

## Case Report

# A rare case of amoebic liver abscess as an immediate post-COVID-19 complication in an immunocompetent female: our experience from KIMS Secunderabad

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## ABSTRACT

The coronavirus disease 2019 (COVID-19) is caused by the novel severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), which originated in Wuhan, the capital city of the Hubei Province, China, in late 2019. It was declared a pandemic by the World Health Organization on March 11th, 2020(1). COVID-19 has challenged healthcare systems through its highly infectious nature and case fatality rate. Till date, numerous complications of COVID-19 have been reported including post COVID-19 Lung fibrosis, pulmonary thromboembolism, lung abscess, complications involving other organs apart from respiratory system like Acute coronary syndromes, Takotsubo cardiomyopathy, peripheral thromboembolic events, large vessel strokes, vasculitis. Direct hepatic injury or hepatitis has also been reported. But there is sparsity of data on occurrence of liver abscess as an immediate post COVID 19 complication. Hence, we present this case of a middle-aged immunocompetent female to highlight the importance of considering rare complications in COVID 19 patients.

**Keywords:** Amoebic liver abscess, COVID 19, SARS-CoV-2

## INTRODUCTION

A liver abscess is defined as pus filled mass in Liver. The majority of these abscesses are categorized as Pyogenic Liver abscess (PLA) or Amoebic Liver abscess (ALA), although a minority can also be caused by other parasite or Fungi especially *Candida* species.<sup>1</sup>

Pyogenic liver abscess is more common and mostly polymicrobial with gram negative Enterobacteriaceae being most common culprit organisms.<sup>2</sup> Risk factors include haematological spread from GI tract infections or obstruction in the biliary tree.<sup>3</sup>

Most amoebic infections are caused by *Entamoeba Histolytica*. Risk Factor for ALA are increasing age, alcoholism, compromised immune status (T2DM, CKD, Malignancies, congenital or acquired immune deficiency state, patient on immune suppressive drugs or steroids) or post solid organ transplant patients.<sup>4</sup>

In the current ongoing pandemic of COVID 19, many complications have been reported in patients with COVID 19 infection and also in the recovery phase involving other major organ systems besides respiratory system. But so far not much data has been published regarding the association of pyogenic or amoebic liver abscess with COVID 19 infection.

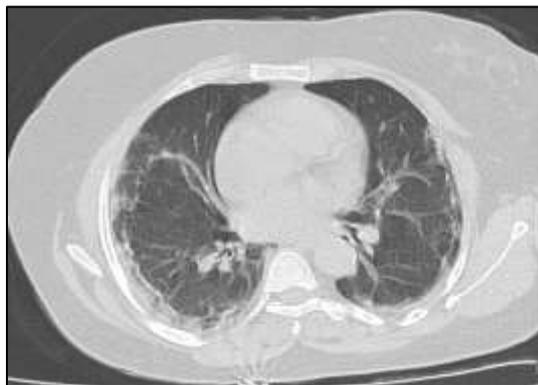
Hence, we report an interesting case of ALA in a middle aged immunocompetent female patient as an immediate post covid complication.

**CASE REPORT**

A 50 years old female, was a known case of Hypothyroidism on thyroxine 50 mcg supplements and bronchial asthma using salbutamol and budesonide inhalers on SOS basis.

**Table 1: Laboratory investigations during COVID-19 illness.**

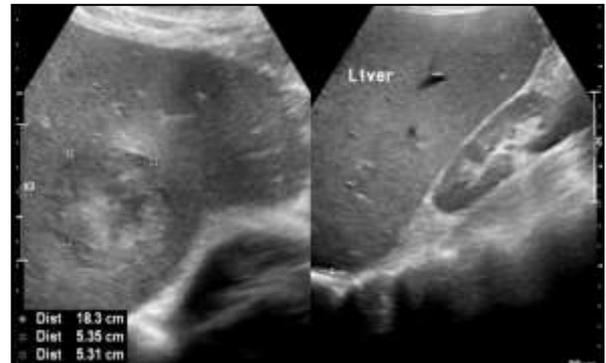
| Parameters                       | At initial diagnosis of COVID-19 disease | Day 7 of COVID-19 disease | Day 12 of COVID-19 disease |
|----------------------------------|--|---------------------------|----------------------------|
| Hb (gm/dl)                       | 11.6                                     | 10.6                      | 11.2                       |
| TLC (/mm <sup>3</sup> )          | 6200                                     | 11600                     | 7300                       |
| Platelets (Lac/mm <sup>3</sup> ) | 1.9                                      | 1.5                       | 3.03                       |
| ESR (mm/1 Hr)                    | 38                                       | 62                        | 33                         |
| CRP (mg/dl)                      | 24.2                                     | 29.9                      | 16                         |
| Procalcitonin                    | 0.2                                      |                           |                            |
| D-dimer (ng/ml)                  | 811                                      |                           | 644                        |
| Ferritin (mcg/l)                 | 92                                       |                           |                            |
| Calcium (mg/dl)                  | 9.4                                      |                           |                            |
| S. Creatinine (mg/dl)            | 0.99                                     |                           | 0.8                        |



