ORIGINAL ARTICLE

PYOGENIC LIVER ABSCESS: DEMOGRAPHIC, CLINICAL, RADIOLOGICAL AND BACTERIOLOGICAL CHARACTERISTICS AND MANAGEMENT STRATEGIES

Qurban Ali Bugti,[*] Mohammad Aslam Baloch,[**] Ahsan-ul-Wadood,[***] Akther Hameed Mulghani,[***] Bushra Azeem[*] and Jamil Ahmed[****]

[*]Department of Radiology, [**]Department of Surgery, [***]Department of Pathology and [****]Pakistan Medical Research Council, Bolan Medical College, Quetta

ABSTRACT

Objective: To determine the demographic, clinical, radiological and bacteriological characteristics of pyogenic liver abscess and its management strategies.

Material & Methods: A total of 84 consecutive patients with pyogenic liver abscess were managed at Department of Surgery, Unit III, Bolan Medical Complex Hospital, Quetta, between February 2002 to May 2005. The investigations conducted were abdominal ultrasound, chest x-ray, complete blood picture, liver function tests and heamagglutination tests. Depending upon the size of the abscess the patients were managed by parenteral antibiotics and percutaneous needle aspiration, catheter drainage or open surgery.

Results: Pyogenic liver abscesses were common in males (Male to female ratio 3:1) and predominantly involved the right lobe of liver; more than 95% of liver abscesses were noted in the right lobe. Fourteen percent abscesses were multiple, while remaining ones were solitary. They were noted to be more common in old age patients. The blood culture and abscess aspirates revealed Klebsiella pneumoniae as the most common etiological agent. Eighty-five percent of the cases were diagnosed correctly on abdominal ultrasound. Percutaneous needle aspiration combined with parenteral antibiotics was the most successful therapy with cure rate of 90%. Overall hospital mortality rate was 6%.

Conclusion: Pyogenic liver abscess is more common in elderly males. It needs rapid diagnosis by high index of suspicion and abdominal ultrasound. Administration of appropriate parenteral antibiotics and ultrasound guided aspiration improves the prognosis.

Key words: Liver abscess, Pyogenic, Ultrasound guided, Needle aspiration.

INTRODUCTION

Pyogenic liver abscess (PLA) is a condition with significant mortality. The most common presenting clinical symptoms are upper abdominal pain, tenderness, hepatomegaly, high-grade fever, nausea and vomiting. Loss of appetite, jaundice and respiratory symptoms are less frequent clinical features. These clinical features are variable depending upon; the size of the abscess, general health of the patient, associated diseases and complications. In majority of the cases, the underlying cause could not be identified. Biliary tract disease is reported to be the most frequent cause.[1] It may be due to bacterial or parasitic invasion of liver.[2] Majority of abscesses are solitary & sub-diaphragmatic and are noted in the right lobe of liver. (Fig-1) Early studies by Oschner et al recommended open surgical drainage as the treatment of choice.[3] For the last two decades, advances in the imaging field coupled with ultrasound guided percutaneous needle aspiration and drainage brought dramatic changes in the pattern of treatment of pyogenic liver abscess.

The aim of our study was to determine the demographic, clinical, radiological and bacteriological characteristics of the condition and to review its management strategies.

MATERIAL AND METHODS

A total of 84 patients with pyogenic liver abscess were managed in the Department of Surgery unit III Bolan Medical Complex Hospital Quetta from February 2002 to May 2005. Medical record of all the patients was maintained. The cases were collected from Emergency unit and surgical outdoor department of the hospital. All the patients were sent to the Radiology Department for confirmation of diagnosis on ultrasound. Chest x-ray was also performed. Ultrasound guided percutaneous needle aspiration and drainage was performed in the Radiology Department. Other investigations included

complete blood picture, liver function tests and heamagglutination tests. Abscesses smaller than 5cm size were managed by parenteral antibiotic therapy while those above 5cm size were planned to be managed by ultrasound guided percutaneous aspiration/drainage. Very large >10cm and multi-loculated abscesses with exaggerated necrotic process were managed by open surgery. (Fig-2,3)

RESULTS

In our study 62 patients out of 84 (74%) were males and 22 patients (26%) were females, male to female ratio was 3: 1. The patients age was ranging from 15 to 85 years, mean age was 55 years.

