The diagnosis and current treatment of liver abscess

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Introduction

TOPICS ON LIVER ABSCESS have crowded the literature, we appraised old diagnostic and therapeutic measures and assessed new ideas. The problems of diagnosis and evaluation remains a dilemma; the trial carried out here would unpopularise some old concepts and re-emphasize what is known but the debate would nevertheless continue.

To the lay public liver disease is synonymous with jaundice but this functional abnormality is unaccompanied in abscess of the liver; visible hyperbilirubinaemia is rare. From the stand point of early recognition reliance must be based on pain alone.

The incidence at the present time remains 5 per million per year. It carries a mortality in excess of 12.5% and so remains a significant killer.

Materials and methods

Twenty four cases of liver abscess were studied between the period February 1972 and January 1975. The cases were drawn from admissions to the First Surgical Unit, General Hospital, Kuala Lumpur. The clinical findings and available procedures in the treatment were evaluated. Certain outstanding observations were finally made.

Results

Epidimiology

There is abundant evidence that the risk of developing liver abscess lies positively in the third and fourth decades of live, in people who are occupationally active. There has been an awareness of the prevalence of liver abscess among Indians in Malaysia, the minority group out of the three ethnic races. Epidimiological studies have also demonstrated a relationship between the rainy seasons and the incidence of liver abscess, and has provided the measure of the risk of developing the disease during these periods. In the present study 20 (83.3%) of the cases were male while 4 (16.7%) were female.

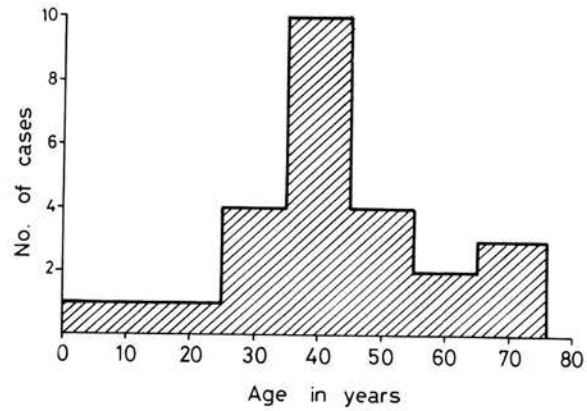

Figure 1. Age and incidence of liver abscess.

Diagnosis:

A synthesis of data: complaints, physical examination and laboratory studies must be evaluated to arrive at a diagnosis. Among the symptoms, right hypochondrial pain was predominant; associated with fever, chills and rigors; anorexia, nausea and

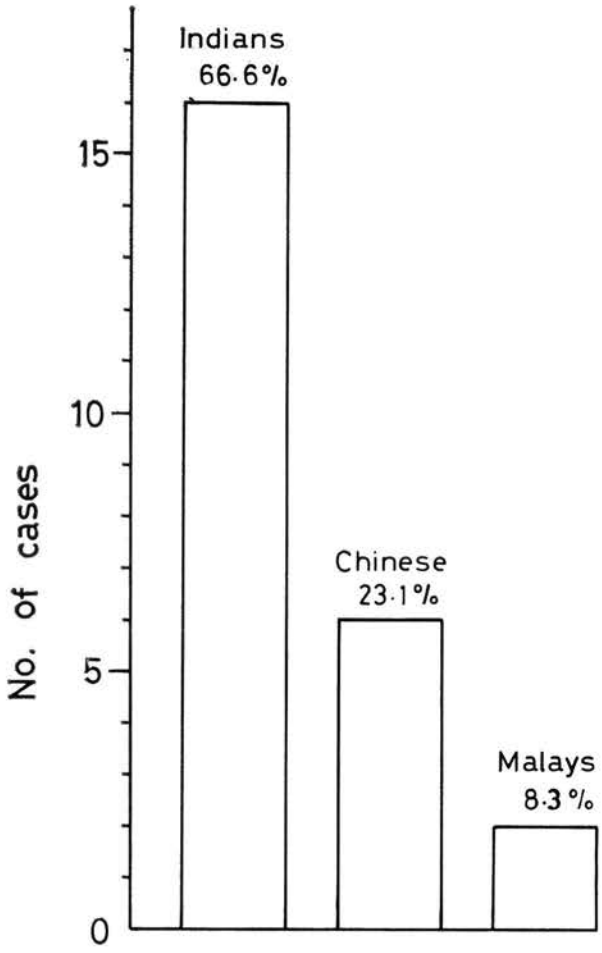

Figure 2. Incidence among the three ethnic groups in Malaysia.

vomiting. Bowel disorders, diarrhoea or dysentery-like symptoms were unusually high in this study (37.5%). Sigmoidoscopy was not done in all these cases to confirm active colitis. A history of drug addiction, chronic alcoholism, dietary imbalance were commonly accompanied. Seventy five per cent of patients had hepatomegaly and liver tenderness; however none had localised tenderness or chest-wall oedema to suggest pointing. In four patients the liver was not palpable and in three the clinical findings were masked by generalised rigidity owing to intraperitoneal rupture of the abscess. Right lung signs were found in a quarter of the total number.

