

LIVER ABSCESS: A TWO-YEAR STUDY

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SYNOPSIS

A review of sixteen cases of liver abscess admitted to the medical and surgical units, Toa Payoh Hospital, in a 24-month period revealed 7 cases of amoebic, and nine of pyogenic hepatic abscess. The clinical features of both groups were similar. Anaemia, leucocytosis, hypoalbuminaemia, and elevated alkaline phosphatase were present in about two thirds of the patients. Liver scan using Technetium-99 was positive in fourteen patients. The Fluorescent Antibody Test was positive in seven cases, while pyogenic organisms were cultured from the blood in seven others. No death was recorded in the amoebic abscess group, while one of the nine pyogenic abscessed patients died (mortality 11%). Current views on treatment of liver abscess are presented.

INTRODUCTION

Liver abscess, either amoebic or pyogenic, is a serious condition that requires early diagnosis and prompt therapy for optimum results. Despite advances in techniques of investigation and therapy, the mortality from pyogenic hepatic abscess averages thirty per cent (1) while that from amoebic abscess ranges between ten and twenty per cent (2). Because it so rarely presents with specific manifestations, a high index of suspicion is necessary for prompt diagnosis, particularly if the patient suffers from a condition known to predispose to hepatic abscess formation. The present study was undertaken to delineate the clinical presentation and management of liver abscess.

METHODS

The medical records of all known patients with liver abscess admitted to the Toa Payoh Hospital between January 1982 and December 1983 were reviewed. The presence of an abscess was proven by liver scan, ultrasound, and in one case, CT scan of the abdomen. A liver abscess was considered amoebic in aetiology (presumptive diagnosis) when the Fluorescent Antibody Test for amoebiasis was positive. Demonstration of *Entamoeba histolytica* in tissue section from the liver proved the diagnosis. Blood cultures were performed in all the patients, as were cultures of the pus in the ten patients who underwent surgical treatment.

RESULTS

Age, sex, and race

There were sixteen patients with sufficient data to validate a diagnosis of liver abscess. In seven of these, the Fluorescent Antibody Test (FAT) to *Entamoeba histolytica* was positive, allowing a presumptive diagnosis of amoebic abscess. Seven others had positive blood cultures, while the remaining two were also considered to be in the pyogenic group because of their clinical presentation and negative FAT. The age and sex distribution is shown in Table 1, and indicates a male preponderance. Four of the patients with amoebic abscess were migrant workers, three from India and one from Thailand. All the patients with pyogenic abscess were Chinese locals. The majority of the patients were above 50 years of age.

Table 1 AGE AND SEX DISTRIBUTION

Age Sex	20-30		31-40		41-50		> 51		Total	
	M	F	M	F	M	F	M	F	M	F
Amoebic abscess	1	1	1	0	0	0	4	0	6	1
Pyogenic abscess	1	0	0	0	1	0	6	1	8	1

The more common presenting clinical manifestations and their relative frequencies are listed in Table 2. Fever was present in all sixteen patients. Hepatomegaly was the next most common finding. Abdominal pain, mainly in the right hypochondrium or epigastrium, was also a frequent complaint. Lung signs included basilar rales on the right side or bilaterally, and pleural effusion. Clinical jaundice was absent in more than two thirds of the patients with amoebic abscess, and in half of those with pyogenic. Shock was an infrequent finding, present only in one patient with pyogenic abscess.

Laboratory findings

Leucocytosis and elevated alkaline phosphatase levels were found in all the patients with amoebic abscess while anaemia and hypoalbuminaemia were present in over seventy per cent. In the pyogenic group, sixty six per cent had anaemia, leucocytosis

Table 2 CLINICAL PRESENTATION

Symptom/sign	Amoebic	Pyogenic
Fever	7/7	9/9
Jaundice	2/7	5/9
Abdominal pain	5/7	7/9
Hepatomegaly	5/7	7/9
Lung signs	3/7	3/9
Hypovolaemic shock	0/7	1/9
Diarrhoea	0/7	0/9

and elevated alkaline phosphatase levels, while hypoalbuminaemia was present in fifty per cent.

