

LIVER ABSCESS IN THE TROPICS: AN EXPERIENCE FROM NEPAL

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Abstract. Thirty-six consecutive cases of liver abscess seen at the BP Koirala Institute of Health Sciences Hospital, Dharan, Nepal, from 1995 to 1998, were reviewed. Twenty-one cases were male and 15 female, with a mean age of 42 years. Twenty-four cases (66.7%) were amebic, 7 (19.4%) pyogenic, 3 (8.3%) indeterminate and 2 (5.5%) tuberculous. The most frequent clinical features included fever (88%), leukocytosis (66.7%), abnormal level of serum albumin (44.4%) and alkaline phosphatase (38.9%). The liver abscess was single in 61.1%, multiple in 27.8%, and in 66.7% of cases the abscess was present in the right lobe of the liver. Ultrasonography was diagnostic in all cases. A positive culture of the abscess was obtained in 7 cases (19.4%). The most frequent bacteria found were *Klebsiella pneumoniae* (4;11.1%), followed by *Escherichia coli* (3;8.3%). Two cases were due to *Mycobacterium tuberculosis* and none had malignancy. Percutaneous drainage was performed in 27 patients (75%). Mortality attributable to the abscess was 5.5%. We found percutaneous needle aspiration of liver abscess helpful in confirming diagnosis, as it provides a better bacteriological culture yield, gives a good outcome, and may uncover clinically unsuspected conditions like malignancy and tuberculosis. These two conditions should certainly be considered possible causes in our part of the world when an abscess fails to respond to standard treatment. In developing countries like Nepal, the clinical presentation of liver abscess has not varied over time. At present, rapid diagnosis and image-guided percutaneous drainage offer a better prognosis for liver abscess. We also recommend routine cytological examination of aspirated abscess materials, as well as stains and cultures for acid-fast bacilli.

INTRODUCTION

Liver abscess remains an important clinical problem in both developing and developed countries, with a significant mortality rate even now. Nepal is a developing country and generally has lower socio-economic conditions than other countries of the South Asia region. Amebic liver abscesses were more common than pyogenic abscesses in this region. Surgical open drainage was performed in most cases of pyogenic abscess. Since the advocacy of percutaneous drainage for the treatment of pyogenic abscesses (Yeoh *et al*, 1997), the technique has won increasing acceptance and has had a profound impact on the management of liver abscesses in our center, dramatically reducing the need for open surgical drainage.

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We describe our experience with 36 consecutive cases of liver abscess seen between 1995 and 1998. Changes in clinical presentation, laboratory findings, and management of liver abscess compared with previous studies in Nepal and the region are discussed.

MATERIALS AND METHODS

The case records of consecutive patients with liver abscess admitted to the Internal Medicine Ward of the BP Koirala Institute of Health Sciences Hospital, Dharan, Nepal, from 1995 to 1998, were reviewed.

A definitive diagnosis of liver abscess was made based on compatible clinical features and the following investigations: ultrasonography, aspiration or drainage of pus. Diagnostic criteria for the various types of abscesses were as follows:

- i. Amebic abscess: demonstration of *Entamoeba histolytica* trophozoites in aspirated pus.

ii. Pyogenic abscess: positive cultures of blood or aspirated pus.

iii. If both of the above sets of criteria were satisfied, the abscess was considered to be of mixed etiology.

iv. Tuberculous abscess was diagnosed by identifying acid-fast bacilli in aspirated material.

v. The abscess was classified as indeterminate if none of the above criteria were satisfied.

RESULTS

Abscess type

There were 36 patients with confirmed liver abscesses, 24 of whom (66.6%) had amebic abscess, 7 (19.4%) pyogenic, 3 (8.3%) indeterminate, and 2 (5.5%) tuberculous.

Patient characteristics

The male to female ratio was 1.4:1 with a mean age of 42 years (range 15-62 years). The racial distribution approximated that of the general population of the eastern region of Nepal. The most common underlying condition was alcoholic liver disease (25%), diabetes mellitus (16.7%), chronic obstructive airway disease (8.3%), and gall bladder disease (5.5%).

Clinical presentation (Table 1)

The most common features at presentation were fever (88%), ranging from 1-120 days with a mean duration of 23 days, abdominal tenderness (41.6%), hepatomegaly (33.3%), pain at right upper quadrant (27.8%), anorexia (27.8%), jaun-

dice (19.4%), hypotension (13.9%), and right pleural effusion (13.9%). Nine (25%) patients were chronic alcoholics.

