A Study of Cavities and Bronchi in Pulmonary Fungus Diseases

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INTRODUCTION

Cavities are frequent complications of pulmonary histoplasmosis as well as blastomycosis, aspergillosis and other fungus diseases. The characteristics of cavities in pulmonary tuberculosis have long been studied by various methods including the transthoracic introduction of a contrast medium.

This is a study of cavities and bronchi in pulmonary fungus diseases. The findings are compared with those in previous studies of tuberculous cavities and the similarities and differences are pointed out. The types of cavities and the structural changes, including bronchiectasis and sinus tracts most frequently associated with them are observed.

METHOD OF STUDY

The cavities were studied by the transthoracic introduction of propylidone (Dionosil) under local anesthesia. A No. 18 needle attached to a three-way stopcock and to a water manometer is introduced into the cavity to observe the intracavitary pressure, if an adherent pleura is present. After 2 to 5 ml. of Dionosil are instilled, posteroanterior and lateral chest x-ray films are obtained and repeated at 24 hours.

In another group of patients, bronchography was done using the same contrast medium. Posteroanterior and right and left anterior oblique films were made following the introduction.

Nineteen cavitary studies were done on 12 patients and six bronchograms on five patients. The bronchograms were all done in histoplasmosis cases, whereas the cavitary studies included one case each of blastomycosis and aspergillosis. The mycologic diagnosis in all cases was confirmed either by positive cultural findings or histopathology.

FINDINGS OF STUDY

Eleven of 12 cavities were open, and the 12th was equivocal since atmospheric pressures were present. In this one, no spill-over of Dionosil into the bronchial tree was noted, possibly because only a small amount had been used (Table 1). The pressures in the open cavities were atmospheric in nine cases, negative in one and atmospheric in the questionably blocked cavity. They were not recorded in one (Table 2).

Five (41.7 per cent) of the open cavities had bronchiectasis associated with them. The bronchiectatic changes were rather limited in extent and involved only a few bronchi with only one exception. They were either cylindrical or saccular in type and involved the distal 1½ to 2 cm. of the bronchus or bronchi communicating with the cavity. Sinus tracts were present in 16.6 per cent (Table 3). These are defined as fine finger-like projections from the cavity, outlined by propylidone (Dionosil) (Fig. 1). Of five patients with pulmonary histoplasmosis who had bronchograms, two showed predominantly a cylindrical type of bronchiectasis, one showed a few sacculations.

Thick walled cavities were more frequently located in the posterior superior

| Table 1—Type of Pulmonary Cavities |
|-------------------------------|----------|--------|
| Type             | Number | Per Cent |
| Open             | 11     | 91.7    |
| Partially blocked | 0      | 0       |
| Blocked          | 1(?)   | 8.3(?)  |
| Total            | 12     | 100     |

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portion of the lung, as in tuberculosis. The number of bronchial openings communicating with the cavity varied from one to more than six (Fig. 1).

Air spaces or cystic areas as in tuberculosis were also found. It appears that fungus cavities may convert into cystic-like areas when they heal spontaneously. This was demonstrated by one case. Figure 2 shows a cavity due to histoplasmosis. Figure 3 shows this has converted into a multiple cystic area after five years. This patient originally had a resection on the right with a bronchopneumonic spread to the left lung with cavity formation. Examination of the resected tissue showed *Histoplasma capsulatum*. When the patient came to necropsy five years later, no Histoplasma organism could be found. Numerous cultures during the last hospital admission were also negative suggesting apparent healing during the five years without antifungal drug therapy. The configuration of the multicystic area is rather unusual in its somewhat crescentic shape with its convexity toward the apex. The same type of configuration has not been observed in tuberculosis.

**Discussion**

This is a small group of patients and may provoke more discussion than conclusions. It appears that open bronchial communications predominate in fungal cavities and therefore atmospheric pressures are more frequent. Bronchiectasis is associated with 41.7 per cent in contrast to 64.4 per cent of the open cavities in tuberculosis.

*Table 2—Pressures in Cavities*

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<th>Atmospheric</th>
<th>Negative</th>
<th>Positive</th>
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<tbody>
<tr>
<td>Open</td>
<td>9</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Blocked</td>
<td>1(?)</td>
<td></td>
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<tr>
<td>Total</td>
<td>10</td>
<td>1</td>
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When present, bronchiectasis was less severe and less widespread, in contrast to that associated with open cavities in tuberculous patients, and was usually cylindrical in type. In the five patients who had bronchograms, two showed evidence of bronchiectasis. Again this was less severe and more limited in extent.