Table 1: Age distribution of patients with pyogenic liver abscess.

Age in Years	Number of patients	Percentage
15–25	07	08%
26–35	10	12%
36–45	08	09%
46–55	15	18%
56–65	11	12%
66–75	18	21%
76–85	15	18%

n=84

Majority of patients 60 (71%) with pyogenic liver abscess presented with upper abdominal pain, high grade fever was noted in 52 (62%) patients, hepatomegaly plus tenderness in 17 (20%) patients, jaundice in 12 (14%) while loss of appetite in 12 (14%) patients. Nausea and vomiting was complaint of 5 (6%) patients.

Seventy-two patients (85%) were diagnosed accurately on ultrasound with all imaging details and characteristics of lesion, which plays a central role for quick diagnosis and proved to be a first line imaging modality in radiological management of the lesion. Intravenous antibiotic therapy (cephalosporin combination with metronidazole and aminoglyosride) started to all patients. 40 patients (48%) were improved completely by this regime. These patients were having a single abscess less then 5cm size. 18 patients (21%), having single abscess larger than 5cm (5-8cm), were managed with antibiotic regime and percutaneous needle aspiration (Fig 4,5). While remaining 26 patients having very large abscesses (>10cm size) were planned to be managed by antibiotic regime and catheter drainage. 16 patients (61%) got improved by this mode

Table 2: Clinical features of pyogenic liver abscess.

Presenting Features	Number of patients	Percentage
Upper abdominal pain	60	71%
High grade fever> 100° F	52	62%
Hepatomegaly and tenderness in RHC	17	20%
Jaundice	12	14%
Loss of appetite	12	14%
Respiratory Symptoms	10	12%
Nausea and Vomiting	05	06%
Ascities	02	02%

n=84

of management while 6 patients (15%) were planned for open surgery. 4 patients (4.7%) died, one due to septicemia, two patients due to diabetes mellitus and one due to major organ failure. Blood culture of 84 patients confirmed the presence of klebsiella pneumonia in 28 patients (33%) while the microbiological report of abscess aspirates of 44 patients(selected for aspiration/ drainage) confirm klebsiella pneumonia in 25 patients (60%). Other laboratory findings confirmed as Hb <12g /dl in 28 patients (33%), WBC count > 11000/dl in 60 patients (71%), Bilirubin > 34iu/l 21 patients (25%), Alkaline phosphatase > 150iu/l 46 patients (55 %), ALT> 33iu/l in

Table 3: Main laboratory findings in pyogenic liver abscess.

Lab Findings	Number of patients	Percentage
Hemoglobin<12g /dl	28	33%
WBC count>11000 /dl	60	71%
Prolonged PT	05	06%
Bilirubin > 34 IU/L	21	25%
Alkaline Phosphatase >150 IU/L	46	55%
ALT>33 IU/L	30	36%
Urea<7.7m mol/l	08	10%
Creatinine>140µmol/l	06	07%

n=84

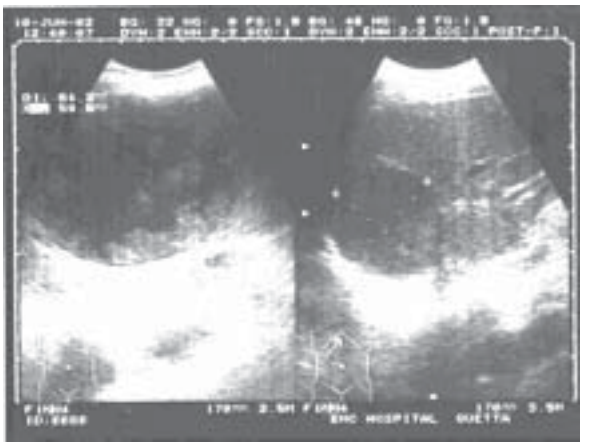

Fig. 1: A large sub-phrenic abscess in the right lobe of Liver. Typical strong echoes of sequestrum and thick debris can be seen within the lesion. It could not be fully aspirated due to thick debris.

