Pulmonary Complications of Amebiasis

A REPORT OF SIX CASES

B. H. WEBSTER, M.D., F.C.C.P.
Nashville, Tennessee

Amebiasis is typically an infection of the colon by the protozoan, Endamoeba histolytica. It may be acute or chronic and presents a varied clinical course. The most frequent symptom is diarrhea with small amounts of blood-streaked mucus, but stubborn constipation is not unusual. Often, constipation may alternate with diarrhea accompanied by tenesmus, lassitude, and a generalized vague abdominal discomfort. Due to the variety of symptoms, it may be confused with chronic cholecystitis, pancreatitis, chronic appendicitis, diverticulitis of the colon, regional ileitis, mucous colitis, and spastic colon.

Pulmonary and hepatic involvement are believed to be secondary to intestinal infestation in all cases. Pulmonary amebiasis is usually secondary to hepatic involvement. There may be contiguous spread through the diaphragm, trans-diaphragmatic lymphatic extension, or embolic spread through the circulation. About 75 per cent of cases occur by a rupture of a liver abscess directly through the diaphragm. Batson has described a mode of metastases through the vertebral venous system network to the cerebral and pulmonary areas without passage through the liver.

The primary form of pulmonary amebiasis caused by amoebae reaching the respiratory tract by direct embolism from the intestinal tract is considered to be rare. However, pulmonary amebiasis in people without other symptoms or signs of amebiasis are on record. Such a case is reported by Chaudhuri and Chaudhuri in which there is no history of dysentery, hepatic involvement, or Endamoeba histolytica in the feces. Sodeman points out that there may be hepatic infection by amoebae without pulmonary involvement and yet suggesting lung disease. This is found in cases of hepatic abscess where the pain is referred to the right shoulder area and aggravated by inspiration. Such cases often complain of stabbing pain in the region of the right costal margin. Here the diaphragm may be immobilized and the right base of the lung fixed. In this case an apparent increased density in the lower right pulmonary area may be mistaken for pneumonia. Extension through the diaphragm from hepatic abscess below may give rise to pleural reaction resulting in pleural effusion which appears clear and sterile. However, amoebae may be isolated in the pleural fluid. Radke reports the isolation of Endamoeba histolytica from the pleural fluid and the successful treatment with quinacrine (atabrine) and carbarsone. Fibrinous exudate may attach the lung to the diaphragm, causing adhesions to develop, thus producing a fixation. Hepatic abscess may rupture into the lung, producing bronchopleural or
pleurobiliary communciation. Often, there may be a fanshaped area of
infection extending toward the hilum on the roentgenogram. In a later
stage, Kleton claims that the increased bronchial markings previously
seen may not be noticed after repeated expectoration. There may be
thickening which is not uncommonly confused with basilar tuberculosis
or bronchiectasis. Complete recovery with return of the tissue to normal
may follow adequate treatment. It is important to remember that there
is no definite picture entirely characteristic of the disease and therefore
that the x-ray film findings may be variable in pleuropulmonary amebiasis.

A good working classification of pleuropulmonary amebiasis into five
subdivisions has been suggested by Ochsner and DeBakey: (1) hematogen-
ous pulmonary abscess without liver involvement; (2) hematogenous
pulmonary abscess and independent liver abscess; (3) pulmonary abscess
extending from the liver abscess; (4) bronchopulmonary fistula with little
pulmonary involvement; (5) empyema extending from a liver abscess.
Sodeman suggests that to these five groups be added a sixth class, namely,
pleural effusion without true pus, occurring when the amoebic infection
approaches the pleura through the diaphragm before it has become in-
fected and when the fluid is still clear.

