Changing Concepts in the Therapy of Lung Abscess: A Twenty Year Survey

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Worsening in the prognosis of patients with lung abscess in the past four years prompted us to bring our previous observations* to date. The 15 years from 1941 to 1955 in our experience, were marked by steady and dramatic improvement in the results in this disease. In the past four years this trend has been reversed.

Material and Method of Treatment

This series consists of 87 cases; these can be divided readily into four groups (Table 1). Group A: 1941-1944; 19 cases; Group B: 1945-1951: 29; Group C: 1952-1955: 17; Group D: 1955 to date: 22.

Group A: 1941-1944: The Sulfonamide Period; treatment consisted of supportive measures, bronchoscopic aspirations, postural drainage, sulfonamides and surgical procedures. Bronchoscopy was used routinely in all cases, both as a diagnostic tool and also as a means of cleansing the tracheal bronchial tree. Sulfathiazole and sulfadiazine were used in various dosages. Surgical procedures were simple incision and drainage or two stage pneumonotomies.

Group B: 1945-1951: The Penicillin Period; this drug was used both parenterally and by aerosol. Supportive treatment was unchanged. Surgical procedures were the same as Group A except from 1949 on, resection was carried out in the majority of cases requiring surgical intervention.

Group C: 1952-1955: The Antibiotic and Trypsin Period; supportive treatment remained unchanged. The antibiotics used were oxytetracycline, and penicillin. The drug used was selected from sensitivity studies of material obtained at bronchoscopy. Aerosol trypsin administration in a dosage of 125 mg. in 2 cc. of diluent daily, was used in each instance for five to ten days and then every second day for a period of from two to four weeks. Surgery during this period was resectional. No surgical drainage procedure was done.

Group D: 1955-1959: The Iatrogenic Period; supportive treatment remained unchanged. Culture and sensitivity studies determined the anti-

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TABLE 1—LUNG ABSCESS GROUPS

<table>
<thead>
<tr>
<th>Groups</th>
<th>1941-44</th>
<th>1945-51</th>
<th>1952-55</th>
<th>1956-59</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cases</td>
<td>19</td>
<td>29</td>
<td>17</td>
<td>22</td>
<td>87</td>
</tr>
</tbody>
</table>

TABLE 2—ETIOLOGIC FACTORS

<table>
<thead>
<tr>
<th>Groups</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Unconsciousness</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Anesthesia</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>b. Alcohol</td>
<td>2</td>
<td></td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>c. Convulsion</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>d. Cerebral Vascular Accident</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>2. Pulmonary Infection</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Pneumonia</td>
<td>4</td>
<td>8</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>b. Upper Respiratory Infections</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>c. Influenza</td>
<td>1</td>
<td>2</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>3. Foreign Body</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4. Injuries</td>
<td></td>
<td></td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>5. Idiopathic</td>
<td>7</td>
<td>12</td>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>

Pathogenesis and Etiology

Our concept of pathogenesis and etiology remains unchanged from our previous report. It is our belief that bronchial, or bronchiolar obstruction by any one of several causes, i.e., foreign body, inflammation or aspirated secretions, leads to an area of atelectasis which when followed by infection leads to vessel thrombosis and this then to an area of infarction. Infection plus infarction leads to tissue necrosis and suppuration.

Table 2 shows the distribution of the believed etiologic factors in each of the four groups, this shows no significant difference in these groups.

Bacteriology

The majority of cases had nonpathogenic organisms on culture; this is in line with our previous experience along with that of others.
ever, in Group D the incidence of *Staphylococcus aureus*, and *Pseudomonas aeruginosa* was much higher than in any of the other groups. This, we believe, is of extreme importance in the changing prognosis noted in the last four years.

**Results**

Mortality figures are shown in Table 4. The figure of 31.5 per cent in the 1941 to 1944 period (Group A) was generally in line with the mortality figures at that time. With the advent of penicillin in 1945 to 1952 (Group B) there was for the first time a significant drop in mortality to 17.2 per cent. Group C, 1952 to 1955 with no mortality was encouraging.

Group D, 1955 to the present, was a considerable surprise and disappointment to us, with a mortality of 36.3 per cent, putting us back to the pre-antibiotic period.

