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Pyogenic Liver Abscess

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Pyogenic liver abscess has been recognized since ancient times and it continues to be associated with substantial morbidity and mortality. This paper is a summary of the clinical manifestations of pyogenic hepatic abscess.

The diagnosis and treatment of pyogenic liver abscesses have been evolving since the time of the ancient Greek physicians. Hippocrates speculated that the prognosis of abscesses of the liver could be altered by the character of the drainage [1]. Despite ancient recognition of hepatic abscesses, the clinicopathologic entity was not described until 1836 by John Bright [2]. Waller contributed to the understanding of the etiology of pyogenic liver abscesses in 1846 with his description of pyelophlebitis complicating appendicitis [3]. In 1938, Ochsner's classic review of 575 cases collected from the literature noted a 34.2% prevalence of appendicitis as the etiologic agent [4]. Since then, reports have appeared detailing evolving trends in etiology, diagnosis, management, and mortality. It is clear that hepatic abscess is no longer predominantly a parasitic disease, nor is it likely to occur in young people as a sequela of perforated appendicitis [5, 6]. No longer straight forward in its presentation, pyogenic liver abscess may present as an indolent illness of obscure etiology [7] or as a rapidly fatal complication of complex medical or surgical illness [8]. Biliary tract disease has supplanted appendicitis as the most common precursor of liver abscess [9]. In spite of earlier recognition and improvements in diagnosis and management, mortality rates remain high, ranging from 40% to 80% in recent series [5, 10–13]. Multiple hepatic abscesses and neoplastic diseases are largely responsible for persistently unimproved survival [5, 12–15]. In contrast, encouraging survival can be obtained by early diagnosis and appropriate management of solitary pyogenic abscesses [5, 13, 16–18].

This review summarizes information from reports of pyogenic hepatic abscesses since 1954 [5, 6, 8–10, 12–15, 17–29]. The collected series comprises 1085 patients. Variability in selection and reporting by individual authors tends to detract from the precision and homogeneity of such collected data. Nonetheless, trends in etiology, management, and mortality are apparent. The introduction of newer diagnostic techniques has permitted earlier diagnosis and increased survival. Prognostic features have also emerged, which may alter the approach to individual patients. Changes in the bacteriologic spectrum of infections have also become apparent, particularly with the recognition of the importance of anaerobic infections and improvement in culturing techniques [30]. It is hoped that information gleaned from the previous 25 years' experience can be applied to improve patient management and survival.

Prevalence

The prevalence of pyogenic hepatic abscesses has been estimated from both autopsy and hospital admission data. Autopsy reports published since 1900 indicate little change in the frequency of liver ab-

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Table 1. Etiology of pyogenic hepatic abscesses in 885 patients.

	Number	Percent
Biliary	293	33
Portal	198	22
Cryptogenic	184	21
Hematogenous	113	13
Contiguous spread	40	5
Trauma	28	3
Metastases	29	3
	885	100

scesses. Kobler [31] found a prevalence of 0.45% among 17,204 autopsies in 1901. From nearly 22,000 examinations performed at the Boston City Hospital between 1934 and 1958, Sherman and Robbins [9] found 130 cases, a prevalence of 0.59%. Ochsner et al. [4] reported that 0.008% of patients entering Charity Hospital between 1928 and 1937 had pyogenic abscesses of the liver. Rubin et al. [15] in 1974 noted an admission prevalence of 0.016% at the Massachusetts General Hospital. This figure is closely paralleled by the 0.013% frequency reported from The Johns Hopkins Hospital in 1975 [12]. Thus, it appears that the antibiotic era has not altered the prevalence of pyogenic liver abscesses. With improvement in diagnosis, however, the disease will likely become more common, reflecting the advanced chronicity and complexity of current diseases as well as more accurate diagnosis.

