



# Etiology, symptoms and epidemiology of new mysterious hepatitis outbreak in children; do's and don'ts

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## Key point

- Differential diagnosis for coronavirus disease 2019 (COVID-19) caused by SARS-CoV-2 and hepatitis caused by adenovirus is of great importance.
- Possible etiology is adenovirus.
- Any hepatitis-related symptoms must be reported to health authorities.
- It is suggested to use preventive measure like hand-washing before and after having food and avoiding to contact blood to stop the transmission of the hepatitis in young children to not be reported more in the coming days.
- History of COVID-19 must be checked in the infected patients.
- Fever was not reported for new mysterious hepatitis.
- About 10% of the patients with new mysterious hepatitis need liver transplantation.
- Infected patients with new mysterious hepatitis are healthy people.

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Recently, three patients of severe hepatitis in children less than 10 years in Spain and 74 patients mostly aged 2-5 years in the United Kingdom, and also nine patients in Alabama aged 1-6 years were reported (1, 2). The mortality following reported hepatitis was rare however it resulted in severe form of illness showing the liver inflammation in which 6 out of 74 patients in the UK, one out of three cases in Spain and two out of nine cases in Alabama required liver transplantation (3, 4). According to a study by Marsh et al, mysterious hepatitis in which thirteen patients with hepatitis were admitted to the Royal hospital for children in Glasgow while their routine cases were 4 cases per year (5). Laboratory tests revealed that the possible etiology is adenovirus extracted from more than 50% of the patients in the UK and Alabama (1). It is essential to conduct further laboratory and epidemiologically research to find the strong evidence. By 29

April 2022, 169 patients of hepatitis with unknown etiology have been reported from 12 countries in which 74 out of 169 patients were positive for adenovirus (6). According to the Pan American Health Organization (PAHO) report, adenovirus-41 was detected in 5 out of 9 patients by reverse transcription polymerase chain reaction (RT-PCR) (7). Although adenoviruses were rarely linked with hepatitis in pediatric with immunodeficiency but not in healthy people (8). Regarding the symptoms of hepatitis, jaundice, abdominal pain, vomiting, diarrhea, encephalopathy, elevated aspartate transaminase (AST) or alanine aminotransferase (ALT) > 500 IU/L, white eyes and yellow skin, hepatomegaly are common in the reported cases (7, 9, 10). Therefore, paying attention to the hepatitis caused by adenovirus is crucial by health authorities due to severe complication and measure like hand-washing before and after having food and avoiding blood contact to

stop the transmission of the hepatitis in young children are necessary.

#### Authors' contribution

TS, MK, ND and RV were the principal investigators of the study. HH, RT, RV, ND and TS were included in preparing the concept and design. HH and RV revisited the manuscript and critically evaluated the intellectual contents. All authors participated in preparing the final draft of the manuscript, revised the manuscript and critically evaluated the intellectual contents. All authors have read and approved the content of the manuscript and confirmed the accuracy or integrity of any part of the work.

#### Conflicts of interest

The authors declare that they have no competing interests.

#### Ethical issues

This epidemiology and prevention letter was conducted in accord with the World Medical Association Declaration of Helsinki. Besides, ethical issues (including plagiarism, data fabrication and double publication) have been completely observed by the authors.

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#### References

1. Science. Mysterious hepatitis outbreak sickens young children in Europe as CDC probes cases in Alabama. Available at <https://www.science.org/content/article/mysterious-hepatitis-outbreak-sickens-young-children-europe-cdc-probes-cases-alabama>.
2. UK Health Security Agency. Increase in acute hepatitis cases of unknown aetiology in children. Available at <https://www.gov.uk/government/publications/hepatitis-increase-in-acute-cases-of-unknown-aetiology-in-children/increase-in-acute-hepatitis-cases-of-unknown-aetiology-in-children>.
3. World Health Organization (WHO). Acute hepatitis of unknown aetiology – the United Kingdom of Great Britain and Northern Ireland. Available at <https://www.who.int/emergencies/disease-outbreak-news/item/acute-hepatitis-of-unknown-aetiology---the-united-kingdom-of-great-britain-and-northern-ireland>.
4. Alabama's Health. Investigations of nine young children with adenovirus are underway. Available at <https://www.alabamapublichealth.gov/blog/2022/04/nr15.html>.
5. Marsh K, Tayler R, Pollock L, Roy K, Lakha F, Ho A, et al. Investigation into cases of hepatitis of unknown aetiology among young children, Scotland, 1 January 2022 to 12 April 2022. *Euro Surveill.* 2022;27:2200318. doi: 10.2807/1560-7917.ES.2022.27.15.2200318.
6. Reliefweb. Epidemiological Alert: Acute, severe hepatitis of unknown origin in children, 29 April 2022. Available at <https://reliefweb.int/report/world/epidemiological-alert-acute-severe-hepatitis-unknown-origin-children-29-april-2022>.
7. Pan American Health Organization (PAHO). Acute, severe hepatitis of unknown origin in children. Available at [https://reliefweb.int/sites/reliefweb.int/files/resources/2022-April-29\\_PHE-Acute%20severe%20hepatitis%20of%20unknown%20origin\\_EN.pdf](https://reliefweb.int/sites/reliefweb.int/files/resources/2022-April-29_PHE-Acute%20severe%20hepatitis%20of%20unknown%20origin_EN.pdf).
8. World Health Organization (WHO). Multi-Country – Acute, severe hepatitis of unknown origin in children. Available at <https://www.who.int/emergencies/disease-outbreak-news/item/2022-DON376>.
9. European Centre for Disease Prevention and Control. Increase in acute hepatitis of unknown origin among children – United Kingdom. Available at <https://www.ecdc.europa.eu/en/news-events/increase-acute-hepatitis-unknown-origin-among-children-united-kingdom>.
10. European Centre for Disease Prevention and Control. Update: Hepatitis of unknown origin in children. Available at <https://www.ecdc.europa.eu/en/news-events/update-hepatitis-unknown-origin-children>.