ELSEVIER

European Journal of Cardio-thoracic Surgery 21 (2002) 634–637

EUROPEAN JOURNAL OF CARDIO-THORACIC SURGERY

www.elsevier.com/locate/ejcts

Surgical treatment in bronchiectasis: analysis of 166 patients

Hakan Kutlay, Ayten Kayı Cangır, Serkan Enön, Ekber Şahin, Murat Akal, Adem Güngör, Nezih Özdemir, Şevket Kavukçu*

Department of Thoracic Surgery, Ankara University Medical School, Ankara, Turkey

Received 17 October 2001; received in revised form 29 December 2001; accepted 15 January 2002

Abstract

Background: Bronchiectasis is usually caused by pulmonary infections and bronchial obstruction. It is still a serious problem in developing countries as our country. We reviewed the morbidity and mortality rates and outcome of surgical treatment for bronchiectasis. **Patients and methods**: Between 1990 and 2000, 166 patients (92 female and 74 male patients) underwent pulmonary resection for bronchiectasis. The mean age was 34.1 years (range, 7–70 years). Mean duration of symptoms was 5.7 years. **Results**: Symptoms were copious amount of purulent sputum in 135 patients, expectoration of foul-smelling sputum in 109, hemoptysis in 35 and cough in all patients. The indication for pulmonary resection was failure of medical therapy in 158 patients, massive hemoptysis in five and lung abscess in three. The disease was bilateral in six patients and mainly confined to the lower lobe in 127. One hundred and twenty patients had a lobectomy, 13 had a pneumonectomy, 21 had a segmentectomy and a combination of these approaches in 18. Operative morbidity and mortality were seen in 18 (10.5%) and in three (1.7%) patients, respectively. Follow-up was complete in 148 patients with a mean of 4.2 years. Overall, 111 patients were asymptomatic after surgical treatment, symptoms were improved in 31, and unchanged or worse in six. **Conclusions**: Surgical treatment of bronchiectasis is more effective in patient with localized disease. It is satisfactory with acceptable ratio of morbidity and mortality. © 2002 Elsevier Science B.V. All rights reserved.

Keywords: Bronchiectasis; Surgical treatment

1. Introduction

Bronchiectasis, a chronic necrotizing infection of the bronchi and bronchioles leading to or associated with abnormal dilation of these airways, was first described by Laënnec in 1819 [1,2]. Today, with the improvement of health care and the availability of suitable antibiotics, the prevalence of bronchiectasis has declined and the patients with early disease can be treated successfully by conservative procedures in developed countries. Bronchiectasis still constitutes an important problem in developing countries because of tuberculosis, pneumonia, pertussis and serious rubeola infections [3–5]. Few recent reports of surgical management of bronchiectasis are available in English literature.

We present herein our 11-year experience on 166 patients with bronchiectasis who underwent surgical treatment.

2. Patients and methods

Between 1990 and 2000, 166 patients with bronchiectasis were operated on in the Department of Thoracic Surgery in Ankara University School of Medicine. All patients were evaluated with a detailed history and physical examination and blood tests including a complete blood count and serum chemistries. Pulmonary function tests were performed routinely. Quantitative pulmonary ventilation and perfusion scans were carried out in patients with poor pulmonary function. Radiologic examinations included a chest radiography, and a chest computed tomography (CT). Before CT was routinely used, bronchography was performed. The patients were evaluated according to gender, age, symptoms, clinical and radiographic findings, the method of treatment, and prognosis.

Chest physicians usually follow medically-treated patients, and the decision to present the patients for surgery was made by them, but the final decision was reached together at the weekly medico-surgical meeting. All patients had intensive chest physiotherapy in preoperative period. Sputum culture and sensitivity tests of all patients were examined and received prophylactic antibiotics. Chest

* Corresponding author. Ankara Üniversitesi Tıp Fakültesi, İbn-i Sina Hastanesi, Göğüs Cerrahisi Anabilim Dalı, 06100 Samanpazarı-Ankara, Turkey. Tel.: +90-312-310-3333 ext. 2906; fax: +90-312-310-6371.