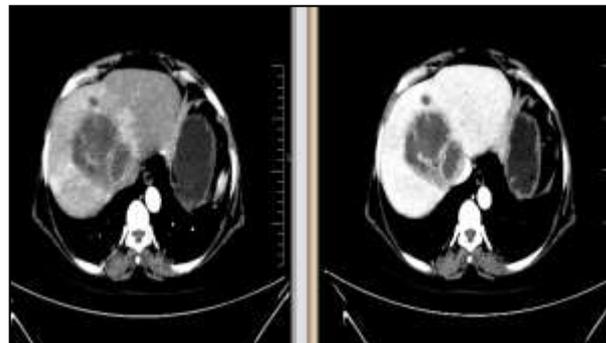
**Figure 1: CT chest showing post COVID-19 infection fibrotic changes.**

Patient was in her usual state of health until 1 month back when she presented to outpatient department with three days history of fever. In view of ongoing COVID 19 pandemic her nasopharyngeal swab was tested for Severe acute respiratory syndrome Corona virus-2 (SARS-CoV-2) RNA which turned out to be positive and patient was

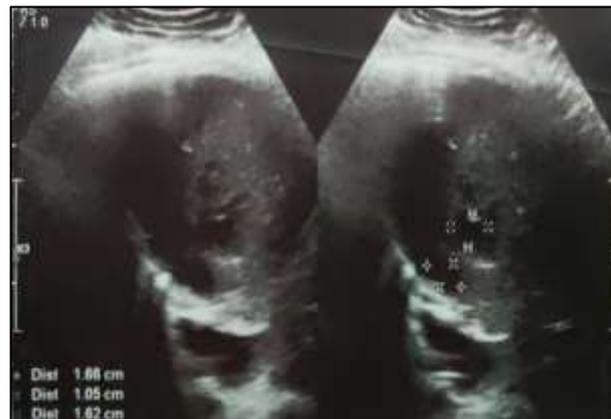
diagnosed to have COVID-19 illness. At presentation, her temperature was 101° F, vitals were normal and room air saturation was 96%. So, she was started on oral guideline directed treatment and kept in home quarantine.



**Figure 2: USG Abdomen showing large single liver abscess.**



**Figure 3: CECT abdomen showing arterial and portal images of liver with large liver abscess with thick septation.**



**Figure 4: USG abdomen showing 2x2 cm residual abscess post pigtail drainage.**

At day 7 of illness, patient continued to have persistent high-grade fever and developed mild hypoxia with room air saturation of 92%. Hence, she was shifted to intravenous (IV) remdesivir, IV steroids, IV Cefoperazone and sulbactam, low molecular weight heparin and Oxygen

supplementation of 2 litres/min via nasal canula. The treatment was continued for 5 days. Patient responded to the treatment and her fever subsided and room air saturation improved to 96%. She was then switched to oral steroids for 5 more days and stopped. Patient recovered completely.



**Figure 5: Follow up USG abdomen showing complete resolution of the abscess.**

After 7 days of her completion of quarantine, she developed high grade fever again which persisted for 2 days. There was no history of cough, shortness of breath, pleuritic chest pain, rash, pain in abdomen, vomiting, diarrhoea, burning micturition, reduced urine output, headache.

Patient was a housewife by occupation and consumed mixed diet. There was no history of alcohol intake, smoking or tobacco chewing. There was no history of use of any other medication other than drugs prescribed for hypothyroidism and bronchial asthma. There was no other significant past medical history.

On examination, patient was alert and oriented. Her body mass index was 32.6 kg/m<sup>2</sup>. Temperature was 101°F. Pulse rate was 96 beats/min, regular; blood pressure was 130/80 mmHg in right arm supine position. Respiratory rate was 16 cycles per minute and oxygen saturation was 96% while breathing ambient air. There was no pallor, icterus, cyanosis, clubbing, oedema feet or lymphadenopathy. Other system examination did not reveal any abnormality.

On initial evaluation, there was neutrophilic leucocytosis with raised inflammatory markers in the form of ESR and CRP. Serum procalcitonin was mildly elevated and malaria and dengue serology was negative. Other routine investigations were within normal limits.

Blood and urine cultures were sent and patient was started on empirical antibiotic cover with Cefoperazone and sulbactam. But her fever still persisted and cultures were sterile. However, her total leucocyte count (TLC) and CRP were in rising trend. Hence, as a part of fever evaluation, CT Chest was done and showed post COVID 19 infection mild fibrotic changes. There was no evidence of any infection (Figure 1). Her antibiotic cover was stepped up from Cefoperazone and sulbactam to IV Meropenem.