Chest radiographs were performed in all sixteen patients and were abnormal in six. Findings included basal pneumonitis, pleural effusion, a raised hemidiaphragm, and subphrenic gas-fluid levels.

Isotope scan using Technetium-99 was performed on 15 patients and was diagnostic in 14. In one patient with multiple abscesses, the liver scan was unable to detect any space occupying lesion.

Ultrasound was used in the diagnosis of only two patients. In one, the diagnosis of a hepatoma was suggested, but further investigation with a liver scan and CT scan provided the correct diagnosis.

Table 3 LABORATORY FINDINGS

Investigations	Abnormal Value	Per Cent Amoebic	Abnormal Pyogenic
White cell count	($10 \times 10^9/l$)	100	67
Haemoglobin	(F 11 g/dl) (M 13 g/dl)	86	67
Alkaline Phosphatase	(105 u/l)	100	67
Serum Albumin	(3.7 g/dl)	71	56
Bilirubin	(1.6 mg/dl)	29	56
SGPT	(36 u/l)	33	67

Character of the abscess

All the amoebic abscesses were solitary, and the majority in the right lobe of the liver (6/7 = 85%). Three quarters of the pyogenic abscess patients had large right lobe solitary abscess. Multiple abscesses involving the right lobe were found in two patients.

Table 4 CHARACTER OF ABSCESS

	Amoebic	Pyogenic
Single		
Right lobe	6	7
Left lobe	1	Nil
Multiple		
Right lobe	Nil	2
Left lobe	Nil	Nil
Both lobes	Nil	Nil

Serology

Seven patients with a positive Fluorescent Antibody Test (FAT) were presumably in the amoebic abscess group. In two of the five patients in this group who were surgically drained, *E histolytica* was seen microscopically in the abscess wall.

Bacteriology

Blood cultures were performed in all the patients. The patients with presumed amoebic abscess had sterile cultures. Of the pyogenic group, *Klebsiella* was cultured in six, and *Streptococcus faecalis* in one. The remaining two patients had sterile cultures. Cultures of the abscess fluid obtained at surgery were all negative.

Pathogenesis of pyogenic abscess

In two of the patients in this group, gallstones were detected during surgery. No obvious gastro-intestinal pathology was detected in the rest (cryptogenic). Diabetes Mellitus was present in one of the patients with cholelithiasis.

TREATMENT AND OUTCOME

All our patients were initially treated with Ampicillin and Gentamicin. Metronidazole was also employed in some cases for its anti-amoebic and anti-anaerobic activity.

Five of the seven patients with amoebic abscess were treated with open surgical drainage, the abscesses ranging in size from 8 to 10 cm in diameter. The remaining two cases were less than 5 cm and were treated successfully with metronidazole. Five patients with pyogenic abscess (one with multiple abscesses) were also treated surgically in addition to the usual antibiotic therapy. Of the remaining four patients with pyogenic abscess, one died soon after admission. One of the three survivors had multiple abscesses.

The indications for surgery during this period took into consideration the size of the abscess, the presence of other acute surgical abdominal disease, and non-resolution of the abscess with conservative treatment.

Surgery was guided wherever possible by localisation through liver scanning, with intra-operative needle aspiration to locate deep-seated abscesses, when indicated. Care was taken to palpate and detect abscesses in other parts of the liver and the other contents of the peritoneal cavity. Abscesses once located were drained by insertion of a trochar and suction tube, loculations, if any were broken down digitally, and the abscess cavity drained by a dependent tube drain. Biopsies were taken of the abscess wall whenever feasible. The tube drains were left for several days, and progressively withdrawn as the drainage dried up. Serial tube sinograms were performed in a minority of cases. Operative drainage was followed by a rapid defervescence and resolution of symptoms in all patients.

