Bronchoscopy in Pulmonary Tuberculosis*

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The purpose of this paper is to report briefly on the work done by a bronchoscopist associated with tuberculosis specialists, for diagnosis and treatment of tuberculous lesions and other abnormalities of the bronchial tree. Two hundred seventy nine patients affected by pulmonary tuberculosis were studied and treated endoscopically. A total of 502 bronchoscopies were done. Most of these patients were seen at the Sanatorio para Tuberculosos de Huipulco, Mexico, the remainder at the Hospital General and in private practice, since 1936.

According to Brock,¹⁵ the bronchial element is one of the most important factors in pathogenesis and treatment of pulmonary tuberculosis. Our own observations prove for us the correctness of his view, and lead us to the conclusion that any clinic of tuberculosis should have facilities for carrying out the endoscopic study of the tracheobronchial tree routinely. Not every patient having pulmonary tuberculosis should be bronchoscoped, but all of them ought to be carefully studied in making a selection of cases to be sent to the bronchoscopist. That is the way we have studied most of the cases at the Sanatorio de Huipulco.

Of the 279 patients studied, 174 were male and 105 female; their ages ranged from 15 to 50 years, with adults predominating over adolescents. Tuberculous lesions were found in 83 adults of 20 to 45 years of age, or 29.7 per cent of the total group. This percentage is not excessive when it is taken into consideration that most of these patients were selected for bronchoscopy because tracheobronchial lesions were suspected.

The table on the following page indicates the types of lesion observed, and their frequency.

The solitary ulcer was seen usually as a small, round, superficial ulcer, with sharp edges, without any alteration of the surrounding tissue; bleeding at the slightest contact. Sometimes it is covered with a yellowish exudate; occasionally it looks like a simple erosion of the mucosa.

The granulomatous ulcer, which is the most common type of lesion, was seen as wide modification of the endobronchial mucosa, with yellowish granulation tissue. As soon as this tissue is removed,

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<table>
<thead>
<tr>
<th>Type</th>
<th>Female</th>
<th>Male</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solitary Ulcer</td>
<td>1</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>Granulomatous Ulcer</td>
<td>22</td>
<td>30</td>
<td>52</td>
</tr>
<tr>
<td>Hyperplastic (including tuberculoma)</td>
<td>8</td>
<td>10</td>
<td>18</td>
</tr>
<tr>
<td>Fibrostenotic</td>
<td>1</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>32</strong></td>
<td><strong>51</strong></td>
<td><strong>83</strong></td>
</tr>
</tbody>
</table>

The lesion becomes reddish and bleeds easily. When it is touched with a silver nitrate solution the color turns to gray. The granulation tissue is friable; a moderate amount of purulent material can be aspirated. Stenosis of the lumen is the consequence.

The hyperplastic lesion seems to be the result of a deep infiltration of the submucosa causing remarkable stenosis of the lumen. Sometimes the trachea and one bronchus as well as the carina are involved. At other times it presents the appearance of sessile tumor. Biopsy demonstrates its tuberculous nature. The color is darker than that of the normal mucosa. Some irregularities due to ulceration may be observed.

The fibrostenotic type was recognized in this series of cases by the smoothness of the edges and its hard consistence and stiffness. A bilateral fibrostenosis was observed in one case. The patient was suffering asthmatic attacks periodically; Koch bacilli were absent from the sputum. Both lungs were affected by fibrosis, and moderate dyspnea had been present for two years. When observed endoscopically, just after the bronchoscope was withdrawn a serious attack of dyspnea appeared, and the patient fell into coma. Oxygen insufflation through the bronchoscope, which was quickly inserted again, and administration of stimulants, saved him. This patient died three months later in acute dyspnea.

The clinical diagnosis was based on the following symptoms: subjective pressure felt on the anterior wall of the chest; difficulty in expectorating; ronchi and asthmathoid wheeze, sometimes heard at a distance from the patient; subjective sensation of foreign body in trachea; snoring; intermittent vomica; cough with or without expulsion of purulent material; recurrent fever; slight or marked dyspnea; flatness on percussion of the interscapular area; rales (sub-crepitant); and signs of limited atelectasis, emphysema or condensed areas, not attributable to the effects of treatment. The radiologic signs were variable depending on different circumstances, such as degree and type of stenosis of the bronchi.
and parenchymal lesions and method of treatment applied to the lung. Localized emphysema and atelectasis due to bronchial obstruction and retention of secretions can be noticed on the x-ray films.

The distribution of tuberculous lesions of the tracheobronchial tree, was as follows:

<table>
<thead>
<tr>
<th>Location</th>
<th>Times</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trachea</td>
<td>6</td>
<td>7.2</td>
</tr>
<tr>
<td>Right bronchus</td>
<td>25</td>
<td>30</td>
</tr>
<tr>
<td>Left bronchus</td>
<td>46</td>
<td>55.4</td>
</tr>
<tr>
<td>Both bronchi</td>
<td>4</td>
<td>4.8</td>
</tr>
<tr>
<td>Carina</td>
<td>2</td>
<td>2.4</td>
</tr>
</tbody>
</table>

This distribution includes different locations in the secondary bronchi.