E-mail address: kayicangir@hotmail.com (S. Kavukçu).

1010-7940/02/$ - see front matter © 2002 Elsevier Science B.V. All rights reserved.
PII: S1010-7940(02)00053-2

Downloaded from https://academic.oup.com/ejcts/article/21/4/634/485119 by ANKARA user on 11 December 2021

physiotherapy programmes were continued until the daily volume of the sputum decreased to 50 ml or less. Rigid and/or flexible bronchoscopy were also performed for all patients for the removal of secretion and determining foreign body or endobronchial lesions. In adult patients, a double-lumen endotracheal tube was used to provide isolated ventilation to each lung to prevent spilling of secretion to the other side. Posterolateral thoracotomy was performed in all patients. If the disease is limited to one lobe, lobectomy was done and when the whole lung was affected, pneumonectomy was performed. When patients had poor respiratory functions tests or disease is fairly limited, segmentectomy was performed. During pulmonary resection, excessive bronchial dissection was avoided, and peribronchial tissues were preserved. Currently, toilet-bronchoscopy was performed routinely preoperatively, after intubation. All resection specimens were subjected to histopathologic examination in order to confirm the diagnosis.

Postoperative management included intensive chest physiotherapy and administration of antibiotics and analgesics.

Operative mortality included patients who died within 30 days after thoracotomy or those who died later but during the same hospitalization. Follow-up information was obtained for all survivors, either during periodic clinic visits or telephone interview with the patients or his/her relatives.

The patients were followed up for a mean period of 4.2 years, ranging from 6 months to 10 years. Segmentectomy was accepted as an incomplete resection. At last follow up, the outcome of surgery was evaluated according to the following criteria: (1) excellent-complete absence of preoperative symptoms leading to surgery; (2) good-marked reduction in preoperative symptoms; and (3) no-change no-reduction in preoperative symptoms.

Data are expressed as mean ± standard deviation and differences were considered statistically significant when the *P* value was less than 0.05.

3. Results

The sex distribution was 92 females and 74 males with ages ranging from 7 to 70 years (mean, 34.1 years). Female patients (55.4%) were greater than male patients (44.6%) in number, but it was not statistically significant. Ages of 97 (58.4%) patients were above 30 years old (Fig. 1). Symptoms were copious amount of purulent sputum in 135 (81.3%) patients, expectoration of foul-smelling sputum in 109 (65.7%), hemoptysis in 35 (21.1%) and cough in all patients. Mean time of complaining was 5.7 years (range 2–30 years). Nearly all patients had recurrent pulmonary infection.

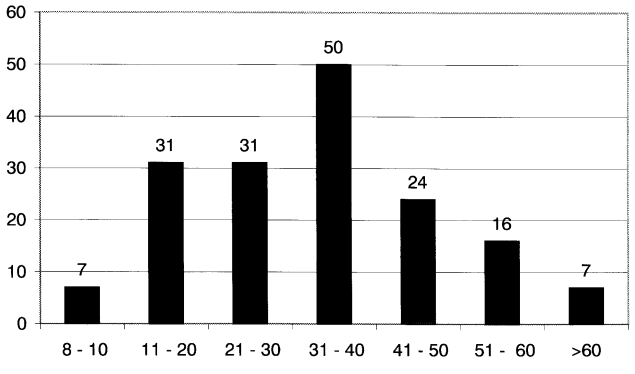


Fig. 1. Age distribution of patients.