Laboratory findings (Table 2)

Leukocytosis was documented in 66.7% of cases. Most of the patients had at least one abnormality in the panel of liver function tests (serum bilirubin, serum albumin, alaline aminotransferase, aspartate aminotransferase, and alkaline phosphatase). Ultrasonography was performed in 88.9% of patients, and successfully demonstrated abscesses in all cases.

Microbiology

Bacteriological yield from aspirated abscess material was superior to that of blood culture. The most common pathogen was *Klebsiella pneumoniae*, followed by *Escherichia coli* (Table

Table 1
Clinical presentation (n=36).

Symptoms/ signs	No.	%
Fever	31	88
Abdominal tenderness	15	41.6
Hepatomegaly	12	33.3
Right upper quadrant pain	10	27.8
Anorexia	10	27.8
Jaundice	7	19.4
Hypotension	5	13.9
Right-sided pleural effusion	5	13.9

Table 2
Laboratory and radiology findings (n=36).

Investigation	No.	%
Leukocytosis (total white cell > 10 x 10 ⁹ /l)	24	66.7
Raised serum alkaline phosphatase	14	38.9
Hypoalbuminemia (albumine < 3 g/dl)	16	44.4
Raised serum bilirubin	7	19.4
Raised serum alanine and aspartate aminotransferase	9	25
Ultrasound : demonstrated abscess	32	88.9
single abscess	22	61.1
multiple abscess	10	27.8
right lobe abscess	24	66.7

Table 3
Microbiology of abscess (n=36).

	Investigation of aspirated pus for C/S test	No.	%
Amebic abscess	<i>E. histolytica</i> in aspirated pus	24	66.7
Pyogenic abscess	<i>Klebsiella pneumoniae</i>	4	11.1
	<i>Escherichia coli</i>	3	8.3
Indeterminate		3	8.3
Tubercular	AFB +ve	2	5.5

Table 4
Underlying diseases associated with abscesses
(n=36).

Underlying diseases	No.	%
Diabetes mellitus	6	16.7
Chronic obstructive airway disease	3	8.3
Biliary disease	2	5.5
Extra-hepatic sites of sepsis		
pneumonia	5	13.9
peritonitis	1	2.8
Chronic alcoholic liver disease	9	25

3). Eleven of 36 patients (30.5%) reported receiving antibiotics from another doctor prior to hospital admission, which may have affected culture results. The majority had a single abscess (61.1%) located mostly in the right lobe (66.7%) of the liver (Table 2). Of the 10 cases of multiple abscess, 7 were pyogenic, 2 were tubercular and 1 was indeterminate in etiology. Five cases had associated right sided exudative pleural effusion. Amoebic trophozoites (*E. histolytica*) in aspirated pus were identified in 44% of cases.

Management

In the majority of cases, the presenting clinical features did not allow a definitive diagnosis of the type of abscess. Hence, our initial antimicrobial regime included a combination of metronidazole with ampicillin and gentamicin for coverage of *Entamoeba histolytica*, gram-negative enteric bacteria, and anaerobic organisms. When the culture results were obtained, the antibiotics were altered, as appropriate. Percutaneous aspiration of the abscess was performed in

27 cases (75%), including 2 of 7 (28.6%) cases of pyogenic abscess before definitive diagnosis. Indications for this procedure were: to confirm diagnosis, to drain large abscesses (more than 7 centimeters in diameter on radiological imaging) and for non-response to initial treatment with parenteral metronidazole and antibiotics. Open surgical drainage was necessary in one case of amebic, and one case of pyogenic, abscess, because of non-response to metronidazole and antibiotic treatment, and rupture of abscess, respectively. In one case of amebic abscess inter-costal drainage was performed because of rupture of abscess in to right pleural cavity.

The overall mortality rate was 5.5% and of the 2 fatalities, one patient was elderly with diabetes mellitus, whilst the other had multiple pyogenic abscesses, which ultimately ruptured into the pleural and pericardial cavity.

DISCUSSION

Our series had markedly increased numbers of amebic (66.7%) over pyogenic abscesses. This concurs with previous regional studies, but contrasts with a recent study from Singapore, where pyogenic abscesses were more common (Yeoh *et al*, 1997). This changing trend is probably due to improved socio-economic conditions there.

