplete medical records, or operated for pathologies other than infectious or inflammatory diseases, or had a surgical procedures others than anatomical lung resection were excluded from this study. We have recorded clinical, paraclinical and surgical data. The main goal is to report our experience in the management of these diseases.

Results

There are 182 patients, divided between 93 men and 89 women. The average age was 34.55 years old. The pathological antecedents were predominated by tuberculosis in 77 patients (42.30%) all forms combined, chronic smoking in 12 patients (6.59%), recurrent pneumopathies in 10 patients (5.49%), an operated hydatid cyst (lung or of the liver) in 12 patients (6.04%), and a situs inversus in 2 cases (1.09%). Hemoptysis was the predominant respiratory functional sign in 104 patients (57.14%), followed by bronchorrhea in 58 patients (31.86%), and a combination of these two symptoms in 25 patients (13.73%), dyspnea in 16 patients (8.79%), chest pain in 10 patients (5.49%), hydatid membrane rejection in 7 patients (3.84%), and biliptysia in one patient (0.54%). The right side was reached in 96 patients (52.74%) and the left side in 86 patients (47.25%) (Table 1).

After a good preparation by correction of the infectious phenomena with a good respiratory physiotherapy, a surgery had been proposed to the patients. All patients (100%) were treated with posterolateral thoracotomy conservative of the chest wall muscles. The extrapleural plan was approached in 75 patients (40.20%). Lobectomy was the most performed anatomic resection in 114 patients (62.63%), followed by pneumonectomy in 36 patients (19.78%), segmentectomy

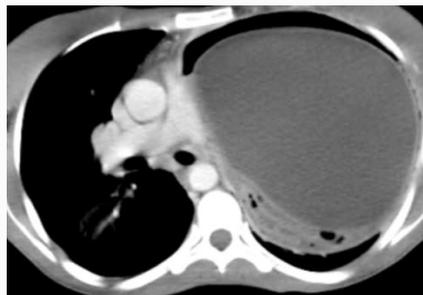


Figure 1: Huge pulmonary hydatid cyst of left upper lobe in a patient who has undergone a lobectomy.

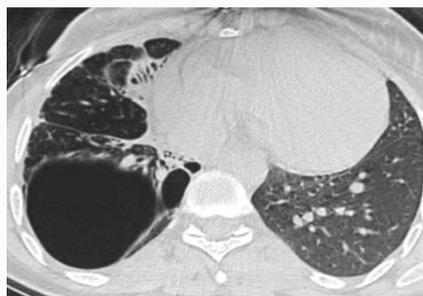


Figure 2: Thoracic computed tomography in parenchymal window showing a emphysema bubble in a patient treated previously for a tuberculosis.

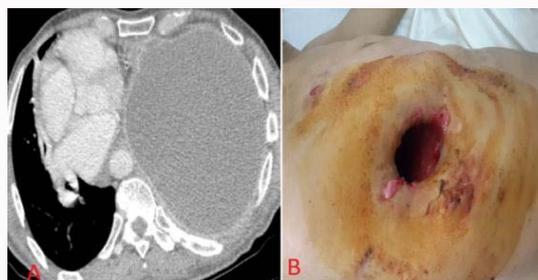


Figure 3: A) post-pneumonectomy empyema in a patient who had a destroyed lung. B) Thoracostomy in a patient who has benefited of bilobectomy for a pulmonary tuberculosis.

in 27 patients (14.83%), and lastly bilobectomy in 5 patients (2.74%). The etiologies were predominated by bronchiectasis in 46 patients (25.27%), followed by hydatid cyst of the lung in 43 patients (23.62%) (Figure 1), aspergilloma in 39 patients (21.42%), a destroyed lung in 33 patients (18.13%), a destroyed lobe in 14 patients (7.69%) (Figure 2), hydatid cyst of liver broken in the thorax in 6 patients (3.29%), and a pulmonary tuberculosis in one patient (0.54%) who was manifested by a pneumothorax (Table 2).

The mean length of hospitalization was 6 days. Our attitude for patients who have had a pneumonectomy is to don't put a chest tube in the thoracic cavity at the end of the surgical procedure. Clinical and radiological surveillance (chest x-ray every 48 hours) and a biological inflammatory assessment every 72 hours were done for all patients. Hospitalization for at least 24 hours in the resuscitation unit was recommended for all patients for effective analgesia and non-invasive ventilation sessions. The immediate postoperative follow-up was marked by bleeding complications in 25 patients (13.73%), including 4 patients (2.19%) re operated for postoperative haemothorax. Also postoperative atelectasis was marked in 20

Table 2: Etiologies indicating anatomical lung resections.