Fig. 2: Multiple liver abscesses with significant colliquative necrotic changes.

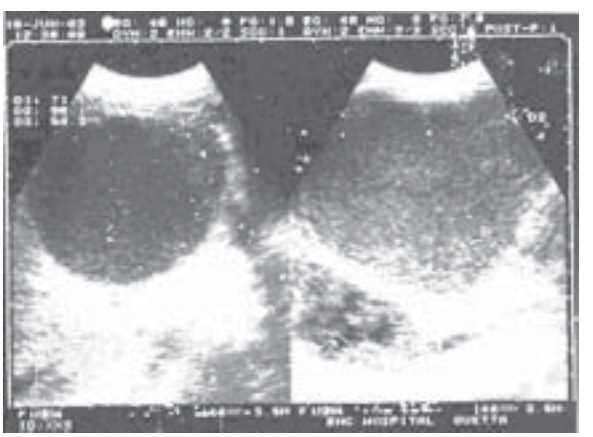

Fig. 3: Huge abscess in the right lobe of liver.

Fig. 4: Right lobe abscess after aspiration, highly reduced in size.

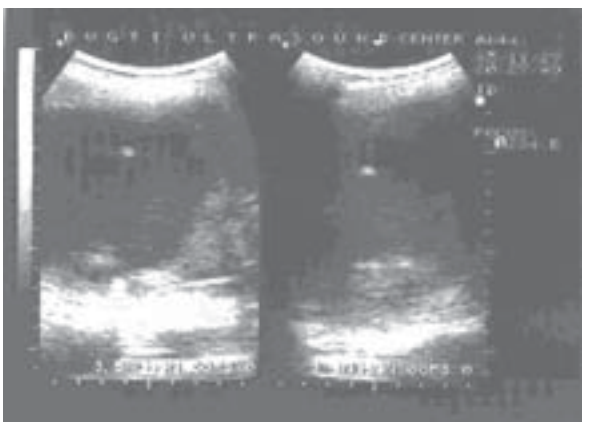

Fig. 5: Percutaneous needle aspiration of a large abscess in the right lobe of liver. Echoes from the tip of the aspiration needle can be noted within the lesion.

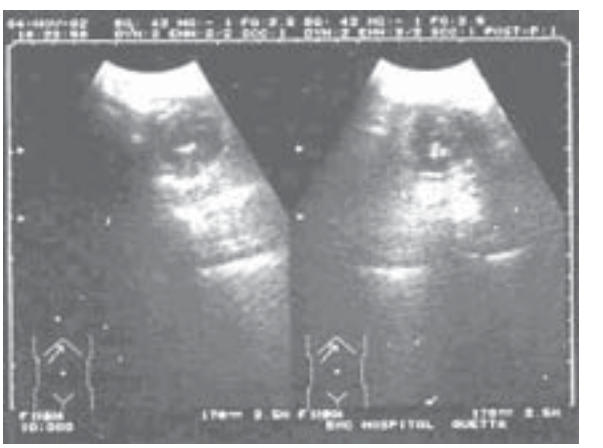

Fig. 6: Shows the regression of size of abscess after aspiration.

30 patients (36%), Urea< 7.7m mol/l 8 patients (10%), Creatinine >140µ mol/l in 6 patients (7%).

