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hMPV: Is It Another Covid-19 Like Situation?

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Abstract

Human metapneumovirus (hMPV) is slowly gripping some parts of China. Having similar symptoms with Covid-19, this respiratory disease has a moderate fatal rate especially affecting children and elderly. However, the matter of concern is that there has been alarming rise in hospitalization. Although refuted by World Health Organization, the possibility of faster spread cannot be ruled out. This opinion article appraises the symptoms, severity as well as recent surge of this disease along with precautionary anecdotes for containment as well as proper isolation of the virus-infected.

Keywords: hMPV; Respiratory Disease; Hospitalization; Symptoms; Isolation

Abbreviations

hMPV: Human Metapneumovirus; TRIM: Tripatite Motif; IFITM: Interferon-Induced Transmembrane Proteins; WHO: World Health Organization; NCPDA: National Disease Control and Prevention Administration; COPD: Chronic Obstructive Pulmonary Disease; RNA: Ribonucleic Acid.

Introduction

The respiratory virus known as human metapneumovirus (hMPV), which belongs to the Pneumoviridae family, was initially identified in 2001 after being isolated from Dutch children's respiratory tracts [1]. In children, immunocompromised individuals, and the elderly, hMPV is one of the main causes of acute respiratory tract infections (ARTI). In infants younger than five years old, this infection is likewise regarded as a major cause of death. Numerous studies have demonstrated that hMPV is quite common around the world, impacting up to 86% of infants under five. Global health care systems are bearing a heavy financial load as a result of this infection. This hMPV has again risen in December last year—creating a fear in worldwide for a Covid-19 like situation [2-7]. The world has already a heavy toll because of this pandemic. Covid-19 has resemblance with hMPV. This short communication appraises the structure. It also highlights the severity as well as other allied features of this.

Structure

Approximately 13.3 kb of single-stranded (ss), negative-sense, non-segmented RNA make up the genome of the hMPV. Nine structural proteins, each with a distinct function, are encoded by this virus. The genes encoding these proteins are located in the viral genome in the following order: -1/-2)-SH-G-L-5′ 3′-N-P-M-F-M2. The genomic ssRNA is encapsulated and protected by the nucleoprotein (N—43.5 kDa), which binds to it. After interacting with the RNA-N protein complex, the phosphoprotein (P—32.4 kDa), a co-factor of the L protein, is necessary for stabilization and the creation of new genetic material. These two proteins, N and P, are primarily responsible for the inclusion bodies that are frequently found during hMPV infections. The main component of the virus, the matrix (M—27.6 kDa) protein, has a high-affinity binding site for Ca2+ and facilitates viral assembly and budding. Remarkably, this protein can cause the release of inflammatory cytokines in in vitro cultures and

appears to be produced in a soluble form by infected cells. The fusion protein (F—58.4 kDa) is in charge of membrane fusion and virus-cell binding. Figure 1 depicts the structure and replication process of the hMPV [1].

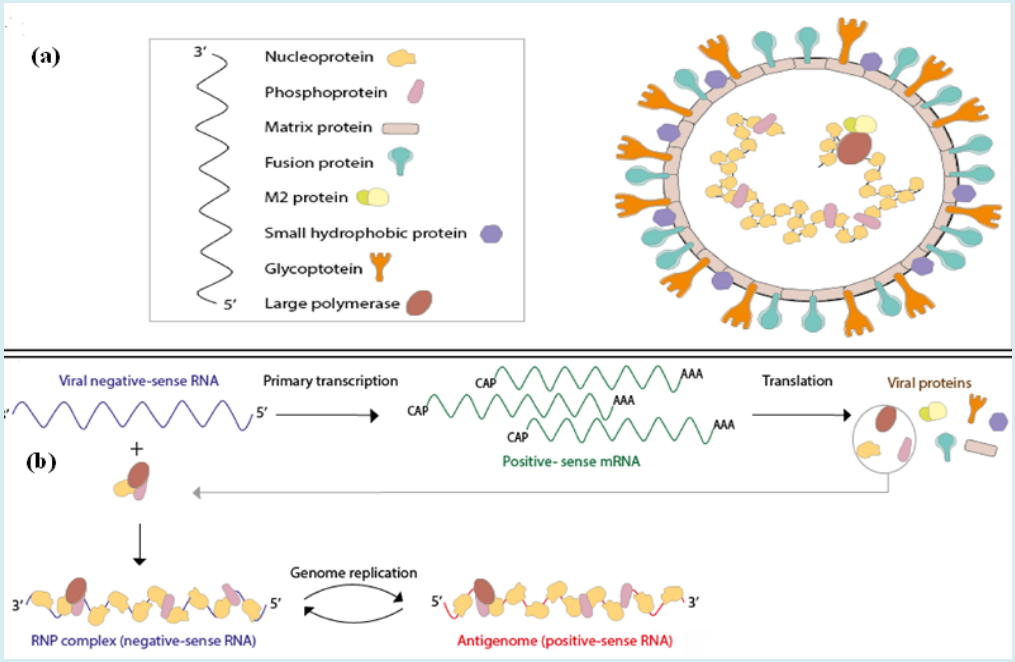

Figure 1: (a) Structure and genetic material hMPV, (b) replication cycle [Modified after [1]].