On day 5 of her illness, patient complained of mild pain over right hypochondrium. On examination, there was tender hepatomegaly. Hence, USG abdomen was done which showed hepatomegaly with evidence of mixed echogenic lesion in segment 8 measuring 5.3 /5.3 cm which was suspected to be liver abscess (Figure 2).

CECT abdomen showed multiloculated thick irregular rim enhancing lesion in segment 8/4A with surrounding parenchymal oedema S/O- Liver abscess (Figure 3).

**Table 2: Laboratory investigations after the onset of fever post COVID-19 disease.**

| Parameters                       | Day 1 of fever after initial recovery from COVID-19 | Day 3 of fever | Day 5 of fever | Day 8 of fever before USG guided pigtail drainage | Resolution of abscess after pigtail removal |
|----------------------------------|---|----------------|----------------|---|---|
| Hb (gm/dl)                       | 11.7  | 10.6           | 8.3            | 8.6   | 10.4  |
| TLC (/mm <sup>3</sup> )          | 14500   | 15100          | 15,750         | 19,400  | 9260  |
| Platelets (Lac/mm <sup>3</sup> ) | 4.9   | 4.8            | 4.9            | 3.12  | 4.25  |
| ESR (mm/ 1 Hr)                   | 62  | 78             | 93             | 115   | 63  |
| CRP (mg/dl)                      | 26.89   |                | 41.82          |   | 13.45                                       |
| Procalcitonin                    | 3.02  |                |                |   | 0.12  |
| PT/INR/APTT                      | 13/ 1/ 36   |                | 17.2/ 1.4/39.8 | 15.8/1.3/ 43.1                                    |   |
| SGOT/SGPT (IU/L)                 | 38/ 49  |                | 61/72          |   | 33/38                                       |
| ALP (IU/L)                       | 148   |                | 198            |   | 124   |
| Total bilirubin (mg/dl)          | 0.99  |                | 2.1            |   | 0.8   |
| Direct bilirubin (mg/dl)         | 0.33  |                | 1.2            |   | 0.2   |

The imaging of the liver abscess was suggestive of thick pus inside the cavity and serum IgM antibodies were positive for *Entamoeba histolytica*. Hence, patient was started on IV metronidazole (40 mg/kg/day) waiting for the pus to liquify. But patient continued to have persistent high-grade fever with rising TLC, ESR and CRP levels and developed progressive anemia.

Hence, on day 8 of illness, USG guided pigtail drainage of the abscess was done and approximately 100 ml thick anchovy sauce pus was drained. Approximately 50 ml of pus was drained for next two consecutive days and there was no collection subsequently. Follow up USG scan was done after 3 days and showed 2/2 cm residual collection in posterior aspect where drain tip could not be kept (Figure 4). So, the pig tail was removed and she was continued on IV Meropenem and IV Metronidazole.

Despite all these measures, patient continued to have fever spikes but her TLC, ESR and CRP improved and pus culture was sterile. In view of persistent fever, patient was started on IV tigecycline and continued for 5 days. Fever subsided and patient was continued on antibiotics for further 2 weeks. Patient responded to the treatment and TLC, ESR and CRP showed down trend and anemia started improving subsequently. After 2 weeks, repeat USG Abdomen was done and showed complete resolution of the abscess (Figure 5).

## DISCUSSION

Liver abscess is broadly categorized as pyogenic or amoebic liver abscess with a minority caused by fungi or other parasites.<sup>1</sup> The annual incidence of liver abscess in itself is quite low affecting 2.3 patients per 1,00,000 population.<sup>5</sup> Pyogenic liver abscess is more prevalent in developed countries while amoebic liver abscess is more commonly reported from developing countries. The main reason behind this observation is low socioeconomic status and poor water sanitation in developing countries.<sup>6</sup>

However, in a developing country like India, different regions of the country report significant variations in the epidemiology and clinical profile of the patients with liver abscess. A study conducted by Ghosh et al in northern part of India reported predominance of amoebic liver abscess with an incidence of 69% and PLA was seen in 18% cases. The most commonly affected patients were from low socioeconomic status and alcoholic patients.<sup>7</sup> On the contrary, Lal et al reported predominance of pyogenic liver abscess (69.6%) in South India.<sup>8</sup>

Other important risk factors for liver abscess are male sex with a male to female ratio of approximately 9:1. Age also plays an important role as patients between 40-60 years are more prone to amoebic liver abscess.<sup>5</sup> Alcohol consumption, T2DM, Immunosuppressive therapy, malignancy, biliary tract infections, post organ transplant status are other important pre-disposing factors. Very few cases of liver abscess have been reported in

immunocompetent patients with majority of them being tubercular in origin.<sup>6</sup>