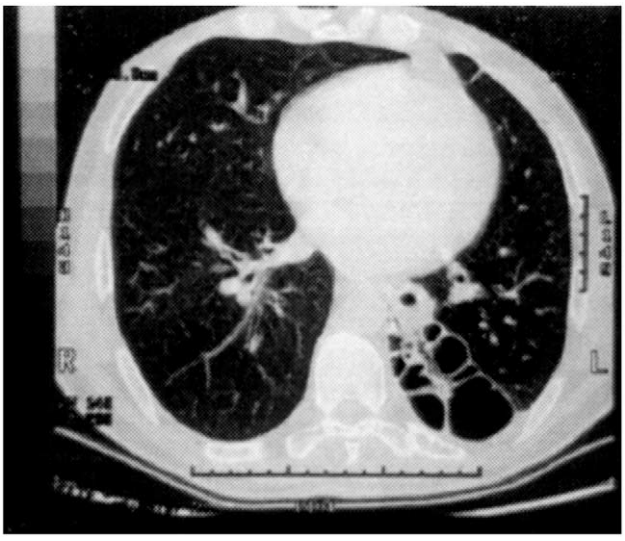


Fig. 2. CT scan showing cystic bronchiectasis in the left lower lobe.

Chest CT scan was performed in 158 patients. Cystic dilation in bronchus or dilated bronchi was seen in CT scan (Fig. 2). In approximately 50% of patients, lobar retraction was noted with CT scan (Fig. 3). Bronchography was performed in six patients.

The most common microorganisms were *Haemophilus influenza* (13.8%), *Pseudomonas aeruginosa* (8.4%) and

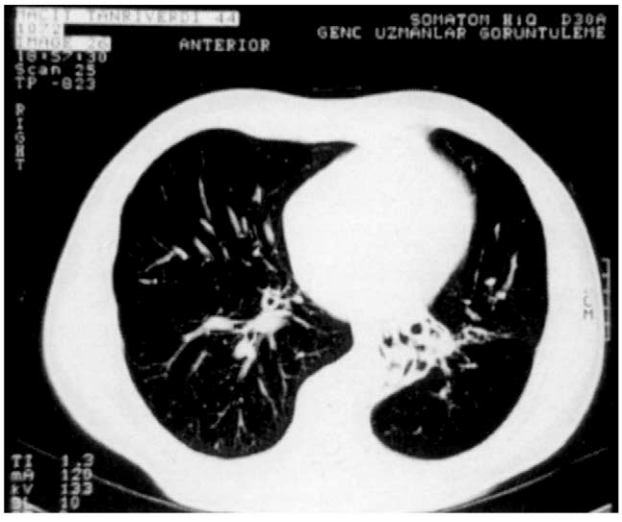


Fig. 3. CT scan showing bronchiectasis with retraction in the left lower lobe.

Downloaded from https://academic.oup.com/ejcts/article/21/4/634/485119 by ANKARA user on 11 December 2021

Table 1
Surgical procedures

	Left		Right		Total	
	No. of patients	%	No. of patients	%	No. of patients	%
Pneumonectomy	9	5.2	4	2.3	13	7.5
Lobectomy	65	37.8	44	25.6	109	63.4
Bilobectomy			11	6.4	11	6.4
Lobectomy + segmentectomy	18	10.5			18	10.5
Segmentectomy	10	5.8	11	6.4	21	12.2
	102	59.3	70	40.7	172	100

Streptococcus pneumonia (5.4%). In preoperative bronchoscopic examination, neither a foreign body nor an endobronchial lesion was detected.

The indication for pulmonary resection was insufficiency of conservative therapy in 158 (95.2%) patients, massive hemoptysis in five (3%) and lung abscess in three (1.8%). One hundred and seventy-two posterolateral thoracotomies were performed in 166 patients. According to intraoperative findings, left lower lobe (53.6%) was the most common localization. One hundred and twenty patients (69.8%) had a lobectomy, 13 (7.5%) had a pneumonectomy, 21 (12.2%) had a segmentectomy and combined lobectomy and segmentectomy in 18 (10.5%) (Table 1). Lobectomy was the most preferred one. Nine of the patients who had pneumonectomy had the operation on the left side and four on the right.