In an analysis of 153 cases of pleuropulmonary involvement collected
from the literature, Ochsner and DeBakey divided the cases according
to their classification as 14.3 per cent being hematogenous pulmonary

<table>
<thead>
<tr>
<th>Number of Cases of Amebiasis</th>
</tr>
</thead>
<tbody>
<tr>
<td>95</td>
</tr>
<tr>
<td>16 SPASTIC COLON</td>
</tr>
<tr>
<td>23 DYSENTERY</td>
</tr>
<tr>
<td>24 HEPATIC</td>
</tr>
<tr>
<td>6 PULMONARY</td>
</tr>
<tr>
<td>1 GRANULOMA</td>
</tr>
<tr>
<td>1 VAGINAL</td>
</tr>
</tbody>
</table>

FIGURE 1: Graph showing the complications of 95 cases of amebiasis.
abscess without liver involvement; 10.4 per cent as hematogenous pulmonary abscess and independent liver disease; 37.2 per cent as pulmonary abscess extending from a liver abscess; 19.6 per cent as bronchopulmonary fistulae with little pulmonary involvement; and 17.6 per cent as empyema extending from a liver abscess. Also, in a study of 15 cases of pleuro-pulmonary amebiasis from Charity Hospital, they found that 46.6 per cent were pulmonary abscesses extending from liver abscesses; 20 per cent being bronchohepatic fistulae; and 33.3 per cent being empyemas extending from a liver abscess.

Of special interest is invasion of the pericardium by the amoebic process. The successful treatment of an amoebic hepatic abscess which had ruptured through the pericardium into the pericardial sac is reported by Shaw.8 Such a complication is usually fatal.

Clinical Cases

Among 95 cases of amebiasis treated by the author (Figure 1), there has been the surprisingly high incidence of 24 (25.2 per cent) with hepatic amebiasis. These were diagnosed by hepatomegaly, right upper quadrant tenderness, and impaired liver function tests. Sixteen (16.8 per cent) had been treated over prolonged periods elsewhere for spastic colon. Many such cases are diagnosed as having "nervous indigestion."

A common concept of amebiasis seems to be that dysentery is a necessary finding. In the present series, only 23 (24.2 per cent) gave history of present or past dysentery. Many have bouts of diarrhea often considered to be "food poisoning," but also frequently experience constipation.

The present paper presents six (6.3 per cent) of the 95 cases in the

FIGURE 2

Figure 2 (Case 1): Pulmonary amebiasis. Roentgenogram May 26, 1954, suggestive of pneumonitis of right base. — Figure 3 (Case 2): Pulmonary amebiasis. Roentgenogram of chest September 18, 1954, increase in right hilar shadow and infiltration in the right base.
series. One of the 95 cases had an amebic granuloma of the colon with an intestinal obstruction necessitating resection. A chronic purulent vaginal discharge of several months duration in one case revealed *Endamoeba histolytica* trophozoites.

**Case 1**: Mrs. H. R. For three years, this 41 year old white married housewife has experienced severe pain in the lower back with radiation to the right thigh. She has had diarrhea off and on for three years. Stools are frequently thin and watery and contain shreds of mucus and blood. Periods of severe constipation lasting two or three weeks at a time come between the bouts of diarrhea. She burps all the time, feels bloated, and gripes a lot. At times, she feels uncomfortably hungry, this coming at most any time unrelated to meals, but relieved by eating. She spat up or vomited blood two weeks ago. She feels sore in the right upper abdomen. She lost from 168 to 107 pounds in five years without dieting.

She has had a chronic cough for six weeks, feels sore in the right ribs, and experiences marked pain in the right chest in front when she coughs. She spits up large amounts of dark-stained sputum which has a nauseating odor. She has felt chilly and runs an afternoon fever 99.6° to 100°. F.

Physical examination: weight, 124; temperature, 99.4° F.; pulse, 86; respiration, 22. She is a poorly nourished, well-developed, chronically ill woman who coughs frequently. There was a slight respiratory lag of the right lower chest with decreased breath sounds in the right base posteriorly. A few moist rales were heard in the right posterior and lateral chest. There was a slight decrease in fremitus in the right posterior chest. There were scattered sibilant rales in the right base. The liver was palpable 4 centimeters below the right costal margin. There was marked tenderness along the entire right ribs anteriorly. Sigmoidoscopic examination showed many pin-point ulcers in the recto-sigmoid area and smears were taken.

Liver function series revealed: cephalin flocculation test, 2 plus in 48 hours; total serum proteins, 6.4 mgm. per cent; albumen, 2.2 mgm. per cent; globulin, 4.2 mgm.

**FIGURE 4 (Case 3):** Stool August 17, 1953, demonstrating *Endamoeba histolytica* trophozoites and cysts.
per cent; serum bilirubin, 1.2 mgm. per cent. The amebic complement fixation test showed a 4 plus reaction.