It appears that in cavitary fungus diseases, which in this group is predominantly histoplasmosis, one may find more open cavities, less bronchiectasis, and fewer sinus tracts than in a comparable number of cases of tuberculosis. In histoplasmosis the bronchiectasis more usually involves the bronchi communicating with the cavity, whereas in tuberculosis the bronchi inferior and ventral to the cavity are involved as well. The data probably indicate that the bronchi have more resistance to destruction by *Histoplasma* infection. This resistance of bronchi to infection may increase the incidence of associated emphysema which is considered to be more prevalent in histoplasmosis than in tuberculosis.

The impression that bronchiectasis is less widespread and that cavities may heal by cystic formation may be the result of a peculiar bronchial reaction to histoplasmosis. Bronchi that resist destructive chronic inflammatory processes would possibly be more susceptible to obstructive phenomena and thus play a part in development of emphysema.

The categories of partially blocked and completely blocked cavities have not been definitely identified in histoplasmosis. The cavity placed in the blocked category may be considered equivocal. This could be due to the small number in this series or to the fact that only open cavities occur in histoplasmosis.

Ettman and Sutliff in describing the radiographic manifestations of pulmonary histoplasmosis did not mention whether cavities have open bronchial communications or not. They described the conversion of an infiltrative lesion into a cavity and eventually into large thin walled areas of cavitation not unlike emphysematosus bul-

*Table 3—Structural Charges Associated with Open Cavities*

<table>
<thead>
<tr>
<th></th>
<th>Number</th>
<th>Per Cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bronchiectasis</td>
<td>5</td>
<td>41.7</td>
</tr>
<tr>
<td>Sinus tracts</td>
<td>2</td>
<td>16.6</td>
</tr>
</tbody>
</table>
I

Volume 47, No. 4
April 1965

PULMONARY FUNGUS DISEASE

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CONCLUSION

Histoplasmosis frequently causes pulmo-
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and more frequently located in the pos-
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ectasis, mostly of the cylindrical type and
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less frequently than in a comparable num-
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show less widespread involvement of bron-
chiectasis and less severe destruction. There-
fore, it appears that, in general, the bron-
chi have more resistance to a destructive
Histoplasma infection than to a destructive
tuberculous process and the parenchyma
is more susceptible to destruction.

RESUMÉ

L’histoplasmose provoque souvent des cavernes
pulmonaires qui sont presque toujours ouvertes,
communicant avec une ou plusieurs bronches,
et sont plus fréquemment localisées dans la por-
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cystic area reported here.

Sweany et al.1 stated that tuberculosis
does not cause bronchiectasis to the degree
that histoplasmosis does. This appeared to
be a presumptive statement referring only to
bronchiectasis produced by hilar lymph
node involvement and bronchial constric-
tion in both diseases. Only a few cases of
hilar node involvement due to Histoplasma
infection associated with bronchiectasis
were reported. In one case of cavitation due
to histoplasmosis, they describe enlarged
hilar lymph nodes without bronchiectasis.
In our patients, the bronchiectasis was
associated with pulmonary cavities and
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ski and colleagues,2 in 51 cases of histoplas-
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This is borne out by other observations.
It has been noted when bronchogenic
spreads to new areas occur, parenchymal
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REFERENCES

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DIAGNOSTIC VALUE OF OSCILLOGRAPHY AND PLETHYSMOGRAPHY IN COARCTATION OF THE AORTA

The authors conducted oscillographic studies in 52 patients with coarctation of the aorta. For the diagnosis of aortic coarctation of the greatest importance is the comparison of the form of oscillographic curves recorded on analogous levels of the upper and lower extremities and calculation of the ratio of oscillographic indices. During plethysmographic investigation of 20 patients, a moderate decrease in the quantity of blood passing into the lower extremities was observed in five patients; in 15 cases, the blood circulation volume in the lower limbs was within values characteristic of healthy persons. According to the authors' data, plethysmographic investigations may help to establish signs of collateral circulation and to reveal the level of the arterial pressure in the lower extremities in aortic coarctation when the arterial pressure could not be assessed by the acoustic method.


INTRATHORACIC MENINGOCELE

Three cases of intrathoracic meningocele not associated with neurofibromatosis are reported. Intrathoracic meningocele appears to be an acquired condition. Meningeal herniation occurs through a pre-existing skeletal defect in an area where localized weakness of the dura is present, or through an intervertebral foramen as a result of an abnormally long extension of the dura along a spinal nerve. In the latter cases, bony erosion of the vertebrae or ribs occurs secondarily as a result of pressure from the enlarging cyst. Intrathoracic meningocele tends to be asymptomatic when small, but symptoms due to compression of neighboring structures occur as the cyst enlarges. The preoperative diagnosis can be made by air mylography. The treatment of choice is surgical excision of the cyst and careful closure of the dural communication. Prophylactic antibiotic administration is important in order to guard against the development of postoperative meningitis and empyema. Recurrence after proper surgical treatment is rare.