Ochsner et al. [4] reported a shift in age prevalence from the third to the fourth decade in life concurrent with a declining association of hepatic abscesses with complicated appendicitis. This trend has continued through the last 25 years. Many series report an average age in the sixth and seventh decades [8, 9, 12, 17, 20, 27, 28]. This increased prevalence can be attributed in part to the enlarging population in this age group. Neoplasia also makes an important contribution to this advancing age trend [5, 14, 15, 32]. Neoplastic diseases were not an etiologic factor in the series of Ochsner et al., nor was the association noted in his extensive review. Appendicitis has nearly disappeared as an underlying cause of liver abscess [6, 9].

Reports prior to 1938 indicate a prominent male predominance among patients with pyogenic liver abscesses [4, 33, 34]. The reason for this is unclear, but current series indicate that these sexual differences have largely disappeared [5, 8, 9, 11, 12, 15]. Only a slight male preponderance now persists. This equaling of the sex ratio has been attributed to the increased frequency of biliary tract disease among women. Complicated biliary tract disease, however, exhibits little sex preference.

Etiology

Infections involving organs within the portal venous drainage remain a prominent cause of pyogenic liver abscesses, as they did at the time of the report of Ochsner et al. [4]. Of 885 patients (Table 1), 198 (22%) hepatic infections were attributed to sepsis within the portal system. Appendicitis, however, is rarely cited as the primary intra-abdominal infection. Biliary tract disease, principally obstruction, is consistently observed as the most frequent cause of liver abscess [5, 6, 9, 12, 13, 26, 35]. In this collected series, 293 (33%) patients presented with primary biliary tract disease. Neoplastic extrahepatic biliary obstruction ranged from 33% to 55%. Hematogenous spread of recognized extra-abdominal infections via the hepatic artery occurred in 113 patients (13%). Contiguous liver infection, trauma, and infected liver metastases each accounted for less than 5% of liver abscesses. In 184 patients (20%), the etiology of pyogenic hepatic abscesses remained unclear. This figure is as high as 55% in Bourne's series [19], closely approximating the 60% prevalence of cryptogenic infections in the series of Ochsner et al. [4]. Ranson et al. [26] noted that 25% of patients with cryptogenic abscesses in their series also had diabetes mellitus.

Cultures taken from healthy human liver are sterile, although bacteria can reach the liver via the portal vein [36–38]. Beeson et al. [35] demonstrated the great efficacy with which the hepatic reticuloendothelial system clears bacteria. Factors producing diminished resistance to bacterial contamination probably play a major role in the etiology of most hepatic abscesses [26]. Diminished host resistance occurs in the presence of an obstructed biliary tree, carcinoma, sepsis, diabetes mellitus, shock, trauma, burns, and immunosuppressive therapy. Factors pertaining to the etiology of cryptogenic abscesses remain purely speculative, however.

Localization of hepatic abscesses to the right lobe of the liver is attributed to the streaming effect of mesenteric blood flow within the portal vein. This effect, that superior mesenteric venous effluent preferentially flows to the right lobe of the liver, was first postulated by Sérégé [39] and later substantiated by Kinney and Ferrebee [40]. In contradistinction to portal infections, abscesses due to biliary obstruction are frequently multiple, involving both lobes of the liver in up to 90% of cases [12, 13].

Biliary tract obstruction accounted for one-third of the cases in this collected review. Cholecystitis was the cause of 14% of the collected series of Ochsner et al. [4]. Biliary obstruction per se was not implicated. In addition to improved diagnosis of biliary disease, this increase likely represents the advanc-

Table 2. Presenting signs and symptoms of 490 patients with pyogenic hepatic abscesses.

	Number	Percent
Symptoms		
Fever	398	81
Pain	252	51
Rigors	174	36
Nausea and vomiting	164	33
Weight loss	155	31
Anorexia	132	27
Malaise	96	20
Signs		
Hepatomegaly	246	50
Tenderness	246	50
Jaundice	131	27
Abnormal chest x-ray	87	18

Table 3. Laboratory and radiographic findings in 445 patients with pyogenic hepatic abscesses.

