

# Before Acute Liver Failure is Attributed to High Altitude, Other Causes Must be Ruled Out

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**Keywords:** Autoimmune liver disease, High altitude, Liver failure, Rhabdomyolysis, Transaminases.

*Indian Journal of Critical Care Medicine* (2024): 10.5005/jp-journals-10071-24843

## Dear Editor,

We were interested to read the article by Srinivasan et al. about a 54-year-old man who had been suffering from a chronic autoimmune liver disease for a year and developed acute liver failure during a pilgrimage to a shrine at an altitude of 3,882 m.<sup>1</sup> Despite transfer to an emergency room within 36 hours of the onset of symptoms and optimal diagnostic and therapeutic measures, the patient died 10 days after the onset of symptoms.<sup>1</sup> The study is convincing, but some points should be discussed.

The first point is that it is not reported whether the index patient had done altitude acclimatization and was acclimatized when he started his journey or not. We should know whether the patient traveled by bus to Balta or Pahalgam, how long he stayed there and for how many days he walked the 46 km from Pahalgam to the cave.

The second point is that acute liver failure has not yet been reported as a consequence of altitude sickness. Liver failure can only develop secondary to right heart failure if there is hepatic congestion and thus inadequate drainage of the hepatic veins. It is also conceivable that liver failure develops secondary to pulmonary hypertension.<sup>2</sup>

The third point is that hepatitis has not been ruled out as a cause of liver failure. Before attributing liver failure to high altitude, all types of liver disease that could explain the deterioration must be thoroughly ruled out.

The fourth point is that the specific diagnosis of the index patient's previous liver disease was not communicated.<sup>1</sup> Did the patient suffer from autoimmune hepatitis, primary sclerosing cholangitis, or primary biliary cirrhosis? What kind of treatment did he receive?

The fifth point is that there is no indication of whether the index patient was tested for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). Since the case obviously falls in the time of the pandemic, it would have been imperative to rule out Coronavirus disease 2019 (COVID-19), especially in light of the fact that SARS-CoV-2 can damage the liver.<sup>3</sup>

The sixth point is that an altitude of 3,882 m is not the altitude at which altitude sickness normally occurs. There are few reports of altitude sickness occurring below 4,000 m.

The seventh point is that we disagree with the interpretation of a hyper-CKemia of 9,500 U/L as hepatopathy. On arrival in the emergency room, the patient complained of muscle pain, which is not normally a symptom of liver failure. More likely than hepatopathy is that the patient has developed rhabdomyolysis. Therefore, it would be important to know the current medication, especially whether he is taking an immunosuppressant regularly or not. Another argument for rhabdomyolysis is that the patient had microhematuria. Was the urine also cola-colored?

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**How to cite this article:** Finsterer J. Before Acute Liver Failure is Attributed to High Altitude, Other Causes Must be Ruled Out. *Indian J Crit Care Med* 2024;28(12):1180.

**Source of support:** Nil

**Conflict of interest:** The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Overall, it can be said that this interesting study has limitations that put the results and their interpretation into perspective. Addressing these limitations could strengthen the conclusions and message of the study. Before interpreting acute liver failure as altitude sickness, alternative causes must be ruled out.

## Availability of Data and Material

All data are available from the corresponding author.

## AUTHORS CONTRIBUTION

Josef Finsterer was responsible for the design and conception, discussed available data with coauthors, wrote the first draft, and gave final approval.

Contributed to literature search, discussion, correction, and final approval.

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