

Management and the Outcome of Liver Abscess, a Single Reference Experience in United Arab Emirates

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Received February 07, 2023; Revised March 17, 2023; Accepted March 28, 2023

Abstract Background: Pyogenic liver abscess is the most common form of liver abscess in the world. Early diagnosis and treatment can decrease its complications. Managing liver abscesses can be challenging. This study is directed on liver abscess management in a single center hospital. Methods: This is a retrospective review of all patients admitted to Sheikh Khalifah Medical City (SKMC) in United Arab Emirates with a diagnosis of liver abscess between January 2010 and November 2019 and the management that was offered to them. Results: Klebsiella Organism causes the majority of liver abscesses admitted at our center. We have found that a combined treatment modality using antibiotic and percutaneous drainage was the best approach. Conclusion: Liver abscesses are present among different nationalities affecting their health and life. Careful treatment should be obtained by a multimodal approach by using the right antibiotic and the assistance of interventional radiology.

Keywords: liver abscess, IR drainage, antibiotic, SKMC

Cite This Article: Fatima Alharmoodi, Noura Al-Ali, Arabella Hammoudeh, and Muhammed Badar Zaman, "Management and the Outcome of Liver Abscess, a Single Reference Experience in United Arab Emirates." *Global Journal of Surgery*, vol. 11, no. 1 (2023): 5-8. doi: 10.12691/js-11-1-2.

1. Introduction

Liver abscess is a serious life threatening condition which is characterized by the presence of space occupying mass in the liver. Liver abscess may be iatrogenic, infectious and malignant [1]. The infectious type can be caused by bacteria, fungi and or parasite infections [1]. Majority of the liver abscesses are due to pyogenic causes. Patients presents with fever, abdominal pain and vomiting with other symptoms [2] and the diagnosis usually made by abdominal image, as symptoms and lab investigations can be vague.

Treatment vary depending on the case and the cause and ranges between antibiotic usage and or drainage.

2. Method

This is a retrospective review of all patients admitted to SKMC hospital in United Arab Emirates between January 2010 and November 2019 with diagnosis of liver abscess and their management in regardless of their age.

Chart review was done including causes of the liver abscess, cultures, antibiotic, images and interventional Radiology (IR) drainage status from an electronic medical system.

3. Results

During the study period, 89 patients were admitted with diagnosis of liver abscess. Characteristics of those patients are summarized in Table 1. Age ranged between 5 years and 101 years, with mean age of 46 and median of 43.5.

Table 1. showing a summary of the patients in the study

Variables	
Age	5 years – 101 years
Gender – Male:Female	59:30
Co-Morbidities	
Diabetes	26 patients
HTN	25 patients
Cancer and immunocompromised	24 patients
Race	
UAE nationals	21
Caucasian	17
African	9
Asians	14
Indian/Pakistan/Bangladeshi	28

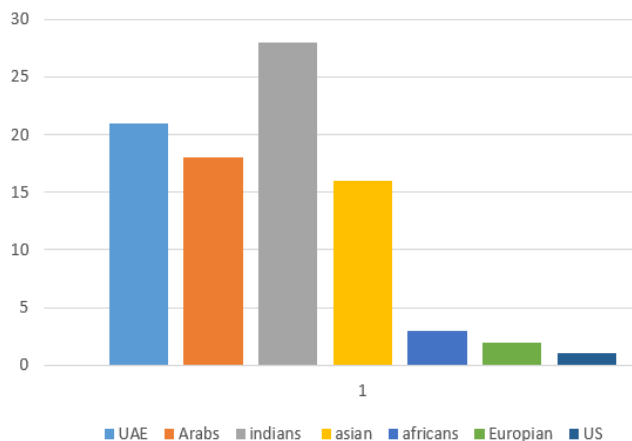
Majority of the patients were males around 66.2%, while females were 33.7 %.

Around 13.5% of the males patients were UAE nationals, while around 43.3% of the females were UAE nationals as shown in Table 2.

Table 2. showing the difference in the gender of the patients in the study

gender	UAE nationals	none UAE nationals	total
females	13	17	30
males	8	51	59

As shown in Figure 1, a total of 21 patients were UAE nationals, and 68 patients were non UAE nationals from different nationalities.

