Bronchial Anthracofibrosis or Anthracotic Bronchitis

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ABSTRACT

Background: The aim of our research was to study the characteristics of anthracotic bronchitis in patients undergoing bronchoscopy in Massih Daneshvari Hospital. All patients that showed anthracotic changes, edema, and/or bronchial stricture on bronchoscopy were studied and included.

Materials and Methods: Bronchoalveolar lavage (BAL) was obtained from all of the patients and sent for BK, smear, culture, and cytological evaluations. Also, bronchial biopsy was obtained from some of the cases. A questionnaire having information such as personal data, place of residence, occupation, history of smoking, history of baking bread in traditional furnaces, and past history of TB was filled out for each patient. Meanwhile anthracotic sites that were observed in bronchoscopy were marked in specially designed tables.

Results: Out of 290 patients that had undergone bronchoscopy in a 4-month period during the year 2001-2002 in Massih Daneshvari hospital, 47 suffered from anthracotic bronchitis; 51.1% of the patients were male; 73.3% lived in the urban, and the remaining cases resided in rural areas; 10.6% had history of smoking and 29.3% baked bread in traditional furnaces. The most common symptom and sign were cough and rale, and the most frequent site involved was right lower lobe. Based on bacteriology and/or pathology, 27.7% of the patients had tuberculosis. The most common radiological finding was the increase of bronchovascular markings.

Conclusion:
- Anthracotic bronchitis is a very common disease in Iran.
- In any middle or old-aged patient that has increased bronchovascular marking, collapse, atelectasis along with calcified mediastinal lymph nodes, anthracotic bronchitis should be considered in the list of differential diagnosis.
- Any patient having bronchoscopic findings in favour of anthracotic bronchitis should undergo all the necessary evaluations for TB. (Tanaffos 2003; 2(8): 7-11)

Key words: Anthracofibrosis, Bronchitis, Anthracotic bronchitis
INTRODUCTION
Since 20 years ago, many reports especially from the developing countries have been published describing the high incidence of chronic bronchitis among middle and old aged non-smoking women (1,2,3,4,5,6).
In some of these reports, the smoke produced from burning wood and animal compost was considered to be cause of the disease (1). However, some of the patients had no past history of contact with the above mentioned causes (2).
On bronchoscopy, extensive depositions of carbon in the main bronchial walls were observed. In majority of the cases, severe sub-mucosal edema resulting in bronchial stenosis, protuberant mucosal folds, and presence of black plaques led to partial lung collapse (1,4).
In different references, this disease is known as “Anthracotic Bronchitis” or “Bronchial Anthracofibrosis”.
Based on various bacteriological and pathological evaluations as well as therapeutic responses observed, 27%-60% of the above mentioned patients suffered from tuberculosis (TB) (5,7).
In this research, we have studied the characteristics of anthracotic bronchitis in patients that had undergone bronchoscopy in Massih Daneshvari Hospital.

MATERIALS AND METHODS
A total of 290 patients with undiagnosed pulmonary lesions such as collapse, mass, and infiltration underwent bronchoscopy in Massih Daneshvari hospital in the following months: April 2001 as well as October, November, and December 2002 (4 months). From the above mentioned patients, all those with anthracosis and severe edema (irregular protuberant mucosal folds) of airways were considered as anthracotic bronchitis. Patients having mild anthracosis without any edema and bronchial stricture were excluded from the study.
Bronchoalveolar lavage (BAL) was obtained in order to study tuberculous Bacilli (BK-Smear, Culture and PCR), and cytology was prepared. Meanwhile in some of the cases in whom malignancy was suspected, bronchial biopsy was obtained and sent for pathological evaluations and tissue culture. Characteristics of the edematous areas, anthracotic sites, and bronchial stricture were noted. Meanwhile a questionnaire including the information such as personal data, place of residence, smoking status, history of baking bread in traditional furnaces, occupation, and past history of TB in the patient and/or their family was filled out for each patient. Also, chest x-ray and CT-scan of the patients were evaluated by a radiologist.