	Pneumonectomy	Lobectomy	Bilobectomy	Segmentectomy
Destroyed lung	33 (18.13%)			
Aspergilloma	2 (1.09%)	29 (15.93%)		8 (4.39%)
Bronchiectasis	1 (0.54%)	38 (20.87%)	3 (1.64%)	4 (2.19%)
Hydatid cyst of lung		31 (17.03%)	1 (0.54%)	11 (6.04%)
Hydatid cyst of liver broken in thorax		2 (1.09%)		4 (2.19%)
Destroyed lobe		14 (7.69%)		
Tuberculosis			1 (0.54%)	

Table 3: Surgical outcomes of patients.

	Pneumonectomy	Lobectomy	Bilobectomy	Segmentectomy
Number of patients	36 (19.78%)	114 (62.63%)	5 (2.74%)	27 (14.83%)
Bleeding complications	11 (6.05%)	15 (8.24%)		
Atelectasis		15 (8.24%)	1 (0.54%)	4 (2.19%)
Prolonged air leakage		8 (4.39%)		4 (2.19%)
Bronchopleural fistula	2 (1.09%)		1 (0.54%)	
Post-pneumonectomy empyema	4 (2.19%)			
Mortality	2 (1.09%)	3 (1.64%)		

patients (10.98%), prolonged air leakage in 12 patients (6.59%). Among patients with pneumonectomy, 4 patients (2.19%) presented a post-pneumonectomy empyema benefited of thoracostomy or thoracomyoplasty. A patient benefited of lower and middle bilobectomy was complicated by a bronchopleural fistula (0.54%), receiving a thoracostomy. The mortality rate in this study was 2.74% in 5 patients, 2 after pneumonectomy and 3 after lobectomy. The mean of follow-up was 2.5 years (Table 3).

Discussion

Despite advances in lung cancer screening and the development of antibiotics and antibiacyllary treatment, tuberculosis and hydatidosis in our country still persist in endemic form. Pulmonary tuberculosis has been described for the first time by Laennec in 1819 [2]. This pathology by its parenchymal sequelae was responsible of 73.07% of etiologies indicating an anatomical lung resections in this study, followed by hydatidosis in approximatively 27% of cases. The median age was 34.55 years old, and it is explained by the predominance of tuberculosis and hydatid lesions which concern the young population. For respiratory functional sign, life-threatening is affected by the risk of hemoptysis which was the most common sign in this study. This hemoptysis ranges from simple streaked blood sputum due to the erosion of inflammatory bronchial mucosa, to massive hemoptysis linked to rupture of a bronchial artery. It is usually indicative of advanced parenchymal involvement, and has been important for surgical decision in our department.

All patients underwent a thoracic computed tomography for the diagnosis of lesions and evaluation of the underlying lung. Spirometry was the main method of exploration of lung function in our study. In infectious diseases, this spirometry is not faithful sometimes, since the patient is already adapted with his destroyed lung or lobe. The open surgery remains the preferred option in infectious and inflammatory diseases, because of the pleural adhesions, hypertrophied bronchial vessels, calcified lymph nodes, and confused fissures due to repeated infections. All these characteristics can be a source of problems if we performed a video-assisted thoracoscopic surgery (VATS) [3],

especially that in our context, patients consult after several years of evolution and arrive at very advanced stages of lesions with significant pleuro-parenchymal adhesions [4]. Other approach which remains sometimes mandatory, it is the extrapleural plane which allows easy lung liberation in comparison with the intrapleural approach, and allows avoiding the infection of the pleural cavity.

Morbidity was marked with an acceptable rate in this study (34.61%), since the rate reported in the surgery for pulmonary tuberculosis was 9.4 to 46% [5-8]. The main and scary postoperative complication remains empyema, especially after pneumonectomy (Figure 3A), because length of follow-up for management either by thoracostomy alone until the sterilization of the pleural cavity (Figure 3B), followed sometimes by thoracomyoplasty practiced mainly by latissimus dorsi muscle which was conserved in the initial posterolateral thoracotomy [9]. The rate of this complication is more reported in the group of infectious and inflammatory diseases [10]. Empyema after pneumonectomy or lobectomy makes fear a bronchopleural fistula whose risk can be reduced by the protection of bronchial stump by a pleural, thymic or intercostal muscle flap. The air leakage is considered prolonged in our department if it exceeds 7 days. This air leak is managed either by mobilizing the chest tube by 2 cm to 3 cm, otherwise by adding a second chest tube in axillary or anterior localization.