Secondary disturbances, manifested by spider angioma splenomegaly and bleeding oesophageal varices were rare; peripheral oedema, fetor and mental disturbances were manifestations in three

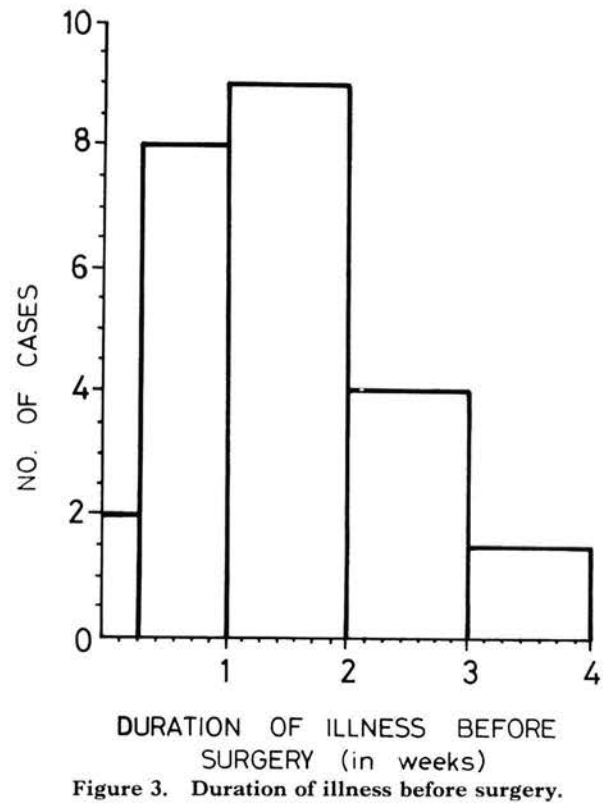

Figure 3. Duration of illness before surgery.

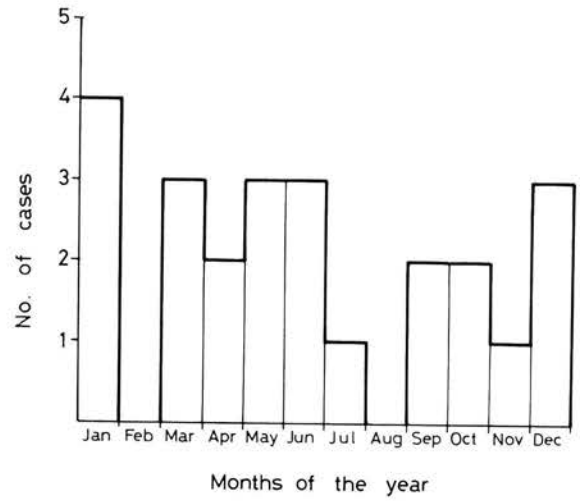

Figure 4. Annual distribution of cases.

patients who were in end-phase hepatic failure. The syndrome of amoebic hepatitis, used to describe fever, mild leucocytosis and tender hepatomegaly that responds dramatically to emetine, seen in a number were excluded from this study.

Table I

Patients' complaints in descending order of frequency

Symptoms	No	%
RHC pain	19	79.1
fever	14	58.3
rigor/chill	9	37.5
nausea/vomiting	9	37.5
gen abd pain	7	29
anorexia	7	29
diarrhoea	6	25
dark urine	4	16.6
jaundice	3	12.5
dysentry	3	12.5
wt loss	2	8.3
dyspnoea	2	8.3

Table II

Frequently seen clinical findings.

Signs	No	%
hepatomegaly	18	75
no hepatomegaly	4	16.6
gen peritonitis	3	12.5
pleural effusion	4	16.6
subdiaphragmatic abscess	2	9.5

Laboratory studies:

1. Anaemia constitutes a common deficiency state. The haemoglobin ranged from 7.1 to 15.3 G, the majority fell in the order of 12 to 14 G.

2. A complete blood count was routinely obtained, white cell count ranged from 4,900 to 50,000 per cu.m.m. The majority had counts above 10,000.

