

## Original Article

# The Influence of Specific Factors on Postoperative Morbidity in Young Adults with Bronchiectasis<sup>☆</sup>

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**Background:** Surgical treatment of bronchiectasis is associated with acceptable mortality and morbidity rates. To date, few reports on the prediction of postoperative morbidity using some preoperative measures have been presented. We present our results regarding the influence of some specific factors on postoperative morbidity on young adult patients who were treated surgically for bronchiectasis.

**Methods:** Between January 2000 and July 2007, 122 patients were operated upon. Female gender, increased number of resected segments, presence of haemoptysis and bilateral disease, compromised pulmonary function test (FEV1/VC < 60%) and absence of preoperative fiberoptic bronchoscopy (FOB) were examined as the potential risk factors for postoperative complications such as persistent air leak (PAL), atelectasis, residual air space (RAS), bronchopleural fistula (BPF) and empyema.

**Results:** There was no operative mortality. Morbidity was observed in a total of 16 patients with an overall morbidity rate of 13.1%. Complete resection was achieved in 88 patients (72.1%). The number of resected segments was not found to be significantly associated with increased morbidity. Presence of preoperative haemoptysis did not correlate with postoperative complications significantly. Absence of preoperative FOB was not found to be associated with postoperative complications ( $p < 0.05$ ). Compromised PFT was significantly associated with RAS ( $p = 0.028$ ), however it was not associated with increased risk of PAL, atelectasis or empyema significantly.

**Conclusion:** Multi-segmental resectable bronchiectasis should not be considered an occult risk factor for morbidity after resection. Associated non-severe haemoptysis and absence of preoperative bronchoscopy are not associated with significant increased risk of postoperative morbidity.

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**Keywords.** Bronchiectasis; Fiberoptic bronchoscopy; Multi-segmental resection

## Introduction

Despite improvements in medication and equipment, resection of the involved lung segments remains the only potential possibility of cure in many patients with bronchiectasis [1,2]. Surgical therapy is carried out in order to eliminate the disease, improve the quality of life for the

patient, reduce the need for hospitalisation and prevent possible complications due to chronic disease [3,4].

As bronchiectasis has an inflammatory basis, surgical treatment of the disease carries a considerable increased risk in both pre and postoperative periods [7,8]. Current mortality rates, ranging from 1 to 9%, are reported to be declining by virtue of advanced surgical care [2–4,9–12].

To date, several large series describing the surgical outcomes for patients with bronchiectasis have been published, and satisfactory results with acceptable mortality and morbidity rates have been presented [1,2,5,6]. However, few reports have particularly focused on the prediction of postoperative morbidity by using preoperative measures [7,8]. In this study, we present our seven-year experience with a special focus on the influence of some specific factors on postoperative morbidity on young adult

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patients who were treated surgically with the diagnosis of bronchiectasis.

## Patients and Methods

Between January 2000 and July 2007, 122 patients with bronchiectasis were operated on at Camlica Thoracic Surgery Department of Gulhane Military Medical Academy, a tertiary thoracic surgery referral centre. Patients were retrospectively evaluated to establish the influence of specific preoperative factors on postoperative complications. Female gender, the number of resected segments, presence of haemoptysis, presence of bilateral disease, compromised pulmonary function test ( $FEV1/VC < 60\%$ ) and absence of preoperative fiberoptic bronchoscopy (FOB) were examined as potential risk factors predictive of postoperative complications such as persistent air leak (PAL), atelectasis, residual air space (RAS), bronchopleural fistula (BPF) and empyema.

All patients were evaluated with a detailed history associated with physical examination. Routinely, posterior-anterior and lateral chest X-ray and high resolution computed tomography (HRCT) were employed to establish the preoperative diagnosis. Electrocardiography and laboratory tests were performed to exclude any comorbidity. Pulmonary function tests (PFT) were conducted in pre- and post-operative period. All patients had intensive chest physiotherapy, prophylactic or specific antibiotic therapy according to the results of sputum cultures, preoperatively. Fiberoptic bronchoscopy was not performed routinely, but was performed in patients with suspected foreign body aspirations and excessive secretions, and also postoperatively in patients with persistent atelectasis.

