Thoraco-Hepatic Amebiasis*

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World War II has created and brought into closer focus many, heretofore remote, clinical problems. One of these is amebic infection.

The mass concentration of military personnel into areas endemic to amebiasis and the exposure of the soldier to a terrain devoid of sanitary control prior to his arrival, contributed appreciably to the epidemiology of this disease. Sanitary regulations, especially if made purposely severe to compensate for lack of sanitary installations, are often disregarded under stress of combat areas.

It is documentary knowledge that one regiment, (under observation of J.P.C.), left an endemic area with a carrier rate of 23.4 per cent—as determined by rectal swab and normal stool examinations. If fresh warm stools passed after a saline purge were examined, no doubt the percentage would have been even higher. This figure is unusually high for Americans, and cannot be construed as an index of the carrier rate of all returned service-men, but should focus the attention of the physician to a plausible etiology for the vague gastro-intestinal and pulmonary complaints of many veterans who have served in the Pacific Theater. Service in the tropics is not, however, an essential prerequisite for such a diagnosis, for similar opportunities for amebic infestation existed within the endemic areas of the Zone of the Interior.

We were interested in a group of patients with amebic infestation whose major presenting symptoms were of a pulmonary nature and whose early presenting signs were conspicuous in the thorax. History of diarrhea was lacking or of mild nature. Little significance had been attributed to it by the patient or the physician. Frequently the patient was seen by the chest consultant first, because of the emphasis placed on the thoracic signs and symptoms. Only after intensive etiological study at first, and more readily after experience matured, was the true secondary nature of the chest lesions fully appreciated and proper definitive

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management instituted. Classical signs of amebic infestation or
typical medical history often were absent or vague in our cases.
The type of patient who presents an adequate history, would
have been screened and definitely managed in his earlier contacts
with physicians.

The recovery of the parasite from the stool or tissue studies
is the ideal criterion for diagnosis. This is difficult in some cases.
In our experience, the presence of acute or recurrent right lower
chest findings (effusion, pneumonitis, lung abscess) in an in-
dividual who lived in endemic areas, especially if associated with
evidence of chronic hepatic involvement, has been adequate pre-
sumptive evidence for the clinical diagnosis of thoraco-hepatic
amebiasis and indication for proper therapeutic procedures.

Case Reports

During 1946, we had the opportunity to observe and treat ten
patients with thoraco-hepatic amebiasis. Two patients had un-
complicated hepatitis; two had hepatic abscesses, one of which
ruptured into the abdominal cavity; in three, a hepatic abscess
had ruptured into the pleural cavity, one of which had also
ruptured into the abdominal cavity; and in three, the hepatic
abscess had entered the pulmonary parenchyma. Six had served
in the Armed Forces in the Southwest Pacific; one in the India-
Burma Theater, and three had never left the continental United
States.

It is interesting to note that only four of these ten patients

![FIGURE 1](image1)

**FIGURE 1**

*Fig. 1, Case 1: Intra-hepatic density of liver abscess.*

![FIGURE 2](image2)

**FIGURE 2**

*Fig. 2, Case 1: No significant chest involvement.*
gave a history of diarrhea, and then not as a major event. Eight presented pulmonary and thoracic signs and symptoms of primary significance. Cysts of E. histolytica were recovered on stool examination in only four of this group. A direct smear from the wall of a liver abscess in one of the patients at postmortem examination contained the amebic trophozoite.

Case 1: N. A., 35 year old male, Army veteran, served in the Southwest Pacific in 1943 where he contracted malaria. He had six to nine recurrences. He was treated for malaria for two weeks prior to admission because of chills, fever and headache. Soreness in the epigastrium and bilateral costal margins and later vomiting appeared. A weight loss of 38 pounds was reported. No past history of diarrhea or dysentery was elicited. On admission, October 13, 1945, he appeared chronically ill. He was jaundiced and was tender in the epigastrium. He developed pain and tenderness in the right upper quadrant which spread to right lower chest. The liver became enlarged and tender. He ran an irregular, intermittent fever. A laparotomy done on November 10, 1945 revealed an abscess, 12 x 17 cm. in diameter in the upper posterior portion of the liver. There was a smaller one on the inferior surface. They contained thick, chocolate-colored pus. The abscesses were incised and drained and the patient was placed on emetine therapy postoperatively. The abdominal operative wound drained profusely. After showing some improvement, he ran a septic downward course and expired December 27, 1945. Necropsy confirmed the postoperative diagnosis by demonstration of E. histolytica on direct smear from the wall of the liver abscess (Figs. 1 and 2).