RESULTS
Out of 290 patients that had undergone bronchoscopy during a 4-month period in Massih Daneshvari hospital, bronchoscopic findings in 47 patients showed the specific anthracotic sites, edema, and/or bronchial stricture. Thus, these cases were considered as anthracotic bronchitis. The mean age of the patients was 70 years old. (51-82 yr.) There were 24 male patients (51.1%), 45.5% previously resided in urban areas while 73.3% were residing in the city at the time of study. Also, 5 cases (10.6%) were addicted to smoking, 14 (29.3%) had history of baking bread in traditional furnaces, and 6% gave past history of contact with smoke in their occupation. Cough was the most common symptom (44 cases-93.6%), and rale was the most frequent finding on examination (16 cases-34%). Sputum smear and culture for BK were positive in 2% and 5.4% respectively. It is notable that the sputum of all the patients had been checked, and positive sputum smear cases (BK) were excluded. Meanwhile smears and cultures of BAL were positive in 11.2% and
13.5% respectively.

Samples of bronchial biopsy showed granuloma in 5 (10.6%) and nonspecific inflammation in 16 patients (34.3%).

In one of the cases, biopsy from an irregular lesion present in the right main bronchus showed an adenocarcinoma in addition to anthracosis.

Tissue culture for BK was positive in one patient. Overall, out of 47 patients that were evaluated, 13 (27.7%) had TB based on smear, culture, and/or pathological findings.

In regard to radiological features, increased bronchovascular marking (80%) and bronchial narrowing (74.4%) were the most common findings. Other radiological manifestations were infiltration (62.2%), calcified mediastinal lymph nodes (61.1%), presence of fibrous bands (50%), and atelectasis (42.1%).

According to the bronchoscopic findings anthracosis more commonly occurred in the bronchi of right upper lobe (38 cases-80%), left upper lobe (33-70%) and right lower lobe (30 patients-63%) respectively.

There were no significant differences regarding the history, clinical manifestations, radiological features and pattern of bronchial involvement between the tuberculous and non-tuberculous anthracotic patients.

DISCUSSION

The high incidence of anthracotic bronchitis in patients that had undergone bronchoscopy (16.2%) in this hospital showed that this disease is one of the most common pulmonary diseases occurring in our country.

In this research, TB was detected in 27.7% of patients with anthracotic bronchitis. In order to perform bronchoscopy in this hospital, the patients had to have 3 negative sputum samples; thus, any patient with positive sputum samples was already excluded. Meanwhile previously conducted studies have shown the high therapeutic response to anti TB medications in anthracotic patients with negative bacteriological and pathological TB evaluations (3,5). Also, another study was carried out on 10 anthracotic bronchitis patients by another in whom TB was not confirmed (the article of which is under publication). All these studies point towards the significant association of anthracotic bronchitis with TB.

There are two questions in this regard: 1- "Is anthracotic bronchitis a sign of major airway tuberculosis? (2) "To what extent is baking bread in traditional furnaces responsible for the occurrence of anthracotic bronchitis?"

History of working with traditional furnaces was obtained in only 23% of the patients. It is noteworthy that earlier studies have shown that contact with coal and smoke in coal mines usually results in deposition of coal dust in the lung parenchyma and not in bronchial walls (1). Since in majority of the cases the lesion is unilateral, brings "smoke" as the sole etiological agent under question. Instead, baking bread in traditional furnaces can be considered as an important predisposing factor. Thus, this necessitates further evaluations that must be conducted in order to clarify the etiological agent. The role of tuberculosis in this disorder also should be more investigated.

CONCLUSION

Finally, based on the results of this research we conclude that:

1. Anthracotic bronchitis should be considered in any middle or old aged patient having increased bronchovascular marking, partial lung collapse, linear atelectasis, and calcified mediastinal lymph nodes.

2. The necessary evaluations and investigations of TB in all patients showing anthracotic bronchitis on bronchoscopy should be performed.
3. Because of the severe inflammation, anthracotic bronchitis looks a more suitable name than bronchial anthracofibrosis.

REFERENCES