The major frequency of lesions in the left bronchus would probably speak in favor of infection by the mechanism of prolonged contact with purulent secretions coming out from the lungs, considering that drainage is more difficult from this side, on account of the different angle of deviation of the left bronchus.

Different forms of local treatment were employed. Electrocoagulation did not seem to give the best results. Applications of silver nitrate solution, 10 to 30 per cent and in one case 50 per cent, were successful. The aspiration of secretions and caseous material was absolutely necessary as first stage of the treatment. Removal of exuberant tissue to get a good drainage of the lung and a better result from the application of chemical agents, was helpful. Dilation of stenosis, insinuating the tip of the bronchoscope or using oliveaire bougies, gave good results; it failed in cases of fibrostenosis.

In 83 cases of tuberculous tracheobronchitis, 28 patients were bronchosoped one time only; 32 were bronchosoped and locally treated from 2 to 6 times, not enough to see a definite result, but relief of symptoms was appreciable. The lesion was found healed after local treatment in the remaining 23 patients. Five of them had solitary ulcer and needed no more than two applications of 10 per cent silver nitrate solution. Seventeen had granulomatous ulceration and needed from 2 to 11 treatments in different lapses of time, between one month to more than one year. Only in one patient having hyperplastic lesion, healing and a considerable reduction of stenosis was observed after five endoscopic treatments. Practically in all these cases pulmonary treatment was already
started, and continued in some of them after the cure of tracheobronchitis was obtained. There was no special indication to change the method of treatment for parenchymal lesions, except in a few cases. This treatment included different methods, mainly collapse therapy.

The abnormalities observed bronchoscopically in cases of pulmonary tuberculosis, were displacement of trachea and bronchi, deformities of the lumen and partial or total stenosis of the bronchi. In those cases in which collapse of the entire lung or a definite lobe is observed, the tracheobronchial tree is displaced to the opposite side. This fact was noted many times in this series. The deformities were produced by extrinsic pressure, caused sometimes by hypertrophied glands of the mediastinum, some other times by certain type of collapse therapy. Fibrosis was another reason.

It is surprising how often total or sub-total stenosis of secondary bronchi produced by extrinsic pressure can be seen. X-Ray films help to give a correct interpretation. No modification of the mucosa can be observed, but the walls of the bronchi are intruding in the lumen. When the closure of the bronchus in communication with a cavity is incomplete, this knowledge has been helpful to the specialist, who always wants to know how effective collapse is or where the purulent material comes from, particularly when there is not a satisfactory explanation for the presence of tubercle bacilli in the sputum, in spite of clinical and radiologic control of the patient's parenchymal disease.

Aspiration through the bronchoscope before and after thoracic surgery, was done many times in this group of cases. In some of them there was a sudden drainage of the cavities, meaning a real menace to the life of the patient, a few hours after thoracoplasty. Atelectasis of the opposite lung was prevented by oportune aspiration.

There is no doubt that bronchoscopy is one of the best helps for the phtisiologist or thoracic surgeon. The procedure has many advantages and does not constitute a danger in tuberculosis. No mortality was observed that could be attributed to the introduction of endoscopic tubes or manipulation inside the tracheobronchial tree. One fatality occurred, as a result of intoxication by morphine. This patient was in bad condition, and died an hour after endoscopy was finished. Intoxication by that drug was proved. Sedatives should be used with great care in similar circumstances.

SUMMARY

a) Two hundred seventy nine patients with pulmonary tuberculosis were studied by bronchoscopy.

b) Eighty three cases of tuberculous tracheobronchitis, 29.7 per
cent, were discovered. Healing of the lesion by local treatment was obtained in 23 patients.

c) Abnormalities of the tracheobronchial tree in tuberculous patients under pulmonary treatment are briefly reviewed.

d) The importance of bronchoscopy in tuberculosis is stressed, as complementary for both diagnosis and treatment.

e) One important feature of this research is that no case of tuberculous bronchitis was discovered among people under twenty years of age, though the group included patients from 15 to 50 years old.

RESUMEN

a) Fueron estudiados mediante la broncoscopia 279 pacientes con tuberculosis pulmonar.

b) Se descubrieron 83 casos (29.7 por ciento) de traqueobronquitis tuberculosa. En 23 pacientes se obtuvo la curación de la lesión por medio del tratamiento local.

c) Se repasan suscintamente las anomalías del árbol traqueobronquial en pacientes tuberculosos bajo tratamiento pulmonar.

d) Se hace notar la importancia de la broncoscopia en la tuberculosis como complemento tanto del diagnóstico como del tratamiento.

e) Un hecho importante de esta investigación fue que no se descubrió ningún caso de bronquitis tuberculosa en personas menores de veinte años, aunque el grupo incluyó pacientes de 15 a 50 años de edad.

REFERENCES