
Original Article

Bronchiectasis in Children: A Case Series Study from Iran

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ABSTRACT

Background: Bronchiectasis in childhood is still one of the most common causes of childhood morbidity in developing countries. The management of these patients remains problematic, and there are few studies of long-term outcome. The aim of this retrospective study was to define the general characteristics, underlying causative factors, radiologic and laboratory findings of bronchiectatic patients.

Materials and Methods: Forty-six patients with bronchiectasis, who had referred to National Research Institute of Tuberculosis and Lung Disease (NRITLD) in Iran, were reviewed during a 6-year period (1999-2005). General characteristics and underlying causes were recorded from the medical reports.

Results: Mean age of patients was 12.39 ± 4.1 years at presentation. Forty-six percent were females and 54% were males. The most common clinical symptom was chronic productive cough. According to HRCT-Scan results, RML and lingula were the main affected regions. The most common etiology of bronchiectasis was idiopathic followed by cystic-fibrosis and mucociliary dyskinesia. Four patients with CF expired due to pulmonary insufficiency.

Conclusion: In conclusion, bronchiectasis remains a disease of concern to pediatricians, particularly in developing countries. Infections are still important causes of bronchiectasis, and clinical improvement can be achieved by appropriate medical and supportive treatment. Although medical treatment is the mainstay of management, surgery should be considered in selected patients.

Keywords: Bronchiectasis, Children, Pulmonary infection.

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INTRODUCTION

Bronchiectasis is the permanent dilatation of bronchi. It can be categorized according to the pathological or radiographic appearance of airways (1,2). It is an uncommon disease with a potential to

cause devastating illness, including repeated respiratory infections requiring antibiotics, disabling productive cough, shortness of breath, and occasional hemoptysis (3,4).

Accurate estimates of the incidence of bronchiectasis are not available. Typically, diagnostic studies are pursued only in those with persistent symptoms and signs, both clinical and radiological (5). Clark et al. found the incidence of bronchiectatic changes to be 1.06 per 10,000 children living in Scotland (6).

Bronchiectasis is still common in developing countries and in lower socioeconomic classes. Recurrent respiratory infections under treatment with antibiotics and poor immunization rates are the main causes of the relatively high prevalence of disease in these populations (7). Other researchers in 2000 reported a high prevalence in relatively isolated populations with poor access to health care and high rates of respiratory tract infections during childhood (8).

Bronchiectasis can be localized or diffuse and primary or secondary to other systemic diseases. The etiology of disease includes a wide range. Infections, Congenital and genetic disorders, ciliary abnormalities, immunodeficiencies and foreign body are the most common causes of bronchiectasis in childhood. In countries with high incidence of tuberculosis, the pulmonary type of this infectious disease is one of the most important causes of bronchiectasis in children (9).

The aim of the current study is to review the etiology, characteristics and underlying causative factors of bronchiectasis in children admitted to the pediatric pulmonary ward of "National Research Institute of Tuberculosis and Lung Disease".

MATERIALS AND METHODS

The medical records of all patients who were diagnosed as having bronchiectasis and admitted to the pediatric pulmonary ward of Masih Daneshvari Hospital between 2000 and 2004 were reviewed.

Forty-six patients were found to have bronchiectasis, with the pediatric age range between 5-15 years.

Medical history including personal and familial history, physical examination data, growth and development chart, and pulmonary site of infection at the time of admission were obtained in all patients.

Results of laboratory tests and radiological findings, chest CT-scan and pulmonary function test were assessed and classified. Induration of tuberculin skin test (Mantoux test by intra dermal injection; 0.1 ml of 5 tuberculin units) was noted down in all 38 patients. Children were excluded if they had proven cystic-fibrosis.

All the cases underwent diagnostic procedures, including sweat test, immunological study and bacteriological test, the results of which were recorded.

Data analysis was accomplished by using SPSS statistical software package (version 13.0)

RESULTS

CT-Scan reports of all cases, admitted to pediatric pulmonary ward of Masih Daneshvari Hospital between the years 2000 and 2004 were reviewed. Out of 1372 admitted cases, 46 (3.3%) were diagnosed as having bronchiectasis. The mean age of patients was 12.3 ± 4.1 yrs. Out of the total cases 21 (46%) were females and 25 (54%) were males. The onset of clinical symptoms was at the age of 3.7 years in all patients.

The most common symptom was chronic cough (81%). Other clinical symptoms were dyspnea (10%) and fever (10%).