A stool specimen which was a light brown liquid, mucoid type, was examined while warm. There was much mucus, many red and white blood cells; many budding yeast cells; Endamoeba histolytica cysts and trophozoites in abundance. Occult blood was positive to benzidine and guaiac tests. A sigmoidoscopic smear obtained from the recto-sigmoid ulcers showed Endamoeba histolytica trophozoites and cysts.

Sputum was dark brown gelatinous and foul-smelling. There was much necrotic material with motile forms of Endamoeba histolytica which had clear ectoplasm, granular endoplasm, ingested red blood cells, and a single nucleus. Sputum culture was negative for acid-fast bacilli at the end of six weeks. A throat culture showed non-hemolytic streptococci.

Roentgenologically there was marked spasticity of the lower portion of the descending colon and sigmoid. The right diaphragm was somewhat elevated and fixed. There was a small amount of infiltration in the costophrenic angle suggesting pneumonia. There were calcified hilar nodes bilaterally, slight fibrosis in the left upper lobe and thickened pleura in both apices (Figure 2).

It was the impression at that time that she had (1) amebiasis, (2) hepatic amebiasis and (3) pulmonary amebiasis with bronchobiliary involvement. She was placed on milibis (0.25 gm) with aralen (chloroquine, 75 mgm.) two tablets three times daily for two weeks. Complete recovery followed.

Case 2: Mr. V. L. This 46 year old white agricultural agent has had severe cramping diarrhea with six to eight loose watery stools with much slime and blood-streaking for two weeks. There has been loss of about 10 pounds of weight in one month. He has had occasional upset of the stomach and bowels only for the past six months, none previously and much vague indigestion in the past.

Past history revealed chronic Brucellosis over a long period of time. Physical examination was noncontributory. Roentgenologically the chest and a gastro-intestinal series, gall bladder series, and barium enema were normal.

August 1, 1952, a stool examination showed many Trichomonas intestinalis. On August 11, 1952, a stool examination showed many Endamoeba histolytica, active and cystic forms. The stool was loose, blood-streaked and contained much mucus.

The impression at that time was amebiasis, intestinal.

He was placed on carbarsone, gram 0.25 three times daily after meals for 10 days, rest for 10 days, and then repeat for 10 days. This was followed by complete symptomatic recovery.

---

Figure 5 (Case 4): Amebic bronchitis. X-ray film of chest, March 19, 1955, appearance of a bronchitis.—Figure 6 (Case 5): Pulmonary amebiasis. X-ray film of chest, May 28, 1951, showing elevation and fixation of right diaphragm and increased peribronchial infiltration in the right base suggesting a bronchiectasis.
August 4, 1954, he returned with the complaints of two or three loose, foul-smelling stools daily associated with tremendous cramping, poor appetite, nausea, much gas and swelling of abdomen.

A stool examination revealed *Endamoeba histolytica*, but no trophozoites. Diodoquin, grains 10, three times daily, for 20 days was prescribed.

September 18, 1954, he returned with complaints of nausea and cutting pain in the right upper abdomen for the past three weeks. There had been a fever of 99 to 100 degrees and two chills. He had been coughing night and day, bringing up mouthfuls of “brown spit” that looked like “apple butter.” Coughing caused pain in the right side of the ribs. There was gagging when he coughed. His appetite was poor.

The bowels moved two times daily with some mucus but no blood. Temperature, 100.8°F.; pulse, 94; and respiration, 26. There was slight decrease in fremitus and moderate dullness to percussion in the right base of the chest posteriorly. There were a few fine moist rales in the right base and scattered rhonchi over the anterior chest on the right. Sibilant rales were audible over the entire chest. The abdomen showed tenderness along the right costal margin and the liver was palpable 4 centimeters below the right costal margin.

An x-ray film of the chest showed an increase of the right hilar shadow with some infiltration in the right base (Figure 3).

The stool examination showed *Endamoeba histolytica* cysts.

A sputum specimen was dark-brown viscid foul-smelling, and streaked with blood which on smear showed many diphtheroids, diplococci, streptococci, scattered *Endamoeba histolytica* surrounded by necrotic material. It was positive for bile and guaiac and benzidine.