Operative morbidity was seen in 19 (11%) patients with six (3.5%) major and 13 (7.5%) minor complications (Table 2). Re-thoracotomy was performed in 3 patients for postoperative bleeding. Nasotracheal aspirations and rigid bronchoscopy were used in four patients with atelectasis for the removal of secretion. Operative mortality was seen in three (1.7%) patients. The cause of death was pulmonary embolism in one case, respiratory failure in one, and bronchopleural fistula and empyema in one.

Follow-up was complete in 148 patients with a mean of 4.2 years (range 1–10 years). One hundred and eleven patients were asymptomatic after surgical treatment, symptoms were improved in 31, and unchanged or worse in six. The results of follow-up are shown in Table 3 and the results of complete resection were significantly better than those of incomplete resection ($P < 0.05$).

Table 2
Complications following surgery for bronchiectasis

Complication	No. of patients	%
Postoperative bleeding	3	1.7
Bronchopleural fistula	1	0.6
Empyema	1	0.6
Pulmonary embolism	1	0.6
Pleural effusion	1	0.6
Prolonged air leak	3	1.7
Wound infection	5	2.9
Atelectasis	4	2.3
Total	19	11

3.1. Comment

The incidence of bronchiectasis is unknown [3]. Bronchiectasis is usually caused by pulmonary infections or bronchial obstruction. Bronchiectasis is still a problem in developing countries as our country [3,4]. In spite of the advances in thoracic surgery, the optimal treatment for bronchiectasis remains controversial.

Recurrent pulmonary infection of childhood is an important factor in the etiology. Similar to the other series, most of our patients have recurrent infections in their histories [3,5,6]. This situation is significant because of emphasizing the importance of the adequate and favorable treatment of pulmonary infections of childhood.

The diagnosis of bronchiectasis today can be somewhat of a problem. Before the usage of CT, a bronchogram was the standard procedure for diagnosis [7,8]. However, in bronchography, timing of the study is important. Only one lung is studied at a time, and the study should be done when the patient is in optimal condition, after postural drainage, and antibiotics have controlled any acute exacerbation and secretions are decreased to a minimum [1]. However, these conditions are not required for CT scan. The detailed images demonstrate bronchial dilatation, peribronchial inflammation and parenchymal disease [7,8,9]. Some authors recommended bronchography as a reliable method for the diagnosis of bronchiectasis [4,5], however we did not need bronchography for our patients. The preoperative diagnosis based on CT scan findings was consistent with operative findings in all our cases. After the routinely usage of CT, we did not use bronchography and do not recommend it for the diagnosis of bronchiectasis. The use of bronchogra-

Table 3
Results of complete and incomplete resections

	Complete resection		Incomplete resection	
	No. of patients	%	No. of patients	%
Excellent	111	84.7		
Good	18	13.8	13	76.5
No change or worse	2	1.5	4	23.5

Downloaded from https://academic.oup.com/ejcts/article/21/4/634/485119 by ANKARA user on 11 December 2021

phy has been decreasing and has been progressively replaced by CT scan as in our series [9,10]. According to our experience, preoperative CT findings and operative evaluation are sufficient to make a decision for complete resection in bronchiectasis.

The initial treatment of bronchiectasis is primarily medical. If medical treatment is unsuccessful or frequent episodes of hemoptysis, exist surgical therapy should be considered [1,11]. Almost all patients with bronchiectasis have been followed by chest physicians, being on medical treatment for many years. The most common symptoms were chronic cough, expectoration of foul-smelling, purulent sputum. Sometimes the daily volume of the sputum could be raised up to 250–500 ml. Consequently, patients suffer from social deprivation and intrinsic depression. According to our clinical experience, patient with bronchiectasis is often introverted. The use of antibiotics in almost every recurrence of pulmonary infections increases the costs of treatment and frequently causes side effects related with these drugs. Hospitalization during pulmonary infections also causes the loss of work force. After every acute infection, surrounding normal pulmonary tissues are also affected and bronchiectatic areas get larger and lead to destroyed lung. Moreover the surgical treatment of bronchiectasis is satisfactory with acceptable operative mortality and morbidity rates of 1–8.6 and 14–53% previously reported, respectively [3–6,11]. These rates were 1.7 and 11% in our series.