	Number	Percent
Leukocytosis (WBC $> 10^4/mm^3$)	316/445	71
Anemia (Hgb < 12 g/dl)	165/349	47
Elevated serum bilirubin (> 2 mg/dl)	117/299	39
Hypoalbuminemia (< 2 g/dl)	130/238	55
Elevated serum alkaline phosphatase	139/300	46
Abnormal chest x-ray	181/344	53
Abnormal liver-spleen scintiscan	85/106	80

ing age of the population at risk in whom complicated biliary tract disease is more common. This also accounts for the persistently high mortality rate for pyogenic hepatic abscesses in spite of earlier diagnosis, drainage, and antibiotic therapy. Biliary tract abscesses are often diffuse, multiple, and respond poorly to attempted drainage. Surgery must be directed at the obstructing lesion with antibiotic control of the liver sepsis for therapy to be effective [41].

Infections that reach the hepatic parenchyma via the hepatic artery are frequently associated with generalized sepsis in an extremely compromised host. The clinical presentation is often overshadowed by the primary disease, and the diagnosis of pyogenic hepatic abscess may be made at autopsy in this group of patients.

Trauma was infrequently recorded as the pathogenesis of liver abscesses in this collected review, although it has been emphasized by several authors [14, 25, 26]. Infection may occur either by direct contamination or, more commonly, by colonization of devitalized hepatic parenchyma.

Clinical and Laboratory Features

Presenting signs and symptoms were described in slightly less than half the patients (Table 2). Clinical manifestations are commonly nonspecific or referable to the primary disease such as intra-abdominal malignancy or ascending cholangitis. Fever was the most frequently reported symptom in 398 of 490 (81%) patients. Associated symptoms were right upper quadrant and/or pleuritic pain (51%), rigors (36%), nausea and vomiting (33%), weight loss (31%), anorexia (27%), and malaise (20%). Less frequently reported symptoms included diarrhea, distention, pruritus, dyspnea, and intractable hiccoughs. The classic symptom of right shoulder pain was rarely reported [22].

Similarly, physical findings are nonspecific in patients presenting with pyogenic hepatic abscesses. Hepatomegaly was present in 50% of patients along with right upper quadrant and hepatic punch tenderness. Jaundice was noted in only 27% of patients, but when present was associated with an especially poor prognosis [5, 28]. Findings of diminished breath sounds, rales, and dullness to percussion at the base of the right lung were noted in 18% of the 490 patients. Findings less commonly observed were splenomegaly, mental status changes, ascites, and abdominal mass or distention.

Results of laboratory investigations were recorded for only 445 (Table 3) of the 1085 patients. Leukocytosis ($> 10^4$ WBC/mm^3) was most commonly observed (71% of the patients). Forty-seven percent of patients presented with anemia (Hgb < 12 g/dl). Elevation of the serum bilirubin was present in 117 of 299 patients (39%). Hypoalbuminemia, present in 54% of those measured, was considered to be an indicator of extremely poor prognosis when levels were less than 2 g/dl [5, 20]. Hirschowitz and others have stressed the importance of serum alkaline phosphatase elevation as an indicator of a hepatic space-occupying lesion [42, 43]. This finding was present in 46% of patients and had an incidence as high as 90% in the series of Rubin et al. [15] in which most patients were screened for elevations. Elevations of bromsulphalein retention and erythrocyte sedimentation rate were found in over 50% of cases when measured [5, 8]. Sparse data are available detailing the frequency of serum transaminase and lactic dehydrogenase elevations.

Abnormalities of the plain chest x-ray were present in 181 of 344 patients (53%), and included elevation of the right hemidiaphragm, right pleural effusion, right lower lobe atelectasis or infiltrate, and subphrenic air fluid levels [44]. The liver-spleen radionuclide scan was infrequently employed. Diagnostic accuracy was high, however, with a positive

scan in 85 of 106 patients evaluated (80%). Newer techniques, such as abdominal ultrasonography, selective celiac angiography, and computerized axial tomography, were not used sufficiently often to yield meaningful data.