DISCUSSION

In our study the most significant clinical feature of pyogenic liver abscess was upper abdominal pain with high grade fever, hepatomegaly and jaundice, as reported by other authors.[6] Other studies show that clinical features of pyogenic liver abscess were non specific and early clinical diagnosis requires a high index of suspicion.[2,5] Patients with pyogenic liver abscess need rapid diagnosis. Advances in the imaging modalities like ultrasound and CT scanning made a quick and early diagnosis possible. Abdominal ultrasound is highly diagnostic and always plays a central role in the assessment of this condition.[7] Qualified and well experienced sonologist plays an important role for quick diagnosis, as a result the mortality rate of pyogenic liver abscess has been significantly reduced form 40% to 10-25% in last two decades.[12,16,17] The improvements in results are due to improved imaging qualities and effective antimicrobial agents such as third generation cephalosporins. These improvements apparently decline the role of open surgery, which was considered as primary treatment of the condition. More sophisticated modalities like MRI T1 and T2 weighted can differentiate the abscess from other hepatic lesions.[8] In our study the diagnostic rate of ultrasound was 85% i.e. 72 cases out of 84 were diagnosed correctly on ultrasound. X-ray chest show elevated dome of right hemi diaphragm. It was always abnormal and may point to right upper quadrant as a source of abnormality.[9] Percutaneous needle aspiration in combination with systemic antibiotics is safe and effective treatment it should be considered as first line treatment.[10] This mode of management is highly appreciable in our study. 21% of diagnosed patients (18 out of 84) treated with this mode of regime and the result was satisfactory. These patients had abscess larger then 5cm size and the lesion was noted in the locations suitable for aspiration. The remaining 26 cases with very large liver abscesses (10 cm or more) underwent percutaneous drainage therapy. The ultrasound guided drainage remains a preferred radiological management of PLA to date. Survey of the literature suggests that both of these management modalities gave satisfactory results but advantage of one over the other modality could not be decided. However it is noted that needle aspiration is cheaper, less invasive and needs less post procedure care and it has the advantage to drain multiple liver abscesses in one session. (Fig 5,6)

Failure of major non-operative management modalities (catheter drainage) in large abscesses in series of our cases was 15%. Open surgery was decided for these patients. These cases were inaccessible to radiological intervention as they were multiple and large, multi loculated and ruptured abscesses, they were warranted for elective open surgery. Seven percent of cases (6 patients out of 84) were selected for open surgery. Four patients died due to septicemia, diabetes, old age with major organ failure. Previous literature suggests that risk of pyogenic liver abscess is increased in diabetic patients.[15] In our study we found 8 patients of PLA with diabetes. These patients were not responding well to antibiotics and tended to stay longer in the hospital. Early institution of empirical antibiotic therapy provided adequate coverage for Klebsiella pneumoniae. Study suggests that administration of systemic antibiotics alone (4 to 6 weeks) can give positive results in solitary abscess less than 5cm in size.[14] A comparative study of PLA in younger and elder patients had subtle differences in the clinical and laboratory findings which did not affect the diagnosis, treatment or mortality.[11] We noted prolonged hospitalization in elderly patients with large abscesses specially multi loculated ones, also reported by previous studies.[12,13]

Klebsiella pneumoniae was the most common pathogen isolated from aspirates/ blood of the patients in our study. It is also reported previously as the most common etiological organism for liver abscess formation.[18,19,20,21] However Escherichia coli, streptococcus, bacteroids and enterococcus are also blamed as the causative organisms of PLA.[21]

The underlying cause of the condition could not be confirmed in the majority of cases in our series. Literature suggests that most of the cases of PLA are cryptogenic.[19,17,13] Only 10% cases in our series were noted with the complaint of acute/ chronic features of cholangitis while characteristics of cystic/hepatic pyaemia could not be demonstrated, although it is one of accepted major cause of the condition. It has been recommended that intra abdominal sepsis may need to be ruled out, as it may be a source.[22]

CONCLUSION

Patients with pyogenic liver abscess tend to be at high risk of morbidity especially elderly and diabetics. An early and accurate diagnosis coupled with aspiration/drainage in guidance of radiological modalities results in dramatic changes in its prognosis. These improvements will apparently decline the role of open surgical drainage. A high index of suspicion, rapid diagnosis and early institution of empirical antibiotics with radiological interventions is an effective management strategy.

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Address for Correspondence:

Qurban Ali Bugti
Department of Radiology
Bolan Medical College
Quetta