The impression was that he had pulmonary amebiasis, secondary to amebic hepatitis.

He was placed on aralen (chloroquine) phosphate, gram 1.0, daily for two days, then gram 0.5 for three weeks. To keep down secondary infection and to further aid in the treatment of amebiasis, he was given terramycin, 250 mg. four times daily and completely recovered.

**FIGURE 7 (Case 6):** Sputum October 7, 1949, showing *Endamoeba histolytica* trophozoite.
Case 3: Mrs. F. M. This 44 year old white teacher has not felt well for past five or six years. During the last three years, she has experienced much gaseous distention and eructation. There has been discomfort under the right breast. She feels nauseated at times. Almost any kind of food disagrees with her. The right shoulder aches almost continuously. For a long time, she has had four or five stools daily, not real loose, but mushy and associated with slimy bloody rectal discharge. She cramps a great deal throughout the abdomen. Recently, she has been constipated a few days at a time.

She has been coughing for three weeks, producing greenish yellow sputum with much phlegm and associated with wheezing. Phlegm wells up in the throat and tastes sour and foul. A sickening pain beneath the right breast follows deep breathing. After coughing up a mouthful of sputum, the wheezing stops.

On physical examination she weighed 147 pounds; temperature, 99.8° F.; pulse, 92; respiration, 22; and blood pressure 118/74. She was a well-developed, and well-nourished woman appearing chronically ill. There were a few sibilant rales in the right lower chest anteriorly. The liver margin was felt, one finger breadth below the right costal margin, and was somewhat tender. There was tenderness over the right lower quadrant.

A sigmoidoscopic examination revealed marked hyperemia in the upper rectum and near the recto-sigmoid junction.

Stool examination showed a positive guaiac test. Much mucus, many *Endamoeba histolytica* trophozoites and a few cysts were noted (Figure 4).

X-ray film of the chest showed moderately increased bronchovascular markings.

The impression was intestinal amebiasis.

Anayodine, one tablet twice a day after meals was prescribed but she complained of being unable to take this because of nausea after two days. She was then given fumidil, mgm. 10, twice daily for 10 days.

Pulmonary symptoms persisted. No further diarrhea or cramping was present. There were many sibilant rales in the chest and slight dullness to percussion over the base of the right lung. A few moist rales over the right hilar area and in the right lower lobe were noted. The sounds were clearer after coughing which produced a greenish yellow mucoid sputum. A pleuritic rub was heard over the right lower lobe anteriorly. The liver was felt 2 to 3 centimeters below the right costal margin and slight tenderness was found over the right lower quadrant.

The amoebic complement fixation test was 4 plus.

A stool examination showed a few *Endamoeba histolytica* cysts, but no trophozoites. It was slightly positive to benzidine but negative to guaiac.

The sputum was greenish yellow mucoid in type. Three trophozoites of *Endamoeba histolytica* were found.

An x-ray film of the chest showed slight elevation and fixation of the right side of

**FIGURE 8**

**FIGURE 9**

*Figure 8 (Case 6):* Pulmonary amebiasis. X-ray film of chest October 7, 1949, resembling an unresolved pneumonia in the right lung base.—*Figure 9 (Case 6):* X-ray film of chest October 25, 1949, shows marked clearing of the infection in the right lower lobe.
the diaphragm, and infiltration in the right hilar area and the right base giving the appearance of pneumonia.
The impression at this time was pleuropulmonary amebiasis secondary to hepatic amebiasis. She was placed on bed rest, fluids to 2500 cc. daily, and a high protein, high carbohydrate, high vitamin, low fat diet. She was given milibis with aralen combination, two tablets three times a day after meals for 10 days, then one tablet three times a day after meals for 10 days.
An x-ray film of the chest one month later indicated that the infiltration in the right base had cleared. All symptoms ceased.

FIGURE 10 (Case 6): Temperature graph.
Case 4: Mr. W. F. This 74 year old white male retired merchant was well until approximately four weeks ago when he began to feel like his throat filled with phlegm. He began to cough, felt sore in the middle of his chest, and expectorated much yellow-green strong-smelling sputum. He seemed to rattle in his chest, got hot in the afternoon and perspired profusely.