3. We have briefly pointed out below the more striking features found in liver function tests. The tests were done in all patients. The bilirubin was raised in 13, but rarely exceeded 5 mg %. Eleven (45.8%) had some degree of intrahepetic cholestasis manifested by a raised alkaline phosphatase (more than 13 mg %). A marked hypoalbuminaemia (less than 3.5) with the resultant decreased colloidal osmotic pressure was one of the major causes for ascites and oedema and was evidenced in 18 (82%) of the cases. The albumin-globulin ratio was less than 1.0 in 18 (82%) of the cases studied. Absence of clear cut biochemical results does not preclude liver abscess.

Table III

Serum bilirubin levels

s. bilirubin (mg)	No	%
<1.0	9	37.5
>1.0	8	33.3
>2.0	3	12.5
>5.0	2	8.3

Table IV

Serum globulin

s. globulin	No	%
3.5	11	50.0
3.5 – 4.5	10	45.4
5.0	1	4.6

4. Photoscans of the liver was a valuable investigation in the diagnosis and localisation of liver abscess, particularly in patients with non specific physical findings. Gamma-emiting radioisotope (Indium, 0.5 mC) was used for the procedure. Positive results were obtained in all patients and it formed graphic information on the anterior, posterior and lateral aspects of the organ. More than eighty five per cent had a single abscess situated in the right lobe. The left lobe was involved in 6.7%. Both lobe abscess were found in one patient and another had a concomitent lung abscess as a result of supradiaphragmatic rupture.

5. Abdominal Rontgenograms were used to confirm a diagnosis of liver enlargement and a raised right diaphragmatic dome, this was readily done in 23 patients. Pulmonary abnormalities, lower lobe pneumonia with pleural effusion or lung abscess were found in 25% of the patients. No air fluid levels were seen within the liver shadow.

6. The evidence incriminating *Entamoeba histolitica* as the causative factor was seldom proven, in spite of repeated stool examinations in 23 patients. Positive results were obtained in 2 Serological tests and angiography were not employed; the objective was to employ a few, simple, rapid and reliable tests.

Treatment:

Treatment was instituted with the objective of draining the abscess, controlling the aetiological factor and lending support to the multi-organ deficiencies. Improved preoperative and postoperative techniques have increased the success of surgery. Support ranged at an average of 7 days. Efforts were simultaneously made to prevent further liver damage by avoiding exposure to noxious agents.

We appraised single percutaneous aspiration, multiple aspirations and open drainage with saucerisation as available methods of treatment; there was no opportunity to occasion a resection.

Metranidazole used in combination with tetracycline produced an effective response in 22 of the total number of patients. In controlled world-wide multicentre studies the convenient and optimal dosage varies. A predictable response was obtained in this study with 800 mg eight hourly for ten days. With the prescribed regimen, it did not cause side effects. Twenty one patients progressed to eventual complete recovery; three died. Long term follow-up of sixteen patients has been completed and they enjoy continued good health.

Table V

Methods of treatment

treatment	No	%
single percutaneous aspiration	4	16.6
repeated percutaneous aspiration	7	29.0
failed aspiration/open drainage	5	20.8
open drainage as choice procedure	3	12.5

Table VI

Nature of drained pus

pus	No	%
yellow pus	14	58.3
anchovy sauce pus	3	12.3
straw coloured fluid	1	4.1
empty ruptured cavity	2	8.3

Discussion:

Those with experience of liver abscess in other parts of the world will note the particularly high incidence of this disease in the East. At the present time the incidence is 5 per million per year.

Indians in Malaysia form a susceptible population but an independent cause and effect relationship is not evident. Many risk factors have been assumed in the past; some like climate, sex, age and heridity are not controllable, while others, hygiene and an active immunisation campaign are remidiable. Reference has been made to the peak incidence in December/January and May/June (the wet months in Malaysia), but epidemics have not been recorded.

Rarer causes of abscess, ecchinococci, actinomicosis, traumatic and infected congenital cysts were not seen.

In hepatic disorders it is usually desirable to evaluate simultaneously the state of the cardiovascular system and kidney, because of the frequent circulatory derrangements.

Marked jaundice is uncommon, and unusual in amoebic abscess; it usually is an indication of end-stage hepatic failure. Pallor, weight loss and anorexia are frequently seen. Hyperbilirubinaemia, when present, is due to diffuse parenchymal involvement and intrahepatic cholestasis.

The characteristic findings are enlargement and tenderness of the liver in conjunction with altered biochemical tests. A tender, enlarged liver is the hallmark of superficial abscess, this feature was absent in the deep seated ones. Left lobe abscess presented as swelling and tenderness in the epigastrium and left hypochondrium, Abscesses situated in the subdiaphragmatic area and posteriorly were found with referred pain. Cough was a troublesome symptom when the abscess burst into the lung. In fact patients often felt better when their abscess ruptured.