Case 2: E. S., 22 year old male, Army veteran, who served for approximately one year on Luzon and New Guinea in 1944-45, was admitted to
the hospital August 21, 1946, complaining of diarrhea of six month's duration. He had six to ten bowel movements daily containing blood and mucus. He had no diarrhea or dysentery overseas. Three weeks prior to hospitalization, he noticed the onset of aching pain in the right lower chest and right upper abdominal quadrant. At the same time, he developed a cough and pain in the right shoulder. Increasing weakness and exertional dyspnea occurred. Physical examination showed a pale, asthenic, chronically-ill white male who had a fever of 102 degrees F. There was limitation of expansion of the right chest with diminished breath sounds and tactile fremitus, as well as an impaired percussion note in the right lower lung field. There was tenderness in the epigastrium. Stools were positive for trophozoites of E. histolytica. He began expectorating chocolate-colored pus on August 26. The diarrhea subsided completely and his temperature came down to normal after a course of emetine therapy followed by carbarsone. Proctoscopic examination on August 29 showed small pin-point bleeding ulcerations suggestive of amebic colitis. A course of emetine and carbarsone was repeated beginning on October 14. Sixty cubic centimeters of chocolate-colored fluid were aspirated from right chest on October 18. No organisms or parasites were demonstrable in the fluid. The patient was clinically well by November 9, 1946. Surgery was held in abeyance because of excellent clinical response to medical management (Figs. 3 and 4).

Case 3: A. B., 27 year old male, Army veteran, entered the hospital on July 15, 1946. He had diarrhea in the Philippines and Okinawa in 1945. An initial diagnosis of amebic dysentery was made at Oakland Regional Hospital. While there in January 1946, the patient began coughing up foul-smelling sputum which tasted like "pine-cone seeds." Following a course of emetine, he recovered and was discharged as well in March.
1946. When hospitalized here for a routine check-up on August 6, 1946, he developed a temperature of 103 degrees F., with recurrence of blood-tinged sputum which tasted like “pine-cone seeds.” He improved with emetine therapy. (Repeated stool examinations for E. histolytica were negative). A third recurrence of rupture of the amebic liver abscess through the right diaphragm into the right lung on September 17 indicated surgical interference, and on September 27, a thoracotomy with decortication of the right lung was done. Following removal of all drains, his postoperative course was uneventful. He was discharged November 16, 1946, clinically well. He returned on February 10, 1947 for follow-up study and was found to be in good health (Figs. 5 and 6).

Case 4: B. S., 38 year old male, Air Force veteran, entered the hospital August 22, 1946, complaining of generalized chest pains, dyspnea and fever with expectoration of bloody sputum. He had a similar occurrence in June 1946, for which he received penicillin, and salicylates without response. A weight loss of 15 pounds during the past few months was reported. No previous history of diarrhea or dysentery was elicited. All his military service was in the continental United States, but he had come in contact with servicemen from the Philippines who had had amebic dysentery, and had used a common swimming pool. Physical examination showed him to be acutely ill, temperature 101 degrees F., with physical signs of fluid in the right chest. A roentgenogram of chest taken before admission revealed suspicious liver abscess with extension into the right lung. On August 23, 500 cc. of serosanguinous fluid were aspirated from the right chest and on August 28, cysts of E. histolytica were found in his stools. The patient was placed on a course of emetine and diodoquin. An exploratory thoracotomy with decortication and drainage of abscess was done on September 13. His postoperative course was uneventful with subsequent complete clinical recovery (Figs. 7, 8 and 9).