Physical examination revealed: weight, 182; temperature, 99.4° F.; pulse, 86; and respiration, 20. He was a well-developed and well-nourished white haired man who coughs and clears throat frequently, but appears well-preserved for his age. The lungs were resonant to percussion. Many sibilant rales were heard throughout the chest. The stool examination revealed no parasites, ova, or cysts. X-ray film of the chest was noncontributory.

On October 26, 1954, a stool examination disclosed Endamoeba histolytica cysts and a rare trophozoite. It was positive to guaiac. Carbarsone was prescribed, grams 0.25, three times daily after meals for 10 days, omitted for 10 days, then repeated. There had been a chronic cough for two years with dark greenish-yellow sputum at times; he continued to clear the throat. There were sibilant rales over the entire chest, more marked on the right, but clear following coughing. A few moist rales were heard in the right base anteriorly.

A stool examination revealed Endamoeba histolytica cysts. A sputum specimen (50 cc.) was dark greenish-yellow with much mucus, and with a positive guaiac test. Much degenerating material was observed. Degenerating Endamoeba histolytica vegetative forms and one motile viable form were seen on merthiolate-iodine-formalin stain.

An x-ray film of the chest showed moderate increased bronchovascular markings bilaterally with some infiltration in the right base (Figure 5).

It was the impression at that time that he had a long-standing intestinal amebiasis with amebic bronchitis; liver involvement not found. He was placed on bed rest, fluids to 2500 cc. daily, and milbids with aralen, two tablets, three times daily, after meals for seven days, then 1 three times daily for 21 days. He recovered.

Case 5: Mrs. F. D. for two or three months, this 47 year old woman has complained of dyspnea, heart pounding, and an exasperating cough. She has run a fever of one of two degrees for about a month. She expectorated brown thick sputum by the spoonful.

FIGURE 11 (Case 5): Sputum May 28, 1951, Endamoeba histolytica trophozoite.
There has been much indigestion, belching, a feeling of bloating and soreness in the lower abdomen near the right side. During the past year, she has had "food poisoning" four or five times with nausea, vomiting, and diarrhea lasting three to four days usually relieved by paregoric.

Physical examination reveals an anxious, chronically ill middle-aged female who weighs 130 pounds. The temperature is 99.8° F.; the pulse rate is 92; and respirations are 22. The lungs are resonant to percussion except for slight dullness in the right costophrenic angle. There is a loud pleural friction rub over the right anterior lower chest. The liver is palpable 1 centimeter below the right costal margin, with some rebound tenderness being present.

A stool examination after a laxative and examined while warm was a mucoid type, dark brown and with a small amount of gross blood. Microscopically, there were a few white blood cells, a good many red blood cells, a marked increase in mucus, many budding yeast cells, and scattered Endamoeba histolytica cysts and vegetative forms on both direct and merthiolate-iodine-formalin stain. The digestion showed some increase in starch (Lugol's). Occult blood was positive to guaiac.

Sputum was prune-colored. It showed a varied bacterial flora. A few trophozoites of Endamoeba histolytica were demonstrated (Figure 11). The guaiac test was positive. The Ziehl-Neelsen test was negative for acid-fast bacilli. A culture for tubercle bacilli was negative at the end of six weeks.

Roentgenologically a gastrointestinal series was normal. A barium enema demonstrated a spastic colon. An x-ray film of the chest revealed considerable increase in the right hilar region with much peribronchial infiltration in the right base. There was slight impairment of the excursion of the right diaphragm. It was felt that this represented evidence of bronchitis or possibly bronchiectasis in the base of the right lung (Figure 6).

It was the impression at this time that she had amebiasis, intestinal; hepatic amebiasis, and pulmonary amebiasis. She was placed on milbix with aralen (chloroquine) phosphate (75 mgm.), two tablets three times daily for three weeks with recovery.

Case 6: Mr. L. F. This 55 year old white musician comes for the first visit with the chief complaint of acute cutting pain in the right front chest for two weeks. He has run some fever, sweats a lot, coughs incessantly, and spits up yellow bubbling phlegm that smells like garbage. This is accompanied by shortness of breath and wheezing.

