



## Pyogenic Liver Abscess: The Role of Surgical Treatment

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**Materials and Methods.** We present an analysis of 48 patients with pyogenic liver abscess (PLA) that were treated according to a protocol between 1975 and 1993. In this period, 35 patients with PLA were treated by surgical drainage (SD). The indication for surgical treatment of the abscess were patients in septic conditions, underlying intra-abdominal surgical disease and the failure/contraindication of other therapeutic methods. Thirty-one patients were submitted to surgical treatment as the initial procedure and four patients unsuccessfully treated by percutaneous drainage, underwent SD.

**Results.** The surgical approach was indicated in patients with severe disease and presented 91.5% of good results, and a mortality rate of 8.5%.

**Conclusions.** These results suggest that surgical treatment is a good alternative as a first step not only for the treatment of the primary cause of the abscess but also in septic patients with severe disease where a delay in adequate drainage, frequent in percutaneous management, can lead to high morbidity and mortality rates.

**KEY WORDS:** Pyogenic liver abscess - Drainage - Surgical treatment.

Historically, pyogenic liver abscess (PLA) has been associated with high mortality rates<sup>1</sup> but recent advances in diagnosis have led to earlier detection and treatment of the disease. The introduction of ultrasound, computed tomographic and radioisotope scanning associated with the development of percutaneous drainage techniques as well as the advances in anti-microbial therapeutics, have improved the outcome and decreased the mortality rates from 50% to 20% in the last 50 years.<sup>2,3</sup>

Several therapeutic approaches have been proposed, including medical treatment alone, percutaneous aspiration or drainage, and open surgical drainage. Patients presenting with early diagnosed small abscesses may present good results with antibiotic therapy alone or used in asso-

ciation with percutaneous aspiration. In the majority of cases, however, drainage of the abscess is required.

Surgical drainage (SD) is usually reserved for low risk patients with underlying intra-abdominal pathology which requires surgical treatment and when other therapeutic procedures have failed. Early reports from the literature, showing high mortality rates following SD, have been performed before the advent of ultrasound and computed tomography, and are no longer valid nowadays. Recently, several authors have reported good therapeutical results with the employment of percutaneous drainage (PD) but this technique is associated with failure rates ranging from 5 to 36%.<sup>3-9</sup> To our knowledge, there are no controlled studies comparing the two methods.

The aim of this study was to point out the importance of the surgical treatment of PLA not only for patients with associated intra-abdominal surgical pathology or in the failure of other therapeutic alternatives, but specially for patients in septic conditions. When dealing with septic patients, the delay or failure of adequate drainage increases morbidity and mortality. For this reason, in the former situations, we recommend surgical management which presents a lower failure rate when compared with PD.

### Materials and Methods

Between the period of 1978 and 1993, forty eight patients with PLA, 26 males and 22 females, ranging from 13 to 77 years (mean = 43 years) were referred for treatment in the Hepatobiliary-Pancreatic Unit - Hospital das Clínicas University of São Paulo Medical School.

Fever was present in all cases, abdominal pain in 28 (58.3%) and jaundice in 19 (39.5%). Twenty-six patients (54.1) had leukocytosis, 21 (43.7%) hyperbilirubinemia and 17 (35.4%) raised serum alkaline phosphatase levels. Twelve patients (25%) were in septic conditions.

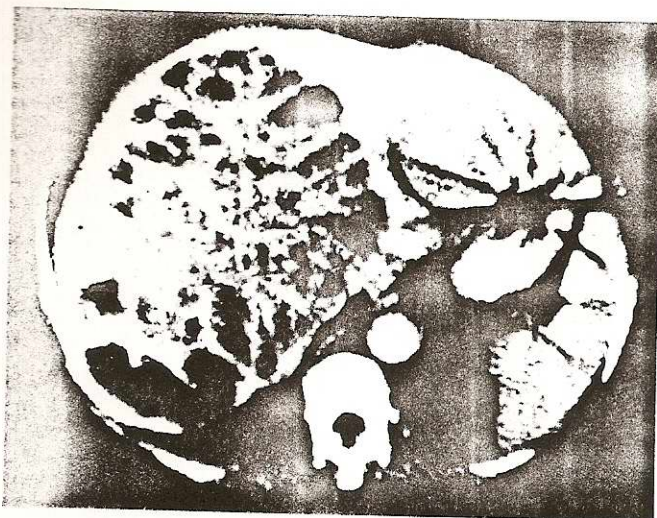


FIG. 1.—CT scan disclosing a multilocular pyogenic liver abscess.

Diagnosis was based on ultrasonographic evaluation in all cases and most recently on computed tomographic scan (CT), (Fig. 1). In some cases, intraoperative ultrasound was performed in order to localize the abscess (number, size, location, presence of loculation). Broad spectrum antibiotics were administered in all patients, oriented by culture results (blood or aspirated material) when available.

The protocol adopted is:

Group 1.—Patients in good clinical conditions with solitary or multiple small abscesses (< 2 cm each) were submitted to medical treatment with broad spectrum antibiotics as an isolated therapeutic modality.