Fig. 7, Case 4: Liver abscess with linear pulmonary atelectasis above elevated diaphragm.—Fig. 8, Case 4: Rupture of liver abscess into thoracic cavity.
Case 5: E.R., was a 24 year old male, Navy veteran, who had served only in continental United States, but came in contact with servicemen who had had amebic dysentery and had used a common swimming pool. He was admitted to the hospital on May 1, 1946, complaining of pain in right chest and cough of three week's duration. The chest examination revealed distant breath sounds and a flat percussion note with crackling rales over right lower and posterior chest. A roentgenogram of the chest revealed a massive effusion in the entire right hemithorax. Aspiration of the fluid revealed a thick, green pus. The underlying lung which became visible after removal of the purulent fluid was suspected of having an intrinsic hepato-pulmonary lesion. All laboratory examinations, including numerous stool examinations, were normal. On May 25, a rib resection with drainage of an empyema cavity 10 cm. in diameter in the right chest was accomplished. A right thoracotomy on July 22 revealed the presence of a subdiaphragmatic abscess which was incised and drained. It contained thick, grayish pus. A revision and broader resection with drainage of the empyema and subdiaphragmatic abscess involving the liver completed the surgery on August 8. Proctoscopic examination was negative. Remittent fever persisted until the patient received a therapeutic course of emetine followed by diodoquin. After several plastic revisions of persistent sinus tracts, complete clinical recovery followed (Figs. 10 and 11).

Case 6: A.M., age 48, was a male veteran of World War I, who served in France in 1918. He had lived in Ohio and Wisconsin all his life. There was no past history of diarrhea or dysentery. He became sick with nausea, pain in the right hypochondrium and fever in July 1944. A laparotomy was done at Veterans Administration Hospital, Brecksville, Ohio, for the treatment of an amebic liver abscess. Drainage was instituted and ultimate recovery of patient resulted. On routine checkup, E. histolytica were found in his stools in January 1945. The patient com-
plained of soreness in the right lower chest and roentgenograms showed
elevation of the right hemidiaphragm at that time. His symptoms sub-
sided following a course of emetine. He was admitted to Wood Veterans
Hospital on June 17, 1946, complaining of pain in the right lower chest,
cough and fever of two week's duration. His stools were positive for
cysts of E. histolytica. The patient left against medical advice (Fig. 12).

Case 7: W. J., 26 year old male veteran, entered the hospital on May
9, 1946, complaining of pain in the right lower anterior chest of ten
days' duration. The pain became gradually worse and was accompanied
by vomiting. A weight loss of 24 pounds in the past six months was
reported. He had had amebic dysentery on Leyte in January 1945, which
responded to emetine. There have been three recurrences of pain in the
right lower chest since that time. No diarrhea was noted with the last
two episodes. He showed a respiratory lag, diminished tactile and vocal
fremitus, impaired percussion note and diminished breath sounds in the
right lower chest. Rigidity and tenderness in the right upper abdominal
quadrant was noted. His temperature was 103 degrees F. The stools were
negative. His temperature dropped to normal within three days after
institution of emetine therapy. He became asymptomatic and the chest
findings gradually returned to normal. Surgical intervention was not
deemed necessary. Follow-up studies revealed no recurrence of chest
disease. This case illustrates probable diagnosis of amebic hepatitis or
very early amebic liver abscess with contiguous pleural reaction and
effusion (Fig. 13).

Case 8: A. R., a 39 year old male veteran entered the hospital on No-
vember 13, 1946, complaining of constant pain in the right upper ab-
dominal quadrant for nine days. Fever, nausea, anorexia and weight loss
were noted but no diarrhea was present. He had had diarrhea of seven
days' duration while in India in 1944. The physical examination revealed

FIGURE 11

Fig. 11, Case 5: Iodized oil visualization of communication between residual
empyema cavity and hepatic abscess after surgical drainage.—Fig. 12, Case 6:
Elevation of right hemidiaphragm with suggestive pointing of a recurrent
liver abscess.
a pleural friction rub with diminished breath sounds in the right lower chest. The liver was slightly enlarged and tender. His stools were negative for cysts and trophozoites. The complement fixation test was positive for amebiasis. A therapeutic course of emetine produced complete relief of symptoms and disappearance of physical signs within three days. Therefore, the diagnosis of thoraco-hepatic amebiasis was considered tenable (Fig. 14).

Case 9: R. C., 28 year old male veteran, was admitted to the hospital on July 17, 1946. He had had intermittent diarrhea which started in the Southwest Pacific in 1943. A previous diagnosis of liver abscess had been made in January 1946. He had a temperature of 101.8 degrees F., an enlarged, tender liver and negative chest findings. The proctoscopic examination showed a healed cicatrix on the posterior wall of the sigmoid, interpreted as a healed amebic ulcer. His stools were negative for E. histolytica. A therapeutic trial with emetine produced complete clinical recovery within four days, suggesting the diagnosis of amebiasis.