DISCUSSION

The importance of liver abscess lies not so much in its frequency as in the need for early diagnosis and appropriate treatment in order to reduce the morbidity and mortality of this condition. Amoebic hepatic abscess has been estimated to occur in 3 to 9 per cent of patients with amoebiasis (2) while pyogenic

abscess has been reported to occur in 4 to 10 per 100,000 hospital admissions (3). The mortality for liver abscess is 10 to 20 per cent for the amoebic group, and 30 per cent for the pyogenic group (1, 2).

There is no single diagnostic symptom or sign of liver abscess, and the many large series of cases reported in the literature have rather suggested that a constellation of symptoms and signs should be sought. Our series illustrates that jaundice may be absent in half (amoebic) to two thirds (pyogenic) of patients. Thirty to forty per cent of cases also presented with potentially misleading lung signs. The triad of fever, hepatomegaly, and right upper quadrant abdominal pain, however, was present in seventy per cent of our cases.

A history of pre-existing diseases such as cholelithiasis, diverticulitis, appendicitis, pancreatitis, and alcoholic liver disease may be helpful in the diagnosis of pyogenic liver abscess (4). However, most of our cases appear to be cryptogenic, in keeping with the experience elsewhere (2). Amoebic liver abscess should be suspected in migrant workers, particularly from the Indian sub-continent, and fifty per cent of our cases belong to this social group.

Laboratory findings which have been found useful in our series included anaemia, leucocytosis, hypoalbuminaemia, and raised alkaline phosphatase levels. Chest radiographs were contributory in forty per cent of our cases.

Technetium-99 scintigraphy has been reliable in series, making a positive diagnosis in 14 of 15 patients tested. It has its limitations if the abscess is less than 2 cm in diameter (6), as was the case in one of our patients. Abscesses on liver scanning appear as focal areas of decreased uptake, but this finding can go with a hypovascular tumour, hematoma, or cyst.

Gray scale ultrasonographic scan has been increasingly used in recent years in investigating liver masses, enabling distinction between solid and fluid-filled masses (5). We have only just begun to use ultrasonography in the investigation of liver masses, and this investigation was used in only two patients, with a false-negative result in one. Operator experience is crucial to the reliability of this procedure. Sonography has also been used to guide the introduction of percutaneous needles or catheters for closed drainage of liver abscess.

Computerized Tomography (CT) scanning was used in one case with conflicting liver scan and ultrasound results, and is probably the most sensitive investigation currently available.

Available serological tests for amoebiasis include indirect haemagglutination, complement fixation, agar gel diffusion, and fluorescent antibody tests. The last mentioned (FAT) was positive in seven patients, and is sufficiently specific (90% of cases) to make a presumptive diagnosis of amoebic abscess (4).

Blood cultures for pyogenic organisms were positive in seven of our patients. *Klebsiella* was the most common organism in our series, although most other reports find *Escherichia coli* most common (2, 6). Other unusual organisms reported to cause liver abscess include *Haemophilus*, *Yersinia*, and *Salmonella* (7-9). Cultures of pus obtained at surgery in our series were uniformly sterile, probably because all had had prior antibiotic therapy, or because of the fastidious culture requirements of probable anaerobes.

The traditional therapy for pyogenic hepatic abscess has been open surgical drainage under antibiotic cover. Many reports in recent years, however, have been made of treatment by percutaneous aspira-

tion or of antibiotic treatment alone (10-13). Needle aspiration guided by ultrasonography or CT scan appears to be a safe technique capable of both diagnosis and treatment at the same time (10, 11). Antibiotic treatment alone after aspiration diagnosis of pyogenic abscess was first described by McFadzen in 1953 in 14 patients (14), and a report quoted success in 67 patients in the world literature to date (15). Nonetheless, until the safety and efficacy of this treatment regime is more widely accepted, open surgical drainage continues to be advised, except under special circumstances such as when the patient is unfit for surgery, or when there are multiple small abscesses. In our series, of seven patients with solitary pyogenic abscess, four were submitted to surgery. Of the remaining three, one died in septicaemic shock. The other two improved with antibiotic treatment while investigations were in progress. Of our two patients with multiple pyogenic abscesses, one responded to antibiotics alone, while the other was discovered at surgery for drainage of a suspected subphrenic abscess to have multiple hepatic abscesses.