Group 2.—Patients in good clinical conditions with large solitary unilocular abscess in accessible location, excluding those with surgical abdominal disease, ascitis and abscess in proximity to the pleura, were submitted to percutaneous drainage (PD) guided by ultrasonography or CT scan.

Group 3.—Patients with septicemia or those with multiple large abscesses, in the presence of underlying abdominal surgical dis-

TABLE I.—Causes (Etiology) of 48 PLA.

Cause	N	%
Biliary	21	43.7
Common bile duct/Biliary stones	13	
Periampullary carcinoma	4	
Post-cholecystectomy	2	
Intrahepatic lithiasis	2	
Gastrointestinal/Portal	9	18.8
Chronic pancreatitis	3	
Colitis	3	
Diverticulitis	2	
Apendicitis	1	
Hematogenous	4	8.3
Bacterial endocarditis	3	
Dental infection	1	
Trauma	1	2.1
Cryptogenic	13	27.1

ease or in the failure/contra-indication of other methods, were submitted to surgical drainage (SD).

The patients were treated as follows: 4 received medical treatment, 13 were submitted to percutaneous drainage and 31 to surgical drainage.

### Results

The etiology of the abscess was determined in 35 patients. The origin of the infection was biliary in 21 cases (43.7%), cryptogenic in 13 (27.1%), portal spread in 9 (18.8%), hematogenous in 4 (8.3%) and trauma in 1 (2.1%), (Table I).

The abscess culture was positive in 39 cases (81.2%), 15 of them presented more than one agent, and showed a predominance of micro-organisms from the intestinal flora. Abscess cultures revealed aerobic Gram negative bacteria in 38 patients, aerobic Gram positive in 14 and anaerobes in 4.

Four patients in good clinical conditions and small abscesses (< 2 cm), received medical treatment with broad spectrum antibiotics (Group 1). All patients from this group presented good evolution.

Thirteen patients with unilocular large abscess whose puncture was technically feasible (Group 2) were submitted to PD, and 9

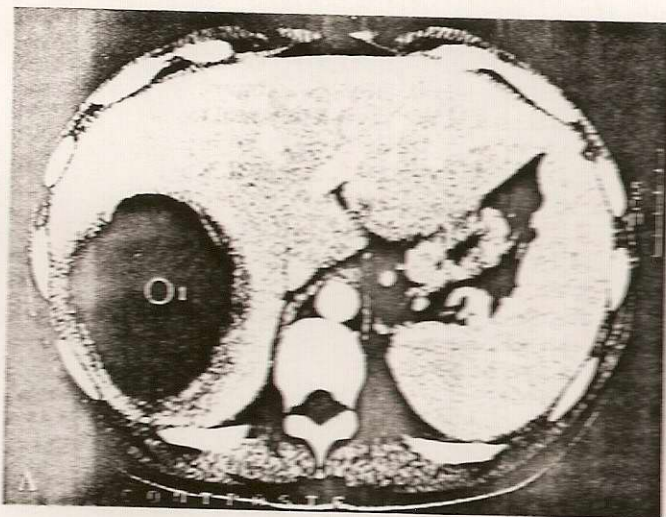


FIG. 2.—A) CT scan showing a unilocular abscess in the right lobe of the liver. B) Percutaneous drainage of the abscess.

TABLE II.—Surgical indications for 35 patients with PLA.

Surgical indication	N
Underlying biliary disease	15
Septicemia	12*
Percutaneous drainage failure	4
Multiloculation of the abscess	2**
Inaccessible location for PD	2

PD=Percutaneous drainage; \*5 patients were found to have associated biliary disease; \*\*1 patient was found to have associated biliary disease.

TABLE III.—Results of the treatment of 48 patients with PLA.

Parameters	Medical treatment	PD	SD
Number of patients	4	13	35
Good results (cure)	4 (100%)	9 (69.2%)	32 (91.5%)
Mortality	0	0	3 (8.5%)

PD=Percutaneous drainage; SD=Surgical drainage.

presented a good outcome (69.2%), (Fig. 2). In one patient two percutaneous punctures were necessary for adequate drainage. Four patients (30.7%) that did not present any improvement after PD, were considered as treatment failures and were subsequently submitted to surgical treatment. There was no mortality in the PD group.

Thirty-five patients were surgically treated (Group 3), 31 as the initial procedure and 4 after percutaneous treatment failure. Surgical indications were underlying biliary disease in 15 patients, septicemia in 12, multilocular abscess in 2 and percutaneous drainage failure in 4 (Table II).

Of patients surgically treated, 3 died (8.5%) consequently to multiple organ failure due to sepsis, and 32 (91.4%) presented a good evolution with hospital discharge. Reoperations were not necessary.

The results of the treatment of pyogenic liver abscess according to the protocol are summarized in Table III.