Clearly, there is no classical pattern of presentation of pyogenic hepatic abscess [17]. It may present as a chronic, indolent illness or as a fulminating septic event with clear-cut liver disease. In one series, the triad of shaking chills, drenching sweats, and a septic course was seen in 100% of 61 patients [13]. Others have noted that up to one-third of patients present with symptoms that have been present for 1 to 12 months [12]. In particular, patients with a solitary macroscopic abscess tend to follow a chronic course [15] with nonspecific symptoms of fever, malaise, and weight loss with associated anemia. When the hepatic infection is overshadowed by the manifestations of the primary etiologic process, the diagnosis must be based on a high index of suspicion.

Fever is consistently the most frequently reported symptom of liver abscess and is present in 81% of patients. However, symptoms referable to right upper quadrant pathology such as right upper quadrant pain and tenderness with hepatomegaly are seen in only approximately 50% of patients. Leukocytosis, although commonly noted, is a nonspecific indicator of acute inflammation. Elevations of the serum alkaline phosphatase, particularly elevations in the absence of other derangements of hepatic function, may be helpful in indicating an inflammatory space-occupying lesion of the liver [42]. The chest x-ray is abnormal in slightly over 50% of patients and may strengthen the suggestion of right subdiaphragmatic inflammation.

The most significant advance in the diagnosis of pyogenic liver abscesses has been the introduction of radionuclide scanning techniques. Accuracy for amebic abscesses has been reported to be as high as 98% [45, 46]. Pyogenic lesions greater than 2 cm in size are similarly detected, with an accuracy in the range of 80% to 95% [5, 10, 12, 23, 47]. An increase in the rate of antemortem diagnosis from 19% to 78% has been reported with the increasing utilization of hepatic scintiscans. Similarly, reduction in mortality rate from 83% to 23% has been attributed to the earlier diagnosis afforded by scanning techniques [16].

Colloidal gold and ^{99}technetium sulfur colloid, agents that are trapped within the Kupffer's cells of the reticuloendothelial system, have been most commonly employed for liver scanning [47]. More recently, ^{67}gallium citrate has been utilized for the diagnosis of abdominal abscesses because of its avidity for inflammatory lesions [48]. ^{67}Ga has also been used in differentiating cirrhotic defects noted on colloidal scans from neoplastic or infectious liver masses [49]. Although inflammatory lesions may be noted as early as 2 hours after administration of the radionuclide, ^{67}Ga scans generally have the disadvantage of requiring 48 to 72 hours to complete, a delay that may be critical in septic patients. ^{111}Indium has advantages over ^{67}Ga in that it does not accumulate in the large intestine. It has recently been used to diagnose intra-abdominal abscesses [50].

Recently, computed tomography (CT) has been added to refine the diagnosis of intra-abdominal abscesses [51, 52]. Although computed tomography can readily identify hepatic lesions, it cannot always show definitively that the lesion is an abscess. However, concomitant use of grey-scale ultrasonography or ^{67}Ga scanning may further refine the diagnostic accuracy of CT scanning in a suspicious clinical setting. The presence of extraluminal gas is highly specific for abscesses and was noted in 38% of patients in a recent series [53]. CT scanning has also permitted accurate localization and guidance for percutaneous drainage of amebic and selected pyogenic hepatic abscesses [54, 55]. Experience with hepatic angiography is limited in the diagnosis of hepatic abscesses. Characteristic avascular lesions with hyperemic rims are usually seen. Angiography may also be useful in differentiating pyogenic abscesses from hepatoma that may present with an indistinguishable clinical picture.

Table 4. Microbiology in 604 patients with pyogenic hepatic abscesses.

