A Case Series of Amoebic Liver Abscess in Patients With COVID-19 Infection

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Background: Globally, amoebiasis is the second leading cause of death due to parasitic diseases. Amoebic liver abscess (ALA) as an opportunistic infection in recently recovered COVID 19 disease patients has not been reported earlier. Methods: We present here a case series of 13 patients of ALA admitted during the month of May 2021 in BLK hospital, New Delhi, and had recently recovered from COVID 19 disease. Results: Out of 13, eight patients had moderate, and one had severe COVID 19 disease. All these patients had received steroids for the management of COVID 19 disease. The remaining 4 (30%) patients had mild disease. The mean age of our patients was 50 years (37–81 years). Out of 13 patients, nine (70%) were male, 5 were diabetic, 2 were hypertensive, and none were alcoholic. The most common presentation was fever (11/13) followed by upper abdomen pain (10/13). The mean time of symptom (fever or pain abdomen) onset from COVID 19 positivity date was 19 days (range 15–23 days). A complication the in form of localized intraperitoneal rupture was common in these patients and was seen in more than 50% (7/13) of patients. All the patients were managed with IV Metronidazole and abscess aspiration. All the patients were discharged, and the mean hospital stay was 6.6 days. Conclusion: We report here an increase in the incidence of ALA in recently recovered COVID 19 patients and propose that it is most likely due to alteration in the immune state of these patients. It is important for physicians to investigate for liver abscess in patients who present again with fever and/or pain abdomen within 2 weeks of COVID 19 recovery.

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Abbreviations: ALA: Amoebic liver Abscess; COVID 19: 2019 novel coronavirus

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### Table 1  Demographic and Clinical Profiles of 13 Cases of Amoebic Liver Abscesses in Recently Recovered COVID-19.

| Patient  | SEX | AGE | CT SEVERITY | STEROIDS RECIEVED | DAYOF PRESENTATION FROM COVID POSITIVE | DM | COMORBIDITIES | CHRONIC ALCOHOL | VOLUME IN CC | ABSCESS ASPIRATION | AMOEBIC SEROLOGY | CAECAL INVOLVEMENT | OUTCOME | DURATION OF HOSPITAL STAY (days) |
|----------|-----|-----|-------------|-------------------|----------------------------------------|----|---------------|----------------|--------------|-------------------|-----------------|------------------|--------|-------------------------------|
| 1        | M   | 41  | Moderate    | Yes               | 16                                     | Yes| nil           | NO             | 74           | YES               | Positive        | No                | Discharge | 6                |
| 2        | F   | 53  | Moderate    | Yes               | 18                                     | Yes| nil           | NO             | 178          | YES               | Positive        | No                | Discharge | 8                |
| 3        | F   | 38  | Moderate    | Yes               | 17                                     | Yes| nil           | NO             | 400          | YES               | Positive        | No                | Discharge | 5                |
| 4        | M   | 81  | Mild        | No                | 15                                     | No | nil           | NO             | 70           | YES               | Positive        | No                | Discharge | 7                |
| 5        | M   | 51  | Mild        | No                | 15                                     | No | nil           | NO             | 155          | YES               | Positive        | No                | Discharge | 4                |
| 6        | M   | 46  | Mild        | No                | 20                                     | No | nil           | NO             | 60           | YES               | Positive        | No                | Discharge | 6                |
| 7        | M   | 47  | Mild        | No                | 19                                     | Yes| nil           | NO             | 200          | YES               | Positive        | No                | Discharge | 5                |
| 8        | M   | 55  | Severe      | Yes               | 23                                     | Yes| HTN          | NO             | 290          | YES               | Positive        | No                | Discharge | 14               |
| 9        | M   | 55  | Mild        | Yes               | 20                                     | Yes| nil           | NO             | 137          | YES               | Positive        | No                | Discharge | 5                |
| 10       | F   | 68  | Moderate    | Yes               | 18                                     | Yes| nil           | NO             | 90           | YES               | Positive        | No                | Discharge | 4                |
| 11       | M   | 41  | Moderate    | Yes               | 18                                     | Yes| nil           | NO             | 200          | YES               | Positive        | No                | Discharge | 8                |
| 12       | F   | 37  | Moderate    | Yes               | 21                                     | Yes| nil           | NO             | 100          | YES               | Positive        | No                | Discharge | 8                |
| 13       | M   | 64  | Moderate    | Yes               | 24                                     | Yes| nil           | NO             | 106          | YES               | Positive        | No                | Discharge | 8                |
recovered the data of all ALA admissions in the month of May 2020 to compare with the number of admissions last year during the same time period. The total number of admissions of patients with amoebic liver abscess was three in the month of May 2020, 24 during November 2020–April 2021, and 16 in the month of May 2021. Thirteen out of these 16 patients of amoebic liver abscess diagnosed in the month of May 2021 had recently recovered from COVID 19 disease. The total number of COVID 19 disease-related admissions in our hospital was 550 in the month of May 2021.

The diagnosis of the amoebic liver abscess was made if there was imaging ultrasonography or CT triple-phase showing (a) findings suggestive of liver abscess (b) Positive Amoebic serology IgG-Elisa >11.0 U and/or (c) Anchovy sauce appearance on abscess aspiration, (d) If an abscess was aspirated, negative pus culture.