We found *Klebsiella pneumoniae* to be the most common pathogen in pyogenic abscesses, as did in previous regional studies (Fock *et al*, 1985; Chou *et al*, 1994; Yeoh *et al*, 1997). This contrasts with Western series (McDonald *et al* 1984; Karatassas *et al*, 1990; Donovan *et al* 1991; Stain *et al*, 1991) in which *E. coli* was usually the predominant organism, although in recent years

Klebsiella pneumoniae has been cited in some Western reports as the most common pyogenic organism (Hansen *et al*, 1993; Yinnon *et al*, 1994). There was also a paucity of anaerobic organisms in our culture results; this may be due to failure to use anaerobic culture bottles and/or because a significant percentage of patients (11;30.5%) had received prior antibiotic treatment. Superimposed bacterial infection was seen in one case. Knowledge of likely pathogens aids the choice of empirical antibiotic therapy before culture results are known, especially since the *Klebsiella* species isolated locally was usually resistant *in vitro* to ampicillin. *Salmonella typhi* and *Pseudomonas pseudomallei* are endemic in Southeast Asia and may cause liver abscess (Goh *et al*, 1987; Vatcharapreechasakul *et al*, 1992; Yeoh *et al*, 1997) although the latter was not seen in the present series. *Pseudomonas pseudomallei* is an organism found in soil and is a cause of chronic infection with abscess formation in rural agricultural communities. In one series from northeastern Thailand, melioidosis accounted for 34 of 50 cases of pyogenic abscess (Vatcharapreechasakul *et al*, 1992). Typically, multiple liver abscesses are found in melioidosis and concomitant splenic abscess is common. The occurrence of two abscesses due to *Mycobacterium tuberculosis* in our series suggests that this organism should be routinely looked for in smears and cultures of aspirated materials, as its presentation may be indistinguishable clinically from other causes of liver abscess. It should certainly be considered a possible cause in this part of the world when an abscess fails to respond to standard treatment.

In our series, most of the patients were chronic alcoholics and the common underlying conditions were diabetes mellitus and biliary tract disease. Amebic liver abscesses were more commonly associated with alcoholics, and pyogenic with diabetes.

We found ultrasonography to be reliable in the diagnosis and follow-up of abscesses. It is less costly but the results are operator-dependent. Halvorsen *et al* (1988) reported CT to be the most sensitive imaging modality for detecting hepatic abscesses. Unfortunately the facilities for CT scan and cytology for needle aspiration materials were not available at our center, and this is true for all

developing countries. Recently, magnetic resonance imaging has been used to characterize liver abscesses (Mendez *et al*, 1994).

Management of liver abscesses has also undergone major changes following the advocacy of percutaneous aspiration (Herbert *et al*, 1982). In our series, radiologically guided percutaneous needle aspiration was performed in 27 cases (75%), including 2 of 5 (40%) cases of pyogenic abscess, before definitive diagnosis. Open surgical drainage was necessary in one case of amebic and one case of pyogenic abscess, in which it was performed because of non-response to medical treatment, and rupture of abscess, respectively. In one case of amebic abscess, intercostal drainage was performed because of rupture of the abscess into the right pleural cavity. In contrast, surgical drainage had been performed in 40 to 70% of abscesses in previous regional studies.

We found percutaneous aspiration of a liver abscess helpful for the following reasons: it helps to confirm the diagnosis if pus is aspirated; it gives a better bacteriological culture yield (82 vs 47% from blood cultures); it gives an equally good outcome for surgical drainage and has less procedure-related morbidity; Unsuspected underlying conditions may be diagnosed from aspirated materials.

In other series, cases of tuberculous liver abscess and hepatoma were diagnosed by finding acid-fast bacilli in aspirated abscess materials and following cytological examination (Yeoh *et al*, 1997). In our series, two of the patients had tubercular liver abscess and none had malignancy.

Two prospective studies have compared ultrasound-guided needle aspiration combined with medical treatment against the latter alone, and found that aspirated patients had a more rapid clinical recovery (Filice *et al*, 1992; Ramani *et al*, 1993) but a third study found no significant difference (Van Allan *et al*, 1992). Recent innovations in the treatment of liver abscess include intra-cavitary instillation of antibiotics following needle aspiration of pyogenic abscesses (Giorgio *et al*, 1995) and laparoscopically guided drainage of abscess (Cappuccino *et al*, 1994).

In conclusion, amebic liver abscesses are still more common in Nepal than western countries,

where pyogenic are more frequent. The most common organism isolated from pyogenic abscesses was *Klebsiella pneumoniae*. As the majority of organisms isolated were resistant to ampicillin, empirical antibiotic treatment for suspected pyogenic abscess should include gentamicin and third generation cephalosporin. Percutaneous aspiration of liver abscess is helpful to confirm the diagnosis, provides a better bacteriological culture yield, gives a good outcome, and may uncover clinically unsuspected conditions like tuberculosis and malignancy which may mimic the presentation of liver abscesses. We recommend routine examination of aspirated materials by cytology, as well as stains and culture for acid-fast bacilli.

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