Case 10: J. A. B., 29 year old male veteran, entered the hospital on January 29, 1946, complaining of fever, weight loss of 30 pounds, pain in the right chest, right upper abdominal quadrant, and malaise. He had been sick for four weeks. There was no history of diarrhea or dysentery. He served in the Southwest Pacific and the Philippine Islands from 1944 to 1945. His temperature on admission was 101.2 degrees F. Tenderness in right upper quadrant, and right pleural effusion were noted on February 14. Eight hundred cc. of lemon-colored fluid were aspirated from the right chest on February 26. The following day he experienced severe abdominal pain and generalized abdominal tenderness. Emetine hydrochloride therapy was started on February 28 and a laparotomy was performed. Generalized peritonitis, a subdiaphragmatic abscess and a liver abscess were found. The abscesses were drained. Postoperatively a
course of emetine was completed and therapy continued with vioform, blood transfusions and daily irrigations of the operative wound. Following surgery, his temperature gradually fell to normal within two weeks. Intermittent fever recurred in May. It subsided after the administration of a second course of emetine and remained within normal limits the remainder of his stay. The anemia was improved by blood transfusions and iron therapy. Two additional chest taps for removal of fluid were necessary. Laboratory studies of the stools, and pus from the chest and abscess were all negative. The patient was discharged on June 18, 1946 as clinically well.

The most important extra-intestinal sites of amebiasis are the liver, lung and brain. The complications occur most frequently in the order listed. Liver abscess is said to occur in about 20 per cent of the cases of amebic dysentery. Approximately 35 per cent of the fatal cases have hepatic amebiasis. Pleuro-pulmonary complications occur in about 15 per cent of patients having amebic hepatitis or abscess.

The posterior-superior part of the right lobe of the liver is the favorite site for the amebic abscess in 70 per cent of the cases of hepatic amebiasis. It may rupture into the right pleural cavity, lung, or into the peritoneum. Another 15 per cent occur in the left lobe of the liver and may perforate into the left lung, pericardium, stomach or lesser sac of the peritoneum. Pulmonary amebiasis may occur independently of hepatic abscess. Whether primary or secondary, it closely simulates such pulmonary conditions as pleurisy with effusion, pneumonia, lung abscess, and tuberculosis. The rupture of a hepatic abscess into the lung may

**FIGURE 15**

*Fig. 15, Case 10: Elevated right hemidiaphragm without pleuro-pulmonary involvement.—*Fig. 16, Case 10: Rupture of liver abscess into pleural space.
sometimes be the first evidence of its existence.\textsuperscript{7} The mortality rate for the diagnosed abscess group ranges from 1 per cent\textsuperscript{8} to 5 per cent.\textsuperscript{9} Prognosis is poor and mortality rate is high when multiple liver abscesses are present.\textsuperscript{4}

The diagnosis of thoraco-hepatic amebiasis usually rests on one or more of the following criteria: (1) suspicious symptoms, physical findings and suggestive roentgenograms or fluoroscopy showing a domed elevation and fixation of the right hemidiaphragm with or without contiguous pleuro-pulmonary involvement, (2) typical proctoscopic findings, positive stools or positive sputum, and (3) therapeutic response to emetine.

The treatment of amebic abscess of the liver is both medical and surgical in most instances. Incomplete medical treatment alone results in too many relapses to be considered satisfactory. All unruptured amebic liver abscesses should be aspirated if possible after the institution of emetine therapy, preferably after the fourth or fifth day. This diminishes the possibility of seeding and removes the bulk of the involved material which presumably is one of the causes of relapses after medical therapy. Open drainage of amebic abscess of the liver is seldom indicated unless there is a complicating pyogenic infection.\textsuperscript{4}

The treatment of complications of amebic abscess of the liver should be handled surgically with medical treatment maintained throughout the course of surgical management. The more common complications is rupture of the abscess into the abdominal cavity or rupture through the diaphragm into the thoracic cavity. Rupture into the abdominal cavity demands immediate surgical interference to provide drainage to the abscess bed.