We present the case series of these 13 patients with an amoebic liver abscess who recently recovered from COVID19 disease.

RESULTS

The demographic, clinical, serological, and imaging profiles of these 13 patients were recorded (Table 1). Out of 13 patients, 8 had moderate, and 1 patient had severe COVID 19 disease. All patients with moderate and severe disease (9 out of 13) received steroids for management of COVID19 pneumonia. None of the patients received tocilizumab for the management of COVID-19. Four patients had mild infections and were managed as outpatients. None of the patients with mild disease received steroids.

All the patients had imaging evidence of liver abscess on USG abdomen and/or CT triple-phase abdomen with positive amoebic serology and negative pus cultures from the abscess aspirate. The mean age of our patients was 50 years (37–81 years). Out of 13 patients, nine (70%) were male, 5 were diabetic, 2 were hypertensive, and none were alcoholic. The most common presentation was fever (11/13) followed by pain upper abdomen (10/13). Two patients were incidentally detected to have liver abscess on a USG of the abdomen; out of these two, one had an unexplained rise in the total leucocyte count, and the other patient presented with altered stool color. The mean time of symptom (fever or pain abdomen) onset from COVID 19 positivity date was 19 days (range 15–23 days).

The size of liver abscesses varied from the largest being 400 cc and the smallest 60 cc respectively. Nine out of 13 patients had a solitary liver abscess, and of whom five had left lobe liver abscess.

A complication in the form of localized intraperitoneal rupture was common in these patients and was seen in 7 out of 13 patients. Four of these seven patients had solitary left lobe abscesses, and the rest three had bilobar abscesses (Figure 1). Cecal involvement in the CT triple-phase abdomen was seen in three patients.

All the patients were treated with IV metronidazole and USG guided liver abscess aspiration. In seven patients with complicated liver abscess, percutaneous catheter drainage was done, and in the rest six, single-time aspiration. All the patients recovered and were discharged from the hospital. Mean hospital stay was 6.6 days (range 5–14 days).

DISCUSSION

Our case series highlights the possibility of a correlation between COVID-19 and amoebic liver abscess. The number of patients admitted for ALA was much higher in May 2021 compared to the previous 6 months, as well as in May 2020. Most of these patients (13 of 16) had recently recovered from COVID infection, thus raising a suspicion that COVID 19 predisposes to the development of ALA. Four out of 13 patients had mild COVID19 disease (and did not receive steroids); the other nine had received steroids for COVID 19 related complications. We postulate that the predisposition to develop ALA may be related to

Figure 1  a) Contrast-enhanced CT abdomen of one of the patients showing multiple scattered hypodense lesions in both lobes of the liver with a peripheral rim of edema consistent with multiple liver abscesses. (b) Sections of chest CT of the same patient shows few ground glass densities with curvilinear bands in bilateral lower lobes.
COVID 19 itself and may be accentuated by the use of steroids. The complication rate in these patients was also observed to be higher (more than 50% presented with localized rupture). This may be attributable to the steroid use (due to COVID 19), which may have masked the initial symptoms leading to late presentation.

Both innate and cell-mediated immunity plays a significant role in the pathogenesis of amoebic liver abscess. The risk factors for amoebic liver abscess are alcoholism, male sex with age 18–50 years, malnourishment, thymectomy and splenectomy, diabetics, corticosteroid use, and altered cell-mediated immunity like HIV infection.6,7

Recent data suggest that COVID 19 disease leads to suppression of cell-mediated and innate immunity. SARS COV2 infection is associated with lymphopenia in moderate and severe cases. In recent studies, the counts of CD8+ T, memory CD4+ T cells, and Treg cells were shown to be decreased.8

In addition, functional exhaustion of T cells has been reported in COVID-19 patients as indicated by upregulation of exhaustion markers, including PD-1, CTLA-4, TIGIT, and TIM-3 and downregulation of IFN-γ, TNF-α, granzyme B, and IL-2.9

The recent randomized control trial reported a decrease in mortality of patients of COVID 19 disease who were on oxygen support with the use of dexamethasone.10 Glucocorticosteroid leads to peripheral neutrophilia, inhibits the release of cytokines and chemokines, and impairs leukocyte migration site of inflammation. It also leads to lymphopenia (T cells more than B cells). This may have contributed to the higher complication rate in the patients developing ALA in our cohort.

Both SARS-COV2 infection and the use of glucocorticoids lead to suppression of the immune system. This immunosuppressed state may lead to opportunistic infections in patients with COVID19 disease. Treating clinicians need to be aware of the possibility of these infections and should rationalize the use of corticosteroids. The first four weeks from the date of COVID 19 positivity are important, as all the patients with amoebic liver abscesses presented during this time period in our study.

We hypothesize that increase in the incidence of amoebic liver abscess in our hospital was most likely due to the alterations in the immune state in patients of COVID 19 disease. It is important for physicians to investigate for liver abscess in patients who present again with fever and/or pain abdomen within 2 weeks of COVID 19 recovery. It will be interesting to see data from other centers in the near future.

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