	Number	Percent
Escherichia coli	221/604	37
Staphylococcus aureus	141/604	23
Proteus	80/604	13
Klebsiella-Enterobacter	74/604	12
Enterococcus	62/604	10
No growth	45/604	7
Streptococcus viridans	44/604	7
Anaerobes (*Bacteroides* species, *Peptostreptococcus, Clostridium* species)	36/604	6
Pseudomonas	35/604	13
Others (*Serratia, Providencia, Salmonella,* Beta-hemolytic *Streptococcus, Actinomyces, Nocardia,* Unclassified *Streptococcus*)		

Microbiology

Microbiologic reports are consistently hampered by the incompleteness of collections and inadequate

Table 5. Type and location of pyogenic hepatic abscesses in 586 patients.

			Mortality rate	
	Number	Percent	Number	Percent
Single	299/586	51	28/117	24
Multiple	287/586	49	106/140	76
Right Lobe	89/137	65		
Left Lobe	16/137	12		
Both Lobes	32/137	23		

anaerobic culturing techniques (Table 4). Data were available on 604 of the patients reviewed. Enteric organisms were most frequently cultured with *Escherichia coli* present in 37% of cases of pyogenic hepatic abscesses. *Proteus* and *Klebsiella-Enterobacter* species accounted for 13% and 12% of organisms cultured, respectively. Staphylococcal abscesses were encountered in 23% of patients. The latter are characterized by hematogenous spread to the liver [15]. De la Maza et al. [6] reported that *Staphylococcus* and *E. coli* were the most commonly encountered organisms in pure culture. Two-thirds of cultures in their series were mixed, 73% of these due to gram-negative bacteria. This experience was corroborated by the autopsy series of Sherman and Robinson. Mixed enteric infections are also characterized by the high prevalence of anaerobes and enteric gram-positive cocci [15]. So-called sterile abscesses were encountered in 7% of patients, likely reflecting deficient anaerobic culturing. Pitt and Zuidema [12] noted a statistically significant increase in prevalence of anaerobic infections from 16% in the first half of their study to 36% in the second half. Anaerobic bacteria were cultured in only 6% of the collected cases. The true prevalence of these infections, however, is unknown [15]. Several authors [5, 12] stressed the importance of anaerobes occurring in pure culture in solitary liver abscesses.

E. coli has persistently predominated as the most frequent pathogen in pyogenic liver abscesses. Virtually all pathogenic organisms have been found, however. The role of anaerobes has gained increasing attention and may rival aerobic enteric organisms in overall frequency as the prevalence of "sterile" abscesses declines. In the most complete review of the subject, Sabbaj et al. [30] noted a prevalence of 45% of anaerobic infections in all liver abscesses seen over an 11-year period. As noted by others [12], anaerobic abscesses were frequently solitary with the well-known predilection for the right lobe. Anaerobes only were present in pure culture in 76% of the patients of Sabbaj et al., as previously observed [5]. In 56% of patients in that series, no potential source of infection could be found. Although the reported frequency of cryptogenic abscesses has varied widely, their association with "sterile" abscesses and anaerobic infection has been noted [56]. Thus, a prominent clinical subgroup of anaerobic abscesses appears to have emerged which are frequently solitary with a single infecting organism and no discernible underlying etiology. As might be predicted, the prognosis in this group of patients is favorable. Sabbaj et al. reported no deaths in 14 patients diagnosed antemortem.

Anaerobes have also been implicated in pyogenic abscesses due to infection of hepatic metastatic lesions [32]. It has been suggested that the reduced oxidation-reduction potential of liver metastases may provide a suitable milieu for the proliferation of anaerobes. It follows that insignificant portal bacteremia may play a major role in the etiology of cryptogenic abscesses when local parenchymal lesions interfere with usually effective host defense mechanisms.

Treatment and Prognosis

Multiplicity of pyogenic hepatic abscesses is perhaps the single most important factor determining prognosis. Data on 586 patients were reported. Of these 299 (51%) were single and 287 were multiple. As noted by Ochsner et al. [4], the right lobe of the liver was involved in the majority of cases. In this collected review, 65% of abscesses were confined to the right lobe while the left lobe or both lobes were involved in 12% to 23% of the cases, respectively (Table 5).