The final decision for surgery in most of the patients with bronchiectasis was reached at meetings conducted by the surgeons and physicians. Patients were chosen as candidates for surgery when: a localised bronchiectatic lung region was detected by HRCT and symptomatology such as chronic cough, foetid sputum, recurrent pulmonary infection and non-severe haemoptysis which were severely impeding the patient's social life and associated with failure of medical therapy despite frequent hospitalisation was present. When a limited preoperative PFT ( $FEV1/VC < 60\%$ ) was documented, surgical decision making was supported by the conditional status of the patient, exercise-tolerance test, preoperative blood gas analysis and ventilation/perfusion scan when required.

A double-lumen endotracheal tube was used during surgery for all patients. Pulmonary resection was performed via a posterolateral thoracotomy. The resection type was determined according to the affected segments or lobe(s) with the aid of preoperative HRCT. Pulmonary resection was considered complete if the patient was believed to have lung fields completely free of bronchiectasis and/or anatomic resection of all affected segments or lobe was achieved. This was performed whenever possible whilst trying to preserve as much as lung parenchyma without disease.

All lobar or segmental resection procedures were performed by using mechanical staplers routinely. Some reactive bronchial lymph nodes were dissected in order to release the vasculature but aggressive bronchial dissection was not performed. We did not use a flap from pleura or any other type of flap for covering the bronchial stump. Bronchial closure was routinely performed by using a mechanical stapler.

Patients were followed-up in the intensive care unit for 24 hours and mobilised in the 6–12th hour postoperatively. All chest tubes were kept on 15–20 cm  $H_2O$  of wall suction until the morning of postoperative day 2. Chest physiotherapy was started in the postoperative first day and lasted for one week. Parenteral antibiotics were administered until the removal of the chest tubes. Chest tubes were removed when there was no air leak and the drainage was less than 100 mL per day.

Operative mortality included patients who died within 30 days after surgery. Postoperative morbidities were set down as PAL (for more than seven days), RAS (occupying more than 10% of the thoracic cage), atelectasis (persisted despite nasotracheal aspiration and requiring FOB), empyema and BPF.

Follow-up information was obtained via periodic reviews or telephone interview. The patients were followed-up for a mean period of 2.8 years, ranging from six months to five years. At last follow-up, the outcome of the surgery was evaluated and rated according to patients' satisfaction as: (1) complete absence of pre-operative symptoms, (2) good-marked reduction in preoperative symptoms, and (3) no-change in symptomatology.

All data are presented as mean value  $\pm$  standard deviation. The influences of specific factors upon postoperative morbidity were studied by grouping the complications. Univariate and multivariate logistic regression analyses were utilised to compare various risk factors between the groups. A *p* value of less than 0.05 was considered significant.

## Results

A total of 122 patients with the diagnosis of bronchiectasis were operated upon, with an age average of 22.3 (range; 14–44 years). There were 106 male (86.8%) and 16 female (13.2%) patients. Most of the patients (63.9%) were in the 19–23-age range. There was only one patient under the age of 18 years in whom pneumonectomy was performed. Eight patients were aged over 36 years six of whom were female.

Ninety-nine (81.1%) patients had chronic symptoms for a mean period of 7.2 years (range; 1–18 years), whereas 23 patients (18.8%) were asymptomatic. As most of the patients were already diagnosed previously by chest physicians and referred to our clinic due to persistent symptomatology dominantly associated with failure of medical therapy, the most common symptoms were persistent productive cough (84.4%) and foetid sputum (63.9%). Fifty-four patients (44.2%) had been suffering from recurrent infections. Haemoptysis ranked fourth, affecting 22.9%; only one patient underwent urgent resec-

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