Atypical presentations of pulmonary tuberculosis diagnosed by fibreoptic bronchoscopy

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Summary: A total of 356 patients were subjected to fibreoptic bronchoscopy from September 1989 to June 1991 to exclude bronchial carcinoma. Bronchial biopsy, bronchial brush smears and bronchial wash were obtained. Bronchial wash was examined for acid fast bacilli (AFB) compatible with Mycobacterium tuberculosis. The total number diagnosed as pulmonary tuberculosis by fibreoptic bronchoscopy was 21(5.8%). The sputum smears were negative for AFB in all these patients. Previous studies have shown the importance of fibreoptic bronchoscopy in suspected cases of tuberculosis where the sputum smear is negative. This study is further evidence of the importance of routine examination of bronchial wash for AFB in all cases undergoing fibreoptic bronchoscopy to detect atypical cases of pulmonary tuberculosis.

Introduction

Various studies done in other centres1–5 have shown the importance of flexible fibreoptic bronchoscopy in the diagnosis of pulmonary tuberculosis in suspected cases, where the sputum smears are negative. It is important to make a definite diagnosis before commencing anti-tuberculous chemotherapy, especially in a community where tuberculosis is common and can mimic any other condition radiologically. This study was performed to exclude bronchial carcinoma in patients who had central or peripheral opacity in the chest radiograph and they were not suspected of having tuberculosis. The sputum smears were negative for acid fast bacilli (AFB) before bronchoscopy in all these patients. Bronchial wash was examined for acid fast bacilli compatible with Mycobacterium tuberculosis initially when a tumour was not visualized through the bronchoscope. Later bronchial wash was examined for AFB in every patient undergoing fibreoptic bronchoscopy.

Patients, materials and methods

Patients were referred from the medical wards and thoracic units of General Hospital, Colombo, other teaching hospitals, and base hospitals in order to exclude bronchial carcinoma. Sputum smears were negative for AFB before bronchoscopy in all these patients. Fibreoptic bronchoscopic examination was performed after premedication with atropine and pethidine. Ten per cent lignocaine spray, 2% lignocaine jelly on swab and 4% lignocaine were used as local anaesthesia. The tracheobronchial tree was observed and bronchial brush smears were obtained from the relevant abnormal pulmonary segments.

At least two smears were prepared by spreading brush gently over clean glass slides. One was air dried and stained by May Grunwald Giemsa stain and the other smear was fixed in alcohol and stained with haematoxylin and eosin.

Bronchial wash material was obtained by injecting 10 ml of isotonic saline through the bronchoscope followed by immediate suction. This was repeated several times until 35–40 ml was collected. At the end of bronchoscopy a further 5 ml of isotonic saline was instilled and retained secretions were collected. Bronchial wash material was divided into three portions and sent for cytological examination, fungal studies and for evidence of tuberculosis.

Of the material sent for examination for tubercle bacilli microscopic examinations and cultures were performed. The microscopic examination was carried out on a smear stained with the Ziel–Neelsen stain. Presence or absence of acid fast bacilli compatible with Mycobacterium tuberculosis was noted. Cultures were performed on the specimens after concentration by the addition of 4% sodium hydroxide followed by centrifugation at 3,500 r.p.m. for 15 minutes. The deposit from each specimen was inoculated into two Lowenstein–Jensen slopes and into para-nitrobenzoic acid medium (PNB). The cultures were incubated for 8
weeks and read weekly for growth of *M. tuberculosis*. All cultures reported as positive contained a significant number of colonies.

Bronchial biopsy was performed on 42 patients, bronchial brush smears were made in 341 patients and bronchial wash was examined for cytology in all 356 patients and for AFB in 254 patients. The fibreoptic bronchoscope was immersed in chloro-hexidine for 20 minutes in between use.

**Results**

Bronchial wash was examined for AFB in 254 patients by direct smear of which nine were positive for AFB and in 195 cases by culture of which 12 were positive. Two cases were positive both on direct smear and on culture.

The percentage diagnosed as pulmonary tuberculosis by examination of bronchial wash was 7.5%. One case was diagnosed by detecting granulomata in the bronchial brush smear stained with haematoxylin and eosin. Two cases were diagnosed by detecting epithelioid granulomata in the bronchial biopsy specimens. One of these cases became positive for AFB on culture of bronchial wash subsequently. The total number diagnosed as pulmonary tuberculosis by fibreoptic bronchoscopy was 21 (5.8%). The sputum smears were negative for AFB in all these patients.