The prognosis for patients with liver abscesses also depends on several other factors, including the presence of underlying malignancy, etiologic classification, and method of treatment. Overall, 269 of 470 patients died, a mortality rate of 57%. Mortality rate for patients with solitary pyogenic abscesses was 24% (28/117), compared to 76% (106/140) for patients with multiple abscesses. Operative mortality rate was 33% (79/240); however, cumulative series report a mortality rate of 93% (53/58) in patients who were not treated by operation. This figure, of course, is influenced by inclusion of patients moribund or too ill at the time of admission to undergo surgery.

Mortality rate for undrained hepatic abscesses consistently approaches 100% [5, 9, 16, 18, 22, 25, 28]. Several series have reported successful management of solitary lesions by antibiotics alone or in combination with percutaneous drainage [57, 58]. Exploratory percutaneous needle aspiration of hepatic abscesses is to be condemned [23]. A recent report recommended antibiotic therapy for very

poor risk patients and those who respond briskly with clinical improvement after initiation of therapy. Six patients treated in this fashion resolved their liver abscesses.

Choice of antibiotic regimens should be based on a clinical awareness of the spectrum of organisms common to pyogenic hepatic abscesses. Since approximately two-thirds of infections are due to gram-negative enteric bacteria [6, 9], broad spectrum coverage is indicated. This figure is probably higher in infections of known biliary or portal etiology. An appropriate aminoglycoside antibiotic such as amikacin, gentamicin, kanamycin, or tobramycin should be considered in the setting of an unknown or gastrointestinal source of infection. With the emergence of anaerobic pathogenicity and the increasing identification of anaerobic abscesses, appropriate antibiotic coverage should be added such as clindamycin [15]. Alternatively, broad spectrum coverage of both gram-negative enteric organisms and anaerobic bacteria can be achieved with either chloramphenicol or 1 of the newer cephalosporin derivatives, cefoxitin [58]. Both drugs achieve high concentrations in the biliary system.

In all cases a diligent search should be made for a source of potential hematogenous liver infection with antibiotic management directed by appropriate gram stains and previously obtained culture results. Use of the reopened umbilical vein has been suggested to deliver increased concentrations of antibiotic to the liver [59]. Experience is limited with this technique, and its routine use is not justified.

The operative approach to pyogenic hepatic abscesses should be directed by preoperative localization of the lesion with ultrasonography, radionuclide scans, angiography, or, more recently, computerized axial tomography. Posterior lesions in the right lobe of the liver are best approached via rib resection and posterior incision and drainage. Transpleural drainage is advocated for high lying posterior abscesses. Although Ochsner et al. [4] strongly advocated extraperitoneal approaches to drainage of liver abscesses, including the anterolateral approach of Clairmont and Meyer [60] for more anteriorly situated lesions, most authors would now agree that transperitoneal drainage offers several advantages with minimal if any increase in morbidity and mortality rates [10, 12, 14, 16, 18, 21, 27, 41, 45]. Formal laparotomy provides excellent exposure for most suitable drainage. Multiple abscesses can be located and drained, and exploration can be performed in an attempt to determine the primary source of infection. Finally, operative cholangiography with common bile duct exploration and decompression can be performed in cases of acute obstructive suppurative cholangitis [12]. Hepatic lobectomy has been performed in selected cases, particularly with abscesses localized to the left lateral hepatic segment [8, 15]. Careful isolation of the remainder of the peritoneal cavity and appropriate preoperative selection of antibiotics should minimize further contamination. Open sump drainage is preferable for large cavities. Multiple abscesses should be drained or made to communicate as a large draining cavity. Postoperative fistulagrams should be obtained to assess the resolution of the abscesses prior to discontinuation of drainage. Best estimates of proper duration of antibiotic therapy in resolving cases are purely speculative; however, a period of 4–6 weeks has been recommended [12]. In all cases, treatment of the infecting source is mandatory to resolve the septic process. In the case of cryptogenic abscesses, which are frequently solitary [10], the predisposing infection often is either insignificant or has resolved. Fortunately, recurrence of cryptogenic pyogenic abscess is infrequent.

