



# "Fast, faster, and fastest: science on the run during COVID-19 drama"—"do not forget the liver"

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Who did ever think that the twenty-first century with the best of scientific innovations and health care system would witness a historic pandemic of a novel Corona virus, SARS-CoV-2, which is crumbling humanity globally. Each day we are confronted with rising statistics and at the time of this writing, the global watch has registered more than 1249107 confirmed cases of Coronavirus disease or COVID-19. On a positive side, 256,059 (20%) have fully recovered and on a darker side 67,999 (5.4%) precious lives have been lost according to the Johns Hopkins University Coronavirus Resource Center until April 5 [1]. Much of the scientific data have come from China and together with the emerging data from the West where old age has been unequivocally identified as the major risk factor with increased mortality due to COVID-19.

The origin of the novel coronavirus can be traced to Hubei Province, in China, which first reported to WHO, on Dec 30, 2019, several cases of pneumonia with an unknown infectious agent. The bronchoalveolar lavage collected from patient in Wuhan hospital tested positive for pan-betacoronavirus by real-time PCR. The Chinese agencies were quick in getting the full-length genomic sequence of the virus which had about 80% similarity to bat SARS-like coronavirus strain BatCov RaTG13. On 7 Jan 2020, the novel human coronavirus was first named as 2019-nCoV(human) and later it was renamed as severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). On February 11, 2020, the WHO announced the outbreak of coronavirus-associated disease and in a short span of 2 months, the virus spread globally and on 11 March, WHO declared it a pandemic [2].

While COVID-19 is predominantly a respiratory disease, subjects with underlying chronic disease such as diabetes and cardiovascular disorders are at higher risk of getting

severe disease which can be lethal as well [3]. The published reports have not underscored the importance of liver disorder as a major risk factor; however, few papers have indicated "2–11% of patients with COVID-19 had liver comorbidities" and these mostly included patients with severe case of COVID-19 [4]. However, a common clinical finding in COVID-19 is raised levels of alanine aminotransferase (ALT) and reduced albumin level indicating liver injury. The angiotensin-converting enzyme 2 is a key receptor for the SARS-CoV-2 viral entry which is also expressed by cholangiocytes in liver and enterocytes in intestine (besides the type II lung epithelial cells). This indicates the possibility of extrapulmonary sites as reservoir for viral replication. In support of this, a recent study has shown that half of the SARS-CoV-2-infected subjects who have completely cleared the infection from the respiratory tract show virus shedding in their fecal samples up to 11 days after respiratory samples became negative [5]. This raises a serious concern of fecal–oral route of transmission, which in turn poses risk of pathogen transfer through FMT procedure [6]. Asia, in particular China, has high incidence of HBV; however, data are scant with respect to its influence on COVID-19. One report suggests that about 2.0% of severe cases had HBV infection compared to those with mild disease (0.06%) [7]. With respect to COVID-19, the other vulnerable groups with liver disease include patients who have undergone liver transplant and currently on immunosuppressants, liver cirrhosis/ACLF with immune dysfunction and those with hepatocellular carcinoma with immune exhaustion status. Patients with NASH have associated comorbidities of diabetes and cardiovascular disorder and they too are at high risk of being infected and may progress to severe form of COVID-19.

As for the liver pathology in COVID-19, one report indicates mild steatosis which is mostly attributable to drug-induced liver injury rather than the virus [8]. With liver being a major organ for drug detoxification, the current proposed treatments with hydroxychloroquine, antibiotics, and antiviral drugs may further aggravate liver injury. Thus, a

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causal relation between underlying liver disease, effect of hepatotoxic drugs, and COVID-19 will await further investigations. Several liver societies have come up with management guidance for COVID-19 developing in liver disease patients, including one on liver transplant and COVID-19 from Liver Transplant Society of India (online in Hepatology International) and the EASL management plan care of COVID-19 patients with liver disease [9] Tobias Boettler, J Hep Reports).