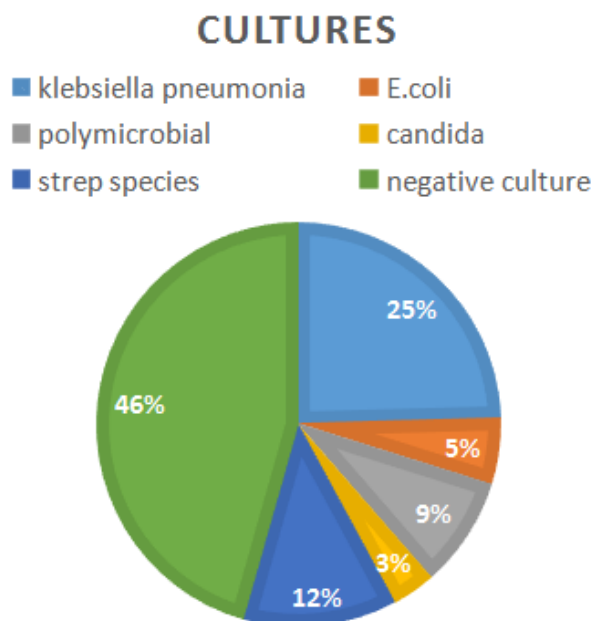
**Figure 1. showing different nationalities of the patients in the study**

Among these patients, 22 (24.7%) had underlying cancer (leukemia (22.7%), colon cancer (18.18%), hepatocellular carcinoma (13.6%), pancreatic cancer (13.6%), lymphoma (4.5%) and cholangiocarcinoma (18.1%)). 53 patients were having other comorbidities like diabetes (49%), hypertension (47.1%), and crohn's (3.7%).

Diagnosis was made with either Ultrasound or computed tomography (CT) scan or both in all of the patients. 49 cases had multi-loculated liver abscess (55.05%), while 40 cases had simple lesions (44.9%). The causes of the liver abscesses varied, but mainly were gastrointestinal and biliary system related diseases with patients presented with perforation, diverticulitis or cholecystitis. One patient was identified of developing liver abscess post iatrogenic liver injury and common bile duct (CBD) transection during laparoscopic cholecystectomy.

Upon making the diagnosis of liver abscess, empirical antibiotics were started. Twenty-six patients (29.2%) were treated with antibiotics only. Most of the patients that were treated with antibiotic alone were having a simple non loculated liver abscess less than 4 cm. The remaining patients required drainage procedure (70.7%). Of those, 3 required surgical drainage (4.7%), while the rest drained percutaneously (95.2%). Patients who required surgical drainage are an 18-month-old male with underlying cardiac and pulmonology conditions, and 2 adults with colon cancer.

Fifty three cultures were sent from the drains, with 26 of them found to be negative cultures. Twenty-seven patients had positive cultures obtained from the abscess, of those, 14 (51.8%) of them had Klebsiella pneumonia, followed by strep species in 7 patients (25.9%), around 5 patients were polymicrobial (18.5%), followed by 3 patients with E. coli (11.1%), and 2 patients with candida (7%). Figure 2

**Figure 2. showing the distribution of the cultures obtained from the patients with liver abscess**

Piperacillin-tazobactam was used in 37 patients, meropenem in 38 patients, and combination of different antibiotic in 59 patients. Antibiotic were then adjusted depending on the culture sensitivity and antifungal was added once candida was obtained in the cultures.

Majority of the patients that were treated with multimodal management stayed in the hospital between 2-3 weeks. While there are some patients stayed longer than a month due to complicated liver abscess or multiresistant bacteria or their comorbidities.

The patients that were treated with antibiotics alone, majority of them as well stayed between 2-3 weeks in the hospital while the patients that had simple and less than 3 cm liver abscess with no prior comorbidities, were treated within 1 week.

4. Discussion

Although Liver abscesses are not common, they are life threatening infections that needs early and prompt management. Liver abscess can be caused directly from the biliary tree system infection, trauma, gastrointestinal (GI) and intraabdominal spread infection and hematological spread from the hepatic artery [3].

Previously, the majority of liver abscesses were caused by acute appendicitis, but more recent years it developed due to diverticulitis and perforated viscous [4]. Recently the situation has changed, with malignancy related liver abscess emerging to increase especially with the recent treatments of transarterial chemoembolization (TACE) or radiofrequency ablation (RFA) [1].

Pyogenic liver abscesses are caused by Bacteria, most commonly Klebsiella pneumonia, which accounts for about 55-80 % of pyogenic liver abscesses in Asian population [5]. Another study in neighboring country, Qatar; found a higher incidence of Klebsiella pneumonia in the studied group, which was around 38 % of the cases

[6]. In our study we've observed the same finding, around 45 % of cases were due to Klebsiella pneumonia.

Majority of the cases are showing young males predominance, and our study is showing a 2.96 male predominance increase rate than females.

Many risk factors can attribute to the development or even increasing in morbidity of liver abscess patients. Diabetic patients, Proton pump inhibitors medication users, liver cirrhosis, male gender and advanced age are the most common risk factors for developing liver abscess [1].

In a Study in Kingdom of Saudi Arabia between 1995 and 2005, a 3.6 increase fold of developing liver abscess was found in patients with Diabetes Mellitus, and those patients had a higher 30 days post discharge mortality rate than the ones without diabetes [7].

The physician should have a high suspicious of the diagnosis of liver abscess, as the symptoms can be very vague and nonspecific like abdominal pain, fever, vomiting and diarrhea. Even lab investigation can be non-diagnostic from raised leukocytosis and inflammatory markers to raised liver function tests. Using CT scan and US images are more specific and diagnostic for liver abscesses. It can clarify the cause of the liver abscess from an intraabdominal infection to malignancy related abscess. Imaging the patient can also help in the management of the liver abscess, wither antibiotic alone is enough, or the patient needs drainage.

Some might question the studies, why all of these studies are done for an uncommon disease? As after all most of the studies have been for a 100 or less over at least 5 years per a study. In fact the incidence of liver abscess is only 2.3 cases per 100 000 per year [7]. The answer would be due to its complication, it can prolong the length of stay in the hospital affecting the healthcare system, increase the resistant bacteria in the system and the emerge of new ones, it can cause sepsis to the patient and further deterioration of the patient's and the need for intensive care unit admission, and death . In fact, a study found that there is a 15.2% higher rate of mortality in patients with pyogenic abscess, were patients with amebic liver abscess has zero mortality [8].

Researchers have found that liver abscesses with metastatic spreading features have higher mortality than the ones without [3]. Furthermore some studies have even looked at the possibilities of developing cancer due to the recurrence of liver abscesses.

One study in Taiwan was conducted between 1996 till 2008 collected around 1257 patients with pyogenic liver abscess without any cancer, and followed them up for a period between 3-4 years, and found out that around 186 of those patients developed cancer, most of it were hepatobiliary and colon cancer [9]. Due to these possible complication and more, an early diagnosis and treatment is necessary. In this study, the 18 patients with liver abscess related to cancer were already diagnosed with cancer prior to the development of the abscess.

Management of pyogenic liver abscess is a multimodal treatment and is tailored to the patient's condition. As for some patients with imaging identifying a large abscess, a combination of antibiotic and drainage is needed, while simple small abscesses might benefit from antibiotic alone [3]. In this study 61 cases were treated with combination

of antibiotic/antifungal and drainage. Some studies showed that leaving a Pigtail drain inside the abscess might be better outcome to the patients rather than only aspirating it [10].

The antibiotic treatment should start with a broad spectrum coverage, and changed according to the culture result. Unfortunately, not all liver abscesses have a positive culture, in our study 26 cases had no growth.

A retrospective study in Korea between 2012 and 2015 showed that the recurrence rate and morbidity is not different between culture positive liver abscesses and culture negative liver abscesses, in fact patients with positive culture liver abscesses were older patients, with recurrent biliary tree infections and had longer in hospital stay than culture negative patients [11].

Follow up for these patients is needed as recurrence can occur. Risk factors for recurrence includes polymicrobial culture, multidrug resistant bacteria, multiple abscesses, lesions in both liver, hypoalbuminemia and recurrent cholangitis, with increasing mortality with hyperbilirubinemia and the location of the abscess in the liver [12].

The limitation in this study included low number of patients due to not availability of a proper documentation in the recording system before 2010 and lack of follow of the patients after discharge, further researches should be made to identify recurrence of the disease or / and progression to cancer.

5. Conclusion

Liver abscess is a life threatening condition, which should be treated carefully with antibiotic and or drainage. Early diagnosis can help in decreasing morbidity and mortality of this disease. Majority of pyogenic abscesses is caused by Klebsiella, but other causes should be suspected if treatment failed.

Acknowledgments

We express our deep gratitude to Sheikh Khalifah Medical City Hospital for the support.

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