Rupture through the diaphragm into the thoracic cavity may be of two types:

(a) Rupture into the free cavity which results in a very rapid total amebic empyema without appreciable involvement of the underlying lung. This requires a wide thoracotomy through the bed of the 7th or 8th rib so that all the debris may be cleaned out of the thoracic cavity. The hole through the diaphragm should be enlarged if necessary and abscess cavity wiped clean of debris. The diaphragm should then be repaired and drainage to the abscess cavity provided subdiaphragmatically. When the rupture has occurred more than four weeks prior to thoracotomy, decortication of the lung may be necessary. This will be determined by the degree of expansion of the affected lung under positive pressure by the anesthetist. Air tight intercostal underwater drainage or suction should be instituted postoperatively and continued as long as drainage occurs.
(b) When rupture occurs through diaphragm in the absence of a free pleural space, erosion is likely to continue into the lung parenchyma and bronchus with a resultant broncho-hepatic fistula. History of the coughing up of chocolate material is obtained and roentgenologic examination reveals parenchymal involvement of the right lower lung, contiguous to a domed diaphragm.

Wide thoracotomy is advisable, as in the previous type, except that in addition, the diseased lung must be treated by segmental resection of the involved portions of the lower or middle lobes. Whenever possible, this should be done by beginning with the bronchial division and carrying the dissection distally from this point rather than attempting resection by clamping off what appears to be the involved segments. It is usually impossible to judge the actual involved area, and by using clamps one tends to either leave diseased bronchi and lung tissue or to cut across normal bronchi. When the involved lung has been resected, the opening in the diaphragm should be enlarged if necessary to clean out the liver abscess and repair the diaphragm over subdiaphragmatic drainage. Since there is, as a rule, little appreciable pulmonary collapse from empyema in this type of rupture, decortication is rarely necessary.

SUMMARY

1) Ten cases of thoraco-hepatic amebiasis are presented. Five of these cases were proven by isolation of the causative organism and the remainder were diagnosed on presumptive clinical and operative findings. Adequate clinical response to therapeutic management was observed in eight patients. In one instance, thoraco-hepatic amebiasis was not diagnosed until necropsy. One patient left against medical advice and could not be completely studied.

2) The most common locale for the original infestation with E. Histolytica was the Pacific area, however, three patients who never left the continental limits of the United States, were found to have systemic amebiasis. It is pointed out that each imported case of parasitic infestation may be a source for endemic spread of the disease.

3) The frequent absence of intestinal symptomatology in the clinical history, and the preponderance of chest symptoms with right upper abdominal pain, as the presenting major complaints, was striking. The observation of changes in the chest teleoroentgenograms was occasionally diagnostic, and as a rule, appreciably helpful in arriving at the proper clinical evaluation.

4) The medical and surgical management of thoraco-hepatic amebiasis as a complication of systemic infestation, is discussed.
RESUMEN

1) Se presentan diez casos de amibiasis tóraco-hepática. Se comprobaron cinco de estos casos mediante el aislamiento del gérmen causante y los restantes fueron diagnosticados por los hallazgos clínicos y operatorios presuntivos. En ocho pacientes se observó una adecuada respuesta clínica al tratamiento. En un caso no se diagnosticó la amibiasis tóraco-hepática sino en la autopsia. Un paciente se salió sin permiso médico y no se le pudo estudiar completamente.

2) El lugar más común donde se originó la infestación con E. histolítica fue la zona del Pacífico. Empero, se descubrió amibiasis orgánica en tres pacientes que nunca habían salido de los límites continentales de los Estados Unidos. Se indica que cada caso de infestación parásita importada puede conducir a la extensión endémica de la enfermedad.

3) Fue sorprendente la frecuente ausencia de sintomatología intestinal en la historia clínica y la preponderancia de síntomas torácicos, y de dolor en la parte superior del abdomen, entre las principales quejas iniciales. Ocasionadamente la observación de alteraciones en los telerontgenogramas torácicos estableció el diagnóstico y, por lo general, estas películas ayudaron a arribar al diagnóstico apropiado.

4) Se discute el tratamiento médico y quirúrgico de la amibiasis tóraco-hepática como complicación de la infestación general.

REFERENCES