The coronavirus SARS-CoV-2 (severe acute respiratory syndrome coronavirus 2), which is responsible for the disease COVID-19 (coronavirus disease 2019), has infected over 21.7 crore people and has caused more than 45,01,000 deaths globally, as of 29 August 2021. Although COVID-19 is most commonly known to cause substantial respiratory damage in the form of pneumonia and acute respiratory distress syndrome (ARDS), it can also lead to multiple extra pulmonary complications too. These conditions include arterial or venous thrombotic complications, myocardial dysfunction, arrhythmias, acute coronary syndromes, acute kidney injury, gastrointestinal symptoms, hepatocellular injury, hyperglycaemia and ketosis, neurologic illnesses, ocular symptoms, and dermatologic complications.<sup>10-12</sup>

A hepatocellular injury pattern is seen in 14–53% of hospitalized patients with critical COVID-19 disease.<sup>11-13</sup> Aminotransferases are typically elevated but remain less than five times the upper limit of normal. Rarely, severe acute hepatitis has been reported.<sup>14,15</sup> The underlying pathophysiology that has been suggested to cause liver injury includes SARS-CoV-2 mediated direct damage to the biliary ducts by binding to ACE2 (Angiotensin Converting Enzyme-2) on cholangiocytes.<sup>15</sup> Hyperinflammation seen with cytokine storm and hypoxia-associated metabolic derangements are other potential mechanisms of liver damage.<sup>16</sup> Drug-induced liver injury, particularly secondary to agents such as remdesivir, lopinavir, and tocilizumab, may also occur.<sup>16,17</sup> Other histopathological changes observed in patients with COVID-19 induced liver injury includes Kupffer cell proliferation, hepatic steatosis, portal fibrosis, lymphocytic infiltrates and ductular proliferation, lobular cholestasis, and acute liver-cell necrosis, together with central-vein thrombosis.<sup>18</sup>

In a study conducted by Lagana et al on 40 patients dying from critical COVID-19 infection, autopsy findings from liver were mainly suggestive of acute hepatitis and only one case with liver abscess was seen. Majority of the patients had underlying risk factors such as T2DM, alcohol consumption, chronic liver disease, chronic kidney disease, history of cardiac disease. 22 of 40 patients received steroids.<sup>19</sup> This data suggests that liver abscess is a rare feature of hepatobiliary complication of COVID-19 disease.

A similar case was reported by Chuan et al from Wuhan, China of a 78 years old male patient who presented with COVID-19 disease and was advised home isolation and treatment at home. He presented with liver abscess two months later as a late complication of COVID-19 disease.<sup>20</sup>

Recently, in July 2021, a tertiary health care center from North India reported 14 immunocompetent patients over 2

months period, who had developed liver abscess as immediate post COVID-19 complication. This included 10 males and four females with age ranging from 28 to 74 years. 8 out of 14 patients had received steroids during their course of COVID-19 treatment. All these patients developed liver abscess within 22 days of recovery with unusually large pus collection involving multiple lobes and required hospitalization and drainage. Only one patient succumbed to massive bleeding while others were stable and discharged. It was proposed that poor nutrition, suppression of the immunity by COVID-19 infection, use of steroids might be possible factors behind development of liver abscess in these patients.<sup>21</sup>

A similar case was reported from Central part of India in June 2021 by Dhadijala et al of a 36 years old male patient without significant medical history who presented with fever, cough and shortness of breath. He was diagnosed to have COVID-19 pneumonia with positive SARS CoV-2 RTPCR. Hence HRCT chest was done which showed bilateral small pleural effusion along with large lobulated 7.5×6.2 cm abscess in segment VII of liver.<sup>22</sup> This patient had COVID-19 pneumonia along with liver abscess at initial presentation itself before commencement of steroids pointing to alternative mechanisms of liver injury in COVID-19 patients apart from immunosuppression.

Our case is about a middle-aged immunocompetent female patient from a tertiary health care center from South India, who developed large amoebic liver abscess after 7 days of her recovery from COVID-19 infection. She was treated with steroids during her COVID-19 illness. She was well nourished and adequately built. The use of steroids and suppression of immunity can be the most probable explanation for development of liver abscess in our case.

Pyogenic liver abscess is more commonly seen in South India as compared to amoebic liver abscess. Also, there are no case reports of amoebic liver abscess as a post COVID-19 complication from South India till date. Hence, we reported this case to enlighten the importance of having suspicion for such rare complications during COVID-19 pandemic. Low index of suspicion and thus delay in treatment in patients recuperating from COVID-19 disease adds to the disease severity and adverse outcomes.

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