Many laboratory tests have been proposed for clinical study but none is diagnostic in itself. Tests however are useful for a positive correlation. The diagnosis of liver abscess is dependant essentially on abdominal signs. Liver abscess of bacterial origin generates a granulocyte response and amoebic a lymphocytic response (Grisby, 1969). The status of bilirubin, alkaline phosphatase and haemoglobin has been alluded to earlier.

The efforts of much basic and clinical research has provided diagnostic accuracy up to 100% in amoebic abscess when positive results are obtained with indirect haemagglutination test, gel diffusion precipitin test and latex agglutination test; unfortunately these are not available in all centres.

Radiological diagnosis rests in the demonstration of elevation and localised upward bulging of

the right hemidiaphragm, basal consolidation or collapse, pleural thickening and effusion. High cost isotope scanning was a valuable adjunct to clinical diagnosis and it has provided exact location and extent of the abscess.

Abscesses in this series occurred mainly in the right lobe of the liver. This may follow Serge's rule of abdominal visceral drainage: superior mesenteric blood to the right lobe while spleenic and inferior mesenteric blood to the left. Multiple abscesses, found in 30 to 40% of cases by Joseph and Longmire (1968) were not substanciated in this study and was found in 10%. From the aspirate majority appeared to be pyogenic in origin, although this was not proven by culture; this could have been due to anaerobic and microaerophilic organisms that grow poorly in commonly used media.

Haemodynamic derrangements in the hepatic circulatory system due to parenchymal damage may result in pooling of blood, this may accentuate shock and a degree of portal hypertension.

Many forms of treatment have been proposed over the years, some less effective procedures have been abandoned. The current available techniques include, single percutaneous aspiration, multiple percutaneous aspirations, saucerization and segmental resection. The review showed that single aspiration was an ineffective method of emptying cavities, frequently aspiration had to be repeated and this produced complications like: severe pain, pyogenic reactions and haemorrhage. The chief limitation of closed needle aspiration was the frequently missed multi-loculations. Eight patients underwent open drainage, four had earlier aspiration without improvement. Good results obtained by McFadzean, Chang and Wong (1953) with percutaneous needle aspiration was not produced in this series.

The anterior transperitoneal approach was employed to drain superficial abscesses and the posterior 12th rib resecting approach for deep cavities. A dependant drainage was effected where ever possible and intrahepatic and perihepatic drains were placed at the completion of operation.

Hepatic resection and transplantation are technically feacible for management of patients with liver abscess. Selection of patients requires studies to determine the extent of liver damage and its reversability.

The improvement of overall hepatic function is important in reducing mortality and morbidity. To interrupt further injury, corticosteroids, vitamins and fresh blood provide a successful regime.

Ruptured liver abscess carried a high mortality in the series published by Wray *et al.* (1964) and Ostermiller *et al.* (1967); 16.6% of our patients developed this complication, and timely surgery saved all of them. One patient with pulmonary extention of the abscess recovered with conservative management. Intrapericardial rupture was not encountered, but it carries a high mortality (Archampong & Clark, 1973). There were three deaths but all these patients showed clinical and laboratory evidence of non-reversible parenchymal damage.

In the follow-up, liver function and morphological studies provided an index to the success of the treatment. Wound infection, biliary fistulae and ill health were seen from time to time and they disappeared spontaneously in most liver abscess patients who showed liver function improvement in the review.

Summary

The seriousness of liver abscess cannot be overemphasised. Liver inadequacy resulting from the space occupying lesion results in severe metabolic derrangement, compounding the threat to life. Considering the evidence, the following outstanding observations were finally made:

1. The diagnosis of liver abscess is mainly a clinical finding.

2. Abscesses more than 5 cm. in diameter if left undrained produced a 100% mortality. Cavities less than this size often healed spontaneously with supportive regimen alone.

3. Drainage from abscess is most effective if made dependant. Tube drains are essential and may be necessary to be kept in place for weeks.

4. Loculations within an abscess are made to communicate. Strands of connective tissue that span cavities are safeguarded; these are periportal connective tissue that acts as scaffolding for regenerating liver cells.

5. Liver regeneration can be estimated by serial sinograms done through tube drains and also by scanning. Liver regenerates from the periphery and takes more than ten weeks to be complete.

6. Open drainage has reduced mortality from 75% in the pre antibiotic era to about 12.5% in this series. Even with limited facility good results can be obtained.

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