Mortality after lung resections varies between 3% and 6% [11]. In our series this rate was 2.7%, which was very acceptable, especially that all patients had an infectious or inflammatory diseases, and all approached by thoracotomy. The mortality differs according to the type of anatomic lung resection. The rate of this mortality at 30 days varies from 3 to 10% after pneumonectomy, and less than 1% after lobectomy [12,13]. This rate is higher in pneumonectomy associated with a bronchopleural fistula. The two deaths recorded after pneumonectomy in our series were on the right side, which is consistent with the study reported by Ziad Mansour et al. [14] and al that objectified the right side as a risk factor for mortality after pneumonectomy.

The limits of this series remain the retrospective collection of data, and the non-comparison of anatomic lung resections according to the indications (infectious pathology vs. tumoral pathology) or after the approach (thoracotomy vs. VATS), since all our patients in this study were operated by thoracotomy.

Conclusion

The endemicity of tuberculosis and hydatidosis in our context explains the predominance of anatomic lung resection for infectious and inflammatory diseases compared to malignant diseases mainly lung cancer. These benign diseases are associated also with a high risk of morbidity due to the pleural adhesions, and damage of the underlying lung. Surgical outcomes of this study mean that more effort is needed to fight against these endemic diseases, by establishing an early diagnosis, to avoid a major lung resection.

References

1. Ministère de la santé Maroc. Ensemble pour un Maroc sans tuberculose. Communiqué de presse; 2018.
2. Laennec R. De L'auscultation médiate, ou Traité du diagnostic des maladies du poumon et du cœur. Paris: Brosson et Chaudé; 1819.
3. Thirugnanam A. Video-assisted thoracoscopic surgery and open chest surgery in infectious lung diseases. *J Vis Surg.* 2017;3:3.
4. Rabiou S, Issoufou I, Ammor FZ, Harmouchi H, Belliraj L, Lakranbi M, et al. Results of bronchiectasis surgery: About 64 cases. *Rev Pneumol clin.* 2017;73(4):199-205.
5. Takeda S, Maeda H, Hayakawa M, Sawabata N, Maekura R. Current surgical intervention for pulmonary tuberculosis. *Ann Thorac Surg.* 2005;79(3):959-63.
6. Rizzi A, Rocco G, Robustellini M, Rossi G, Della Pona C, Massera F. Results of surgical management of tuberculosis: experience in 206 patients undergoing operation. *Ann Thorac Surg.* 1995;59(4):896-900.
7. Treasure RL, Seaworth BJ. Current role of surgery in Mycobacterium tuberculosis. *Ann Thorac Surg.* 1995;59:1405-7.
8. Reed CE. Pneumonectomy for chronic infection: fraught with danger? *Ann Thorac Surg.* 1995;59(2):408-11.
9. Lakranbi M, Rabiou S, Belliraj L, Issoufou I, Ammor FZ, Ghalimi J, et al. What place for the thoracostomy-thoracomyoplasty in the management of the chronic pleural empyema? *Rev Pneumol Clin.* 2016;72(6):333-9.
10. Shapiro M, Swanson SJ, Wright CD, Chin C, Sheng S, Wisnivesky J, et al. Predictors of major morbidity and mortality after pneumonectomy utilizing the society for Thoracic surgeons General Thoracic Surgery Database. *Ann Thorac Surg.* 2010;90(3):927-34.
11. Stéphan F. Complications postopératoires de la chirurgie Pulmonaire. *Réanimation.* 2002;11:40-8.
12. Klemperer J, Ginsberg RJ. Morbidity and mortality after pneumonectomy. *Chest Surg Clin N Am.* 1999;9(3):515-25.
13. Watanabe S, Asamura H, Suzuki K, Tsuchiya R. Recent results of postoperative mortality for surgical resections in lung cancer. *Ann Thorac Surg.* 2004;78(3):999-1002.
14. Mansour Z, Kochetkova EA, Santelmo N, Meyer P, Falcoz PE, Olland A, et al. Réévaluation des facteurs de risques de morbidité et de mortalité à court terme des pneumonectomies. *Chirurgie Thoracique Cardio-Vasculaire.* 2010;15:80-6.