Due to the growth chart, 13 cases (54.4%) were under the 5% and 6 cases (25%) were under the 25%.

The most significant laboratory findings were leukocytosis (61%), and anemia (41%).

In order to find the exact sites of bronchiectasis, CT-Scans of all cases were assessed. Right lung and left lung bronchiectasis were seen in 47.7% and

33.3% of patients, respectively. Both lung involvements were detected in 19.3% of cases (Figure 1)

The etiology of bronchiectasis in patients is as follows:

Out of patients with immunodeficiency, 2 cases had CVID and one case had IgA deficiency. The mean duration of hospital stay in patients was 10 days. Lobectomy of the involved lobe was performed in 4% of patients. Out of 12 CF cases, 4 patients expired due to pulmonary insufficiency. The remaining cases are receiving supportive therapy.

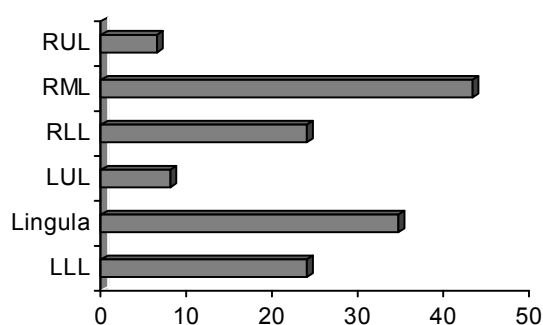


Figure 1. Site of lung involvement in patients

DISCUSSION

Bronchiectasis is primarily a disease of the bronchi and bronchioles involving a vicious circle of transmural infection and inflammation with mediator release (1). Recent studies show that the incidence of bronchiectasis has decreased in developed countries due to control of infectious diseases (10). Field, by examining the yearly admission rates due to bronchiectasis in five hospitals in Great Britain, noted a dramatic decrease in admission rates (11). She speculated that treatment of lower respiratory tract infections improved by the increased availability of broad-spectrum antibiotics accounted for the decreased incidence.

In the recent study, the cause of bronchiectasis was unknown in 43% of cases. It seems that the most

common causes of bronchiectasis in this group were persistent respiratory infections, specially untreated or poorly treated infections. Post respiratory infection was assessed as one of the causes of bronchiectasis in many other studies (12, 13). In a study, researchers published the result of their study on 118 children developing Non-CF bronchiectasis (14).

The results show that the second cause of bronchiectasis in 26.7% of patients was CF.

So far, the most common genetically transmitted disorder that results in bronchiectasis is cystic fibrosis, the result of the chronic bronchial obstruction with mucus, infection, and inflammation associated with CF (15, 16).

Among the various entities that predispose one to develop bronchiectasis, infection is so far the most common, and, until recently, tuberculosis was the most common infectious agent responsible for post infection bronchiectatic changes (17, 18).

As tuberculosis is endemic in Iran, high prevalence of post tuberculosis bronchiectasis was expected in this study. Since TB treatment in our center is based on DOTS strategy and TB patients are followed up monthly during the treatment, the rate of post TB bronchiectasis was low in our study.

The prolonged presence of a foreign body within the airway can result in chronic obstruction and inflammation, both major factors in development of bronchiectasis (19, 20).

In 3% of the patients the etiology of bronchiectasis was foreign body aspiration.

In a study, researchers reviewed 462 cases of foreign body aspiration in children and found chronic infection, bronchiectasis, or both in 3.5 percent of them (21).

Out of 46 cases, 3 patients had primary immunodeficiency. Two cases were detected with CVID and one with IgA deficiency.

Among the various forms of immunodeficiency, those most commonly associated with bronchiectasis

involve deficiency of one or more classes of immunoglobulin (22). Other investigators found that 42 of 53 patients with bronchiectasis had at least one abnormality of immunoglobulin, typically a decrease in serum levels of IgA, IgG, or IgM (23).

Considering the results of this research, post infection bronchiectasis is the most common form of bronchiectasis; therefore, diagnosis and treatment of these infections could be of great benefit for avoiding this disease. The incidence rate of bronchiectasis in this study was 3.3% which is indicative of higher prevalence of bronchiectasis in patients referred to a respiratory referral hospital compared to other studies (1.6-3%)

Significantly, the result of our research could not be generalized to the society. Assessing the prevalence of bronchiectasis in the society seems to need more extensive researches.

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