The advent of metronidazole has led increasingly to its sole use without surgery for the treatment of amoebic liver abscess. The role of surgery survives in the treatment of resistant infection or of severe complications, for example in the treatment of perforation into the abdominal or thoracic spaces, or in massive gastro-intestinal haemorrhage. Five of our amoebic abscess patients were submitted to surgery in view of the large size of their abscesses (more than 5 cm diameter). Surgery in these cases may result in faster recovery and shorter hospitalization with psychological and economic benefits (16), although this assumption could be challenged (17).

In conclusion, the disease pattern of liver abscess in Singapore resembles that in the developed countries, with about equal numbers of amoebic and pyogenic abscess. A significant number of the former are found in migrants from less developed countries. Among the modalities of investigation available, liver scanning remains valuable, despite the advent of sonography and CT scan, which are more sensitive. There has also been increasing interest in the non-surgical methods of treatment, using antibiotics alone, or antibiotics combined with closed drainage.

Antibiotic therapy alone, in our opinion, remains to be tested by true prospective studies.

REFERENCES

1. Neoptolemos JP, McPherson DS: Pyogenic liver abscess. *Br J Hosp Med* 1981; 26:47-55.
2. Barbour GL, Juniper K Jr: A clinical comparison of amoebic and pyogenic abscess of the liver in sixty-six patients. *Am J Med* 1972; 53:323-34.
3. Rubin RH, Swartz MN, Malt R: Hepatic abscess: changes in clinical, bacteriologic and therapeutic aspects. *Am J Med* 1974; 57:601-10.
4. Wright SG: Infections of the liver. In: Weatherall DJ, Ledingham JGG, Warrell DA, eds. *Oxford Textbook of Medicine*. Oxford University Press. 1983; 12: 219-20.
5. Kuligowska E, Connors SK, Shapira J: Liver Abscess: Sonography in diagnosis and treatment. *AJR* 1982; 138:253-7.
6. Lazarchick J, deSouza E, Silva NA, et al: Pyogenic liver abscess. *Mayo Clin Proc* 1978; 48:349-55.
7. Dogulas GW, Buck LL, Rosen C: Liver abscess caused by *Haemophilus parahaemolyticus*. *J Clin Microbiol* 1979; 9:299-300.
8. Viteri AL, Howard PH, May JL et al: Hepatic abscess due to *Yersinia enterocolitica* without bacteremia. *Gastroenterol* 1981; 81:592-3.
9. Poon M, Sandera MG: Hepatic abscess caused by *Salmonella paratyphi B*. *CMAJ*. 1972; 107:529-31.
10. Berger LA, Osborne DR: Treatment of pyogenic liver abscesses by percutaneous needle aspiration. *Lancet* 1982; 1:132-4.
11. Haaga JR, Weinstein AJ: CT-guided percutaneous aspiration drainage of abscesses. *AJR* 1980; 135:1187-94.
12. Stenson WF, Eckert T, Anoli LA: Pyogenic liver abscess. *Arch Intern Med* 1983; 143:126-8.
13. Herbert DA, Fogel OA, Rothman et al: Pyogenic liver abscess: successful non-surgical therapy. *Lancet* 1982; 1:134-6.
14. McFadzen AJS, Chang WPS, Wang OC: Solitary pyogenic abscess of liver treated by closed aspiration and antibiotics: report of 14 consecutive cases with recovery. *Br J Surg* 1953; 41:141-52.
15. Reynolds TB: Medical treatment of pyogenic liver abscess. *Ann Intern Med* 1982; 96:373-4.
16. Balasegram M: Management of hepatic abscess. *Curr Probl Surg* 1981; 18:282-340.
17. Sheehy TW, Parmley LF Jr, Johnston GS, Boyle HW: Resolution time of an amoebic liver abscess. *Gastroenterol* 1968; 55:26-34.