For two or three years he has felt dyspneic on exertion. He was treated two years ago for hypertension.

On physical examination he weighed 151; temperature, 100.4° F.; pulse, 96; respirations, 22. There is a pleuritic rub over the right anterior and lateral lower chest made worse by coughing or deep inspiration. The heart is slightly enlarged to percussion on the left. The liver is felt 2 to 3 centimeters below the right costal margin, with mild tenderness.

An x-ray film of the chest revealed the heart slightly enlarged in the region of the left ventricle. There was slight infiltration in the base of the right lung with evidence of pleurisy.

It was the impression at that time that he had a (1) hypertensive cardiovascular disease, and (2) acute fibrinous pleurisy of the right lower lobe.

He returned nine days later without relief. The pain was worse and he was more dyspneic. Much greenish-yellow sputum was being produced. Temperature was 99.8° F. He complained of diarrhea for two or three days. There was tenderness along the right costal margin, the liver was 3 centimeters below the costal margin. A pleuritic rub was heard over the right lower lobe. Stool examination showed a loose, green type with no gross blood. Endamoeba histolytica trophozoites and cysts were present. Sputum expectorated at the office, about 200 cc, of a greenish-yellow mucoid type showed a small amount of gross blood. It was positive for bile. Endamoeba histolytica trophozoites with ingested red blood cells, surrounded by necrotic material were evident (Figure 7). A Ziehl-Neelsen smear was negative for acid-fast bacilli. An x-ray film of the chest showed an area resembling unresolved pneumonia in the base of the right lung (Figure 8). The heart was enlarged in the region of the left ventricle. He was put on a high protein, high carbohydrate, low fat diet and emetine hydrochloride 0.065 gram subcutaneously daily for 10 days and repeated after 10 days, and phenobarbital, grain one-half, three times daily.

X-ray film of the chest three weeks later showed disappearance of the infiltration in the right base. The lungs and diaphragm were normal (Figure 9). The liver was not felt. The stool examination revealed no parasites.
SUMMARY

Six cases of pulmonary amebiasis or 6.3 per cent among 95 patients with intestinal amebiasis are reported. Five occurred in recognizable hepatic amebiasis; one was an amebic bronchitis without demonstrable liver involvement. The diagnosis in the six cases were substantiated by the demonstration of Endamoeba histolytica trophozoites in the sputum. A bronchobiliary communication existed in four.

Five were successfully treated with chloroquine diphosphate, one with emetine hydrochloride. Surgery was not necessary in any of this series.

RESUMEN

Seis casos de amebiasis pulmonar o sea el 6.3 por ciento de 95 pacientes con amebiasis intestinal se reportan. Cinco de ellos ocurrieron en amebiasis hepática reconocible; el otro era una bronquitis amibiana sin implicación hepática demostrable. El diagnóstico en los seis casos fué proporcionado por la demostración de trofozoitos de Endamoeba Histolytica en el esputo. Había una comunicación obrncobiliar en cuatro de ellos.

Cinco fueron tratados, con éxito, con difosfato de cloroquina, uno con clorhidrato de emetina. No fué necesaria la cirugía en ninguno de esta serie.

ZUSAMMENFASSUNG


5 dieser Fälle wurden erfolgreich mit Chloroquin-diphosphat und 1 Fall mit Emetin-hydrochlorid behandelt, Bei keinem dieser Fälle waren chirurgische Maßnahmen notwendig.

REFERENCES

1 Batson, O. V.: “Function of Vertebral Veins and Their Role in Spread of Metasta-


3 Chaudhuri, R. N. and Chaudhuri, M. N. R.: “Pulmonary Amebiasis,” Indian

Medical Gazette, 81:66, 1946.


5 Manson-Bahr, P. H. Manson’s Tropical Diseases, Cassell & Co., Ltd., London, 1940.


7 Radke, R. A.: “Amebiasis with Hepatic Abscess and Pleuropulmonary Involvement

Treated with Quinacrine (Atabrine) and Carbarsone,” Military Surgeon, 110:343, 1952.


753, 1949.

9 Sodeman, W. A.: Chapt. 13, 470, Pullen, R. L.: Pulmonary Diseases, Lea & Febiger,