In bronchiectasis, unilateral, segmental or lobar distribution, persistent, recurrent symptoms when medication is discontinued, recurrent infection and hemoptysis are each an indication for surgical treatment [3–5,11]. The goals of surgical treatment are complete resection and to ensure the quality life. For successful surgery: (1) we recommend that the operation should be performed in 'dry period'. (2) In intraoperative examination, if suspected areas that could not be determined by radiological examination are present, these parenchymal areas should be resected to perform complete resection and to decrease relapse rates. (3) Surgical treatment of bronchiectasis should be done in childhood because the residual lung could still grow to fill the space left in the chest after resection.

Most of our patients have limited disease, and complete resection was possible in 87.8% ($n = 151$). Bilateral bronchiectasis does not present a contraindication to surgical therapy in selected patients [1,4,5]. In our series, six patients (3.6%) had bilateral bronchiectasis. Results of these cases were similar to those of other reports [1,5,11]. Complete resection of the lesion is important in these patients. In our series, patients with complete resection had better prognosis than those with incomplete resection. More than 80% of our patients had total relief or substantial improvement in their preoperative symptoms. These results are similar to other series [1,5,11].

In conclusion, surgical treatment for bronchiectasis should be limited when localized disease and life-threatening symptoms are present. For a successful result, complete resection should be performed. In patients with bronchiectasis, pulmonary resection can be performed with acceptable morbidity and mortality rates.

References

[1] Van Trigt P. Lung infections and diffuse interstitial lung disease. In: Sabiston DC, Spencer FC, editors. Surgery of the Chest, Philadelphia: W.B. Saunders Company, 1990. pp. 615–670.
[2] Respiratory system. In: Cotran RS, Kumar V, Robbins SL, editors. Robbins Pathologic Basis of Disease. Philadelphia: W.B. Saunders Company, 1989. pp. 755–810.
[3] Agasthian T, Deschamps C, Trastek VF, Allen MS, Pairolero PC. Surgical management of bronchiectasis. Ann Thorac Surg 1996;62:976–980.
[4] Ashour M, Al-Kattan K, Rafay MA, Saja KF, Hajjar W, Al-Fraye AR. Current surgical therapy for bronchiectasis. World J Surg 1999;23:1096–1104.
[5] Doğan R, Alp M, Kaya S, Ayrancıoğlu K, Taştepe İ, Ünlü M, Çetin G. Surgical treatment of bronchiectasis: a collective review of 487 cases. Thorac Cardiovasc Surg 1989;37:183–186.
[6] Annest LS, Kratz JM, Crawford FA. Current results of treatment of bronchiectasis. J Thorac Cardiovasc Surg 1982;83:546–550.
[7] Miller JI. Bacterial infection of the lungs and bronchial compressive disorders. In: Shields TW, LoCicero III J, Ponn RB, editors. General Thoracic Surgery, Philadelphia: Lippincott Williams and Wilkins, 2000. pp. 1039–1052.
[8] Grenier P, Maurice F, Musset D, Menu Y, Nahum H. Bronhiectasis: assessment by thin-section CT. Radiology 1986;161:95–99.
[9] Fujimoto T, Hillejan L, Stamatis G. Current strategy for surgical management of bronchiectasis. Ann Thorac Surg 2001;72:1711–1715.
[10] Prieto D, Bernardo J, Matos MJ, Eugenio L, Antunes M. Surgery for bronchiectasis. Eur J Cardiothorac Surg 2001;20:19–24.
[11] Sanderson JM, Kennedy MCS, Johnson MF, Manley DCE. Bronchiectasis: results of surgical and conservative management. A review of 393 cases. Thorax 1974;29:407–416.

Downloaded from https://academic.oup.com/ejcts/article/21/4/634/485119 by ANKARA user on 11 December 2021