**Discussion**

Several factors contributed to the improvement in the treatment of lung abscesses in the first 15 years of this period. Perhaps of greatest importance was the availability of effective antibiotics and the use of aerosol trypsin as a means of promoting continual and adequate drainage of these abscesses. The development of segmental resection and lobectomy to the point of perfection in the past decade, undoubtedly, played a role in the satisfying improvement in mortality. The regression to pre-antibiotic figures shows the importance of this factor. We believe, could well be attributed to the following iatrogenic causes. Two of the three patients receiving corticoids for various reasons died with lung abscess. The rise in the incidence of *Staphylococcus aureus* hemoliticus, as an etiologic agent, is of great importance as four of the six patients with this organism died. The *Staphylococcus aureus* problem may well be the result of the indiscriminate use of broad spectrum antibiotics.

Our indication for resection in lung abscess is a residual thick walled cavity which fails to show continued clearing over a three week period. We have been content to follow carefully patients with thin walled cavities and have now observed six such patients for periods up to one and one half years and have noted closures in all between four months and one and a half years.

There were only two surgical cases among the 22 in Group D. The trend toward less frequent surgery was first noted in Group C when six of 17 patients required surgical intervention. We believe this is because of more potent antibiotics, the early use of bronchoscopy, and the use of trypsin to promote and continue adequate drainage. Furthermore, our observation that thin walled cavities may be safely followed has reduced our surgical cases.

**SUMMARY**

1. The prognosis of lung abscess has worsened in the past four years. This is believed to be primarily due to such iatrogenic causes as hospital staphylococcus and increased use of corticoids.
2. Aerosol trypsin remains in our hands at least a helpful therapeutic agent.
3. Thin-walled residual cavities may be safely followed with good expectation that they will heal.

**RESUMEN**

1. El Pronóstico del absceso pulmonar, ha empeorado en los últimos cuatro años. Se cree que esto se debe a causas iatrogénicas tales como el estafilococo de los hospitales y el aumento del uso de los corticoides.
2. El aerosol de tripaina permanece en nuestras manos cuando menos como agente terapéutico útil.
3. Las cavidades de paredes delgadas pueden observarse con seguridad con la posibilidad en que curen.
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RESUMÉ
1. Le pronostic des abcès du poumon s’est assombri dans ces quatre dernières années. On croit que ceci est dû d’abord à des causes en rapport avec l’action des médecins, telles que la fréquence du staphylocoque dans le milieu hospitalier, et l’utilisation accrue des corticoides.
2. La trypsin en aérosols reste au moins entre nos mains un agent thérapeutique plein de promesses.
3. Des cavités résiduelles à parois minces peuvent être suivies avec de bonnes chances de guérison.

ZUSAMMENFASSUNG
3. Dünnwandige Restcavernen kann man vorsichtig überwachen in der gültigen Erwartung, daß sie heilen werden.

REFERENCES

SYSTEMIC BLOOD PRESSURE IN CHRONIC BRONCHOPULMONARY INSUFFICIENCY
The authors studied 120 subjects with chronic lung disease. They found that the systemic blood pressure was constantly and significantly lower than the normal range (about 15 per cent). They suggest that the lowering of blood pressure is due to a marked increase in the bronchial arterial flow, resulting in a shunt between the systemic and pulmonary circulation.


INHALANT RESPIRATORY ALLERGY WITH NEGATIVE CUTANEOUS REACTIONS
Refactoriness to pollen and nonpollen inhalant allergens by skin test in patients with respiratory allergies is a definite clinical entity, the author states. The diagnosis is primarily based on the clinical history of recurrent symptoms of intolerance to pollens and other inhalant allergens. Of significant clinical interest is the observation that these patients with skin test negative reactions, especially to pollens, are invariably asthmatics. The treatment of such patients is of clinical and extreme practical importance because they require considerably higher top doses of specific allergenic extracts for relief of symptoms than the patients with skin test positive reactions to corresponding inhalant allergens. The results of treatment with allergenic inhalant extracts in the skin test negative reactors are as good if not better than the results obtained with corresponding allergenic extracts in the skin test positive reactors. The optimal protective doses of allergenic extracts for the skin negative reactors are the same both for children and adults. In the light of our experience, the effectiveness of pollen or other inhalant allergic therapy for persons with respiratory allergy with negative cutaneous reactions to these allergens is based solely on specific immunization.