Symptoms

Fever, cough, running nose, and wheezing are all symptoms of hMPV and other respiratory viruses that are quite similar to those of the flu or common cold. Particularly in children, severe hMPV infections can result in pneumonia or bronchitis. The virus is extremely contagious in crowded environments because it spreads by respiratory droplets and intimate physical contact.

The hMPV frequently produces mild to moderate flu-like symptoms. The winter and early spring seasons are when it is most common. Although upper respiratory infections are the virus's usual symptom, it can occasionally cause more serious illnesses, especially in young children and the elderly [8-15].

Mode of Transmission

Direct contact with an infected person or surface can lead to spread of hMPV. The virus is comparable to measles, mumps, and RSV, among other respiratory viruses. hMPV does not have a vaccine even after twenty years of its discovery, and there are no antiviral medications like there are for COVID-19. Vulnerable populations, including as young children and the elderly, should be especially concerned about the continued outbreak. While older adults with pre-existing diseases, such asthma or chronic obstructive pulmonary disease (COPD), are more likely to experience difficulties, children, whose immune systems are still growing, are particularly vulnerable to severe symptoms [9-12].

Recent Surge Scenario

As winter approaches, China is facing an increase in respiratory diseases caused by hMPV. Five years after the Covid-19 epidemic began, the outbreak has occurred, and reports indicate that hospitals and cemeteries are finding it difficult to handle the growing number of patients. While some users assert that several viruses, such as hMPV, influenza A, Mycoplasma pneumoniae, and even Covid-19, are circulating concurrently, social media posts and online videos show congested hospitals. Concerns have been raised about overburdened medical facilities, especially in children's hospitals, which are said to be struggling as a result of a dramatic rise in pneumonia and "white lung" cases—a term used to characterize severe signs of pneumonia. China's disease control authorities are acting proactively in response to the spike. In an effort to better monitor and address the increase in respiratory infections, especially during the winter, the National Disease Control and Prevention Administration (NCDPA) has started a trial monitoring program for pneumonia of unknown origin. Compared to five years ago, when the nation failed to contain the Covid-19 epidemic because of a lack of monitoring

systems for emerging viruses, this new program represents a shift in readiness. According to an NCDPA statement this week, the week of December 16–22 saw a sharp increase in respiratory infections. In order to provide a better coordinated response to the current crisis, the NCDPA's new rules require laboratories to disclose infections while disease control organizations verify and handle the cases. Gradually, hMPV is spreading to south-east Asian countries. India has already reported more than six cases.

Severity

The majority of cases are minor and treatable at home with rest and fluids. To control symptoms, severe instances could need oxygen therapy, hospitalization, or corticosteroid therapies. Experts recommend avoiding crowded areas, washing hands frequently, using a well-fitting N95 mask, and remaining vigilant in order to reduce risk. Even a slight resemblance to the prior outbreak may seem like a frightening menace in a civilization still recovering from the legacy of COVID-19. The Union Ministry of Health and Family Welfare and Indian health specialists, however, have discounted the possibility that hMPV could cause extensive disruption.

No emergency has been confirmed or proclaimed by the World Health Organization (WHO) or China. The American Society for Microbiology reports that hMPV has been detected globally since its discovery in 2001. The most closely related human pathogen to hMPV is respiratory syncytial virus, or RSV, a pneumovirus. The viruses' genomes share many characteristics, but they also differ significantly. This virus, which is linked to upper and lower respiratory tract infections and may provoke asthma, is a frequent respiratory pathogen, especially in newborns and young children. Research has indicated that it is particularly deadly for babies [13-15].

Final Remarks

Conclusively, it has been reported that there are inherent antiviral factors that can directly hinder the viral replication or fusion of hMPV with its target cells. Some of the best-characterized antiviral factors to date include TRIM and IFITM. In vitro infections with some hMPV subtypes have been reported to be prevented by IFITM3. TRIM56, however, does not appear to be involved in the suppression of hMPV replication. To properly understand the molecular pathways behind hMPV infections, more research is needed. Since these molecules are essential in the regulation of viral infections and their involvement in hMPV infections needs to be understood, a great deal of attention should be paid to the host's intrinsic antiviral factors.

References

1. Soto JA, Gálvez NM, Benavente FM, Pizarro-Ortega MS, Lay MK, et al. (2018) Human metapneumovirus: mechanisms and molecular targets used by the virus to avoid the immune system. Frontiers in immunology 9: 2466.

2. Biswas R (2020) Are Men More Vulnerable to Covid-19 as Compared to Women. Biomed J Sci Tech Res 27(2).

3. Biswas R (2020) Nanosponges: a viable option for combating Covid-19. J Clinical Research and Reports 5(4).

4. Biswas R (2021) Covid-19 and race for rapid diagnosis. J Bacteriol Mycol Open Access 9(2): 54-55.

5. Biswas R (2021) Variants of SARS-Cov-2: a cause of concern. J Bacteriol Mycol Open Access 9(4): 150-151.

6. Biswas R (2022) Outlining Big Data Analytics in Health Sector with Special Reference to Covid-19. Wireless Pers Commun 124(3): 2097-2108.

7. Biswas R (2022) Covid-19 and its Impact on Eye. Tr Ophtha Open Acc J 3(4).

8. Chang A, Masante C, Buchholz UJ, Dutch RE (2012) Human metapneumovirus (HMPV) binding and infection are mediated by interactions between the HMPV fusