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## **Amebic Liver Abscess**

### *A disease native to Oman?*

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#### **Abstract**

**Objective:** Amebic liver abscess (ALA) is endemic to many areas of the world. In this study we sought to investigate the epidemiology, presentation, laboratory tests and imaging characteristics related to ALA in Oman and ultimately determine whether ALA is native to Oman or is it imported from abroad. **Methods:** This case series study was conducted at Royal Hospital Muscat, Oman. Patient data was extracted from the Royal Hospital patient database and included patients older than 13 years of age, discharged with the discharge diagnosis of ALA from January 2013 to December 2017. **Results:** 22 patients were included in the study. The results showed 18 Omani patients and 4 expatriates. Only two Omanis had history of travel abroad. 15 patients were male and 7 females. The average age was 45.2. The most common presentation was abdominal pain seen in 17 patients. Fever was seen in 13 patients. Alanine transferase was found to be elevated in 13 patients. 90% of patients had no symptomatic infections prior to developing ALA. **Conclusion:** The data suggests that ALA is endemic to Oman given the higher number of local patients and the lack of travel abroad in this population. As the number of treated ALA patients is rather small, it can be concluded that the occurrence of ALA is much lower in Oman

as compared to other endemic areas. The majority of patients had no prior symptomatic infections and thus a method of control would be to screen and prevent amebic spread.

**Keywords:** Amebic liver abscess, Amebiasis, liver abscess, *Entamoeba histolytica*, Royal Hospital, Oman

### **Advances in Knowledge**

- This study revealed unexpected results contrary to what other countries in the region with a similar migrant population reported.
- Amebic Liver Abscess is endemic to Oman.
- A large proportion of patients are asymptomatic carriers in Oman.

### **Application to Patient Care**

- Healthcare professionals should be actively looking for infected patients and treating them as this would limit the amebic spread.

### **Introduction**

Amebic liver abscess (ALA) results secondary to amebiasis caused by *Entamoeba histolytica*, a protozoan transmitted mainly through the fecal-oral route. This can occur by ingestion of water or food that is contaminated with cysts excreted via faeces.(1) Amebic infections are mostly asymptomatic, but invasive intestinal disease can occur starting in the colon when the invasive trophozoite form invades colonic mucosa and activates a strong immune response causing further tissue damage.(2) Access to mesenteric vessels can result in hematogenous amoebic dissemination to extra-intestinal sites potentially leading to a liver abscess.(3) ALAs are the most common extra-intestinal manifestation and have a widespread global impact, affecting developing countries with poor hygiene and inadequate sanitation.(4) Areas with high rates of ALA are the Indian subcontinent and East Asia, Africa, as well as Central and South America.(5) Immigration plays an important role in cases discovered in non-endemic areas. Reports from countries in the Arabian Peninsula on ALA are scarce. Studies from Saudi Arabia and Qatar show that a very large proportion of ALA patients are either foreigners or local citizens that have travelled to endemic areas.(6)(7) As per our knowledge, the epidemiological situation about ALAs in Oman is not known. Like in other Gulf countries, Oman also has a very large migrant-worker community from

endemic areas in Asia and they constitute around 40% of the population.(8) It would, therefore, be natural to assume that the majority of ALA patients would also be found in migrant patients. This was the reason to conduct this retrospective study that aimed to establish the epidemiological and clinical characteristics of ALAs in Oman and try to answer whether Oman is an area endemic to ALAs or are most of the cases imported.

## **Methods**

This study was carried out at the Royal Hospital in Muscat, Oman. Ethical approval from The Royal Hospital Scientific Research Committee was obtained and data was extracted from The Royal Hospital database. Patients discharged with the diagnosis of Amebic liver abscess who were older than 13 years of age and were admitted to the Royal Hospital from January 2013 to December 2017 under the diagnosis of ALA were included. The diagnosis was confirmed via the commercial IgG anti-amebic assay. The extracted data included patient biodata and history, comorbidities, laboratory values, radiological imaging reports and procedures carried out. These were analyzed using descriptive statistical methods with the use of Microsoft Office 2017 (Microsoft Corporation, USA).

## **Results**

During the five-year period, 75 patients were treated for liver abscess. Out of this number 53 were confirmed as pyogenic liver abscess and 22 patients were confirmed and treated for ALA. There were 18 Omanis and 4 expatriates, out of which 3 patients were from India and one from Pakistan. 15 (68%) patients were male and 7 (32%) were female. The average age was 45.2 with a range of 16-77. The average age of the men being higher at 47.4 than the women at 40.6.

The most common presentation seen in 17 (77%) patients was abdominal pain. Fever was a common sign in 13 patients (59%) while jaundice was far less common with only 3 (14%) patients presenting with it. Diabetes mellitus was the most common comorbidity found in patients with ALA. The number of patients with comorbidities was 7, out of which 5 (71%) had diabetes mellitus while the rest had hepatobiliary disease. All but one patient was admitted to the general ward with the one admitted to the ICU. None of the patients required urgent surgery and none presented with sepsis or septic shock.

Laboratory tests included alanine aminotransferase (ALT), bilirubin, albumin, leukocytes, and platelets. A significant number of patients, 13 (59%), presented with an ALT above normal, while 9 (40%) patients presented with a normal ALT level. However, bilirubin did not follow the same trend. The majority of patients, 13 (59%), had a normal bilirubin, while 9 (40%) had a raised bilirubin. Albumin was similar to bilirubin as it was normal in the majority of patients, 20 (90%), with only 2 (10%) having an abnormal albumin. As expected, most patients presented with leukocytosis. 11 (50%) patients had a count in-between 10-20 per microliter of blood, while 7 (32%) patients had a count of more than 20 per microliter of blood. We found that only one patient had an abnormal platelet count.

The anatomical position of the abscess was established following multiple radiological imaging techniques. A total of 19 (86%) patients were found to have an abscess in the right lobe while 3 (14%) patients had bilateral abscesses. A single abscess was found in 15 (68%) patients while 7 (32%) had multiple abscesses. Percutaneous drainage was done in 18 patients (82%).

No prior infections were found in 90% of patients. The remaining 10% had a gastrointestinal infection previously. This shows that the majority were asymptomatic carriers.

The outcome of all the patients was good. None of the patients died and they were all discharged from the hospital cured.

## **Discussion**

Available data show that a significant number of liver abscesses are reported to be pyogenic in origin and not amebic.(9) Invasive amebiasis such as ALA is attributed to 50 million infections worldwide.(10) The incidence reported is at 8.5/100,000 hospital admissions in the US with an extremely low mortality.(11) A known endemic area such as Sri Lanka has reported an incidence of 3-9/10,000 hospital admissions. Taiwan which was a known endemic area has attributed improved sanitation to a sharp drop in the high prevalence rate. At the same time, the mortality was reported to be 2.4%.(12)(13) There is no data about the prevalence of ALA in Oman or any of the neighboring countries in the Arabian Peninsula. Our study was done at a single center, the

Royal Hospital in Muscat and does not represent the incidence of ALA in Oman. However, it should be noted, that this is a tertiary care center and the biggest hospital in the country with the largest infectious diseases department in the country. One can assume that the ALA occurrence in Oman is low and as this study shows, the mortality is significantly lower when compared to other studies.

Immunocompromised hosts are prone to develop ALAs.(14) It is well known that diabetes mellitus is the most common predisposing factor to pyogenic liver abscess but no such conclusion seems to have been drawn about ALA.(15)(16) Our data suggest that diabetes mellitus is also a major risk factor for ALA since 71.43% of patients with comorbidities had diabetes mellitus. It is also well known that the ALA is more common in men and, as one study from India showed, the male gender proportion can rise up to 93%.(17) Similar to this is the report from Qatar showing that only 9% of their ALA patients were female.(18) In our study, about two-thirds of patients were male, but this proportion could be biased due to the cohort size. It is reported that ALAs most often occur in the age group 18-50 years and our data resonate with this.(19) In the US, most of the ALAs are found among the immigrant population, mostly from Mexico.(20)(21) Reports from Qatar and Saudi Arabia show that the majority of patients were either expatriates or had a history of travel to endemic areas. Most of our patients were locals and only two of them had a history of travel. One traveled to Pakistan 3 months prior to his illness, and the other one visited India a year before the onset of his illness. This indicates that opposite to the conclusion from Saudi Arabia and Qatar, ALA seems to be an indigenous infection to Oman.

Coinciding with our data, abdominal pain in the right upper quadrant and fever are the most common forms of presentation respectively.(22) Septic shock or admission to the ICU, which can be used as parameters of the disease severity, do not seem to be common with ALA as it is not addressed in literature. This study shows similar results, although 1 out of the 22 of our patients was admitted and treated in the ICU.

The majority of our patients (86%) had abscesses in the right liver lobe, and the left lobe was involved only when the patients had bilateral abscesses. Other studies also showed that about two-thirds of ALAs are positioned in the right lobe, and the rest are left-sided or bilateral. The right

lobe of the liver has more blood supply which possibly explains why more lesions are found on the right side of the liver.(23) A rather small number of patients had bilateral lesions which is also seen in our data showing that 14% of our patients had bilateral lesions.(24) As previously published studies showed, ALAs are usually single as is found in our cohort.

Amebiasis starts after the ingestion of *E. histolytica* cysts found in faecally contaminated water or food. The cyst migrates to the colon where it undergoes excystation releasing trophozoites which can penetrate colonic mucosa. During this process, they also can penetrate the hepatic portal circulation resulting in hematogenous spread. Most often this spread leads to ALA formation but the trophozoite can spread even to other organs which happens very rarely.(25) Almost 90% of infected patients are asymptomatic and fewer than 1% of patients with amoebic colitis have associated extraintestinal disease manifestation, most often ALA.(26) This explains why only 10% of our patients previously had a history of intestinal infection and also indicates that prior to the ALA, being asymptomatic, these patients represented a significant risk for their environment.

It is estimated that globally *E. histolytica* affects around 50 million people every year causing more than 10,000 deaths.(27) This mortality includes intestinal and extraintestinal amebiasis. Mortality varies around the globe depending on whether the country is in an endemic area or not, as well as the quality and the access to the healthcare service. There is no data regarding the ALA mortality in the countries of the Arabian Peninsula. There were no fatal outcomes connected to the ALA treatment in our study, most probably because of the easy access to the high-quality healthcare facilities in Oman.

The main limitation of this study is that it was a single-center study with a rather small sample size. That is why it doesn't represent the ALA epidemiology in Oman, however, it gives us a good insight into the epidemiological situation in Oman and serves as a good starting point for further studies.

## **Conclusion**

As the majority of our patients were Omanis without any history of travel to ALA endemic areas it can be concluded with a high possibility that Oman is an endemic ALA area but with

significantly lower ALA occurrence compared to other close by endemic areas. Also, as the majority of our patients, prior to their disease, were asymptomatic cyst passers, they represented a significant risk for others so it would be important to actively look for infected persons and treat them to prevent the amoebic spread.

### **Conflict of Interest**

The authors of this article declare that there is no conflict of interest.

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