The radiological presentation of these patients was of interest (Table 1). There were two patients who had enlarged hilar shadows that responded to anti-tuberculous chemotherapy (Figures 1 and 2). Three patients had tuberculosis coexisting with bronchial carcinoma. Bronchial carcinoma was diagnosed in two patients who had well-defined upper lobe opacity and one patient who had well-defined lower lobe opacity.

All six patients with patchy opacity of lower lobes were diagnosed as unresolved pneumonia except one, who had been diagnosed as bronchiectasis one year back.

**Table 1 Radiological diagnosis**

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>No. of patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Enlarged hilar shadow</td>
<td>2</td>
</tr>
<tr>
<td>2. Collapse of middle lobe</td>
<td>1</td>
</tr>
<tr>
<td>3. Consolidation of middle lobe</td>
<td>1</td>
</tr>
<tr>
<td>4. Lobar consolidation of lower lobe</td>
<td>2</td>
</tr>
<tr>
<td>5. Well-defined opacity in upper lobe</td>
<td>4</td>
</tr>
<tr>
<td>6. Patchy opacity in lower lobes</td>
<td>6</td>
</tr>
<tr>
<td>7. Well-defined opacity in lower lobe</td>
<td>1</td>
</tr>
<tr>
<td>8. Lung abscess</td>
<td>3</td>
</tr>
<tr>
<td>9. Diffused opacity of left lung</td>
<td>1</td>
</tr>
</tbody>
</table>

![Figure 1 Enlarged hilar shadows are apparent in the chest radiographs of two patients who were suspected of having bronchial carcinomas. Both were diagnosed as tuberculosis by fibreoptic bronchoscopy.](http://pmj.bmj.com/)

**Discussion**

All previous work has shown undoubtedly the importance of fibreoptic bronchoscopy in diagnosis of pulmonary tuberculosis in suspected cases where the sputum smears are negative or the patient is unable to expectorate.¹-⁵ Some authors have stated that routine examination of bronchial wash would be an unnecessary load on the microbiology laboratory.²

This study was designed initially to detect bronchial carcinoma. As such bronchial wash was examined for AFB in 254 patients only although bronchoscopy was performed in 356 patients. These patients were not suspected of having tuberculosis and even if tuberculosis was considered in the differential diagnosis, it was excluded by examination of sputum for AFB in three or more occasions. Our results show the importance of routine examination of bronchial wash for AFB in all patients undergoing fibreoptic bronchoscopy, as these patients responded to anti-tuberculous chemotherapy. Some authors have mentioned that routine cultures of bronchial washings are not indicated.⁶ In our series, 12 were positive for AFB.
on culture of bronchial wash. This again shows the importance of routine culture of bronchial wash in every patient undergoing fibreoptic bronchoscopy. The percentage diagnosed as tuberculosis is very small when compared to results in other centres. This is because the patients in our series were not suspected of having tuberculosis unlike the patients in other series where they were suspected of having the disease.

Fibreoptic bronchoscopy is a safe procedure with a mortality of 0.01 and, morbidity of 0.08. Only one patient developed bronchospasm in this study and there were no deaths.

Some studies done in other centres to diagnose tuberculosis have obtained the highest yield by examination of bronchial brush smears for AFB. We did not subject bronchial brush smears for examination of AFB as our study was designed to diagnose bronchial carcinoma and tuberculosis was not suspected in these cases. Post bronchoscopy sputum samples were not examined for AFB in our study.

The fibreoptic bronchoscope was washed with Savlon and water and cleaned with a cleaning brush and immersed in 1 in 20 chlorhexidine solution for 20 minutes as instructed by the manufacturers. Only one case was diagnosed as tuberculosis in any single batch. Therefore getting a false positive result due to contamination is very unlikely. Atypical mycobacteria were not isolated up to June 1991. All these 21 patients had typical mycobacteria by the identification tests.

It is known that lignocaine can inhibit the growth of mycobacteria. It is recommended that the minimum amount be used on the tracheobronchial tree when bronchial wash is examined for AFB. In our study this was not done and it could be the reason why bronchial wash was negative on culture when the direct smear gave a positive result.

In conclusion we believe that bronchial wash should be subjected to examination of AFB by direct smear and by culture in every patient undergoing fibreoptic bronchoscopy in a country where tuberculosis is prevalent.

Acknowledgements

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References

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