Mortality rate remains high for multiple hepatic abscesses, 61% to 100% in several reported series [5, 11–13, 18, 28]. Not only is the antemortem diagnosis more difficult, but surgical therapy is often ineffectual. These patients tend to be more acutely ill, having multiple small or microscopic lesions. Antemortem diagnosis was made in only 9% of cases in 1 series [27]. The prevalence of multiple abscesses associated with biliary tract obstruction is high [5, 12, 13, 27], 98% in 1 report [13]. Therapy in these cases must be directed at biliary decompression after resuscitation and antibiotic administration. Mortality rate will remain high, however, in part influenced by the frequent occurrence of malignant biliary obstruction [12]. The role of prevention by early intervention in cases of obstructive biliary tract disease has been stressed [15].

Mortality rate is also influenced by the age of the patient. One series reports a mortality rate of 79% in patients over 50 years of age as opposed to 53% in those under 50 years [15]. In another report using 70 years as a discriminating age, mortality rates were 81% and 57%, respectively [12]. Generalized debility and marked impairment of hepatic excretory functions, as manifested by hypoalbuminemia and hyperbilirubinemia, are also correlated with poor survival [5, 12, 20]. Patients with complicated abscesses, such as those with subphrenic abscesses, rupture into the peritoneal cavity, hemobilia, or lung abscesses, had an increased mortality rate [15]. Of patients who had multiple organisms cultured from the blood, 100% died in 1 series.

In contrast, the prognosis may be excellent for patients with solitary indolent abscess uncomplicated by underlying malignancy. Mortality rates of 10% to 20% can be achieved in this group of patients [12, 18, 45], an improvement over the 41.7% mortality rate reported by Rothenberg and Linder [61] in 1934 for solitary, benign pyogenic hepatic abscess. Further improvements can be made with earlier diagnosis utilizing newer radiographic tech-

niques and prompt surgical drainage. Primary medical therapy should be reserved for patients who are inordinately poor operative risks due to other organ system illness and those who present with an indolent illness or multiple abscesses and respond briskly to antibiotic administration. Percutaneous drainage is to be used with caution. Critically ill septic patients are often too sick not to be operated upon except in cases of diffuse, multiple abscesses of nonbiliary or metastatic malignant etiologies.

Résumé

Les abcès pyogènes du foie sont connus depuis l'antiquité. La morbidité et la mortalité sont lourdes. L'article résume les manifestations cliniques de ces abcès.

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Invited Commentary

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In reviewing the literature on pyogenic hepatic abscess over the past 25 years, McDonald and Howard document changes that have taken place in etiology, bacteriology, diagnosis, and management. Pyogenic hepatic abscess is now very rarely the consequence of pylephlebitis following appendicitis, but is seen most frequently following benign or malignant biliary obstruction. Despite modern diagnostic techniques and a trend toward exploratory laparotomy as opposed to extraperitoneal drainage, the etiology remains obscure in 20% of pyogenic hepatic abscesses. As the authors have acknowledged, the relative incidence of these etiological categories is quite dependent upon the criteria for inclusion employed by various authors. Some authors have excluded patients in whom multiple hepatic and splenic abscesses were the end result of massive sepsis usually secondary to bacterial endocarditis, whereas other authors have included these patients in their analyses. The relative incidence of hepatic abscess secondary to liver trauma is another factor that will vary significantly from 1 institution to another.

The relative importance of anaerobic organisms in pyogenic hepatic abscess may be somewhat diluted by an analysis covering the 25-year period beginning in 1954. The importance of these organisms in intra-abdominal and liver infections, the widespread availability of proper culturing techniques, and the importance of specimen handling have only been fully appreciated during the second half of this 25-year period. Furthermore, anaerobes, and in particular *Bacteroides fragilis*, are being isolated with increasing frequency from the bile of patients with biliary tract disease [1]. The anaerobes which