### Discussion and Conclusions

The routine use of ultrasonography and computed tomographic scan leading to early diagnosis, have undoubtedly contributed to a decrease in the morbidity and mortality rates of patients with PLA.<sup>2</sup> These imaging techniques have also permitted the characterization of the abscess with precise information about the location, size, number and occurrence of loculations. Although medical management may be successful in a small percentage of patients, drainage of the abscess is the goal for the treatment.<sup>10</sup> Recently, the use of percutaneous drainage procedures,<sup>4</sup> has led to a modification in liver abscess therapeutic strategy.

After the diagnosis of a hepatic abscess, broad spectrum antibiotics should be administered immediately. The pathogenic microorganisms are usually Gram negative aerobes and anaerobes of enteric origin, and 30 to 50% of abscesses are polymicrobial.<sup>11</sup>

Antibiotic therapy used alone for the treatment of PLA has been described<sup>5</sup> but there are several reports where it failed, leading to high mortality rates.<sup>10 12 13</sup> Medical treatment was reserved in this study for patients in stable con-

ditions with solitary or multiple small abscesses (<2 cm each), with good results in 4 treated patients.

According to recent reports, surgical treatment is reserved for cases where there is an underlying intra-abdominal surgical disease, in the failure of percutaneous or medical management, or when there are contra-indications for percutaneous drainage.<sup>5 10 12 14 15</sup>

The surgical treatment series published before the ultrasound and CT era, report a mortality rate as high as 88%.<sup>7 12 13</sup> Recently, with the improvement of pre-, intra- and postoperative care and the use of new antibiotics, SD has become highly effective, presenting low morbidity and mortality rates in the management of patients with PLA.<sup>7 9</sup> The blood loss due to the manipulation of hepatic parenchyma and sometimes difficulty in localizing intraparenchymatous abscesses are the drawbacks of surgical treatment. Intraoperative ultrasound scan can be used in order to localize the abscess and as a guide for an adequate and precise drainage, avoiding damage to the liver parenchyma and consequent bleeding.

Several authors have reported good results with percutaneous management monitored by ultrasound or CT for the treatment of PLA,<sup>3 4 7 16</sup> this procedure now being considered the initial step for the drainage of liver abscesses. This method avoids general anesthesia, providing shorter hospitalization and better patient acceptance.<sup>17</sup> However, a review of the literature shows failure rates from 5 to 28%.<sup>3-8</sup> PD is also associated with a higher failure rate when compared to surgical treatment (36% versus 9.5%), as reported by Farges *et al.*<sup>9</sup> In our own experience, the percutaneous approach failed in 4 out of 13 patients (30.8%) and surgical drainage was ineffective in only 3 out of 35 (8.5%).<sup>18</sup> Percutaneous management failures are related to thick-walled abscess, viscid pus, presence of loculations and is not to be indicated in the presence of ascitis or when the abscess is located near the pleura.<sup>11</sup> There are a few groups that adopt PD in cases where multiple abscesses are present but we consider it not to be indicated in this situation.

These controversies persist because there are no controlled studies comparing percutaneous with surgical drainage procedures. Branum and colleagues pointed out that the treatment should be individualized according to the presentation of the disease.<sup>19</sup> According to Bissada and Bateman, PD should be used as a complementary form of therapy and should not completely replace surgery.<sup>6</sup> This report re-emphasizes the necessity of a protocol for the treatment of PLA, individualizing the treatment.

The ideal form of treatment is controversial, and in spite of great enthusiasm for percutaneous management, surgical treatment has an important role to play in the management of the disease as pointed out by others.<sup>10 12 20</sup> SD should be indicated from our point of view, not only in cases with associated intra-abdominal surgical disease or in the failure of percutaneous drainage but specially, in septic patients.

As a hepato-biliary unit like many other specialized centers, we receive a great number of patients from other institutions in septic conditions due to delayed diagnosis. Most of these patients have been already investigated and treated unsuccessfully. The frequency of septic patients in

the present report is 25% (12/48). As reported by Chow, sepsis and multiple organ failure were significant factors predicting mortality.<sup>21</sup> Percutaneous drainage can be used as the first step in the treatment of PLA in septic patients and in case of no improvement in 12 to 24 hours, surgery is then indicated. As PD may be ineffective in a certain number of cases, even a delay of 12-24 hours could be harmful. For this reason we prefer surgical treatment for patients with severe infection to avoid the risk of failure frequent in the percutaneously treated group, that in our own experience, was ineffective in 30.8% of the patients. When dealing with critically ill patients, a delay in adequate drainage may be life threatening.

According to Hansen, in a high risk patient aggressive therapy should be instituted as soon as possible.<sup>22</sup> Recently, Chow *et al.* pointed out that in patients with gas-forming liver abscess, a disease with high incidence of septic shock, early adequate drainage is mandatory and surgical treatment should not be delayed.<sup>23</sup>

We believe that an individualization of the therapy based on patients' clinical conditions and the characteristics of the abscess are necessary. In this study, the therapy was tailored for each patient as detailed in our protocol.

In the present study the surgical treatment of 35 patients with PLA was accompanied by 91.5% survival, which can be considered a good result, specially when so many critically ill patients are concerned.

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