The patients who have fully recovered from COVID-19 and those who are asymptomatic but show viral shedding in feces pose a new challenge to hepatologists and gastroenterologists in the coming days. Will there be a second outbreak, reactivation, and new wave of SARS-CoV-2 infection via a fecal–oral route? The need of the hour is to initiate well-planned clinical studies in symptomatic and also recovered patients to generate more scientific evidences about not only the course of the disease but also to develop effective clinical management strategies.

COVID-19 has brought in a sea of change in all sectors of life especially the clinical and scientific world. There is fast pace of clinical and scientific research, with fast-breaking published reports and those on preprint servers even under lockdown. We commend the heroic clinical trials which could be designed even under immense COVID-19 pressure. The brave new world in era of Covid-19 has seen emergence of heroic breed of clinicians, nurses, scientific, technical, governance staff, and community workers a.k.a “Covidwarriors” fighting and chasing the rogue virus. Dr. Gayatri Ramakrishna and her team have prepared a snapshot of COVID-19, by collecting the latest information on COVID-19 infection and have presented it in a lucid, poetic manner. It is hoped that this virus scan will find a place on your desk or wall for ready reference. We invite rapid contributions from colleagues across the globe to use Hepatology International for educating the world and help in overcoming the devastating crisis.

The global pandemic has to be fought locally by collective sharing and open access of scientific data and technology

at a global level. Every small step taken for preventing the spread of SARS-CoV-2 is a big leap for protecting mankind. We at Hepatology International are dedicated towards the cause of fighting the virus and preventing COVID-19.

Science and Humanity will surely win this battle too!

## References

1. Corona Resource Centre. <https://coronavirus.jhu.edu/map.html>.
2. Report of the WHO-China Joint Mission on Coronavirus Disease 2019 (COVID-19).
3. Zhou F, Yu T, Du R, Fan G, Liu Y, Liu Z, et al. Clinical course and risk factors for mortality of adult in patients with COVID-19 in Wuhan, China: a retrospective cohort study. *Lancet* 2020;395(10229):1054–1062.
4. Zhang C, Shi L, Wang FS. Liver injury in COVID-19: management and challenges. *Lancet Gastroenterol Hepatol* 2020. [https://doi.org/10.1016/S2468-1253\(20\)30057-1](https://doi.org/10.1016/S2468-1253(20)30057-1).
5. Wu Y, Guo C, Tang L, Hong Z, Zhou J, Dong X, et al. Prolonged presence of SARS-CoV-2 viral RNA in faecal samples. *Lancet Gastroenterol Hepatol* 2020. [https://doi.org/10.1016/S2468-1253\(20\)30083-2](https://doi.org/10.1016/S2468-1253(20)30083-2).
6. Green CA, Quraishi MN, Shabir S, Sharma N, Hansen R, Gaya DR, et al. Screening faecal microbiota transplant donors for SARS-CoV-2 by molecular testing of stool is the safest way forward. *Lancet Gastroenterol Hepatol* 2020. [https://doi.org/10.1016/S2468-1253\(20\)30089-3](https://doi.org/10.1016/S2468-1253(20)30089-3).
7. Mao R, Liang J, Shen J, Ghosh S, Zhu LR, Yang H, et al. Implications of COVID-19 for patients with pre-existing digestive diseases. *Lancet Gastroenterol Hepatol* 2020. [https://doi.org/10.1016/S2468-1253\(20\)30076-5](https://doi.org/10.1016/S2468-1253(20)30076-5).
8. Xu Z, Shi L, Wang Y, Zhang J, Huang L, Zhang C, et al. Wang FS Pathological findings of COVID-19 associated with acute respiratory distress syndrome. *Lancet Respir Med* 2020;8(4):420–422.
9. Boettler T, Newsome PN, Mondelli MU, Maticic M, Cordero E, Cornberg M, et al. Care of patients with liver disease during the COVID-19 pandemic: EASL-ESCMID position paper. *JHEP Rep* 2019. <https://doi.org/10.1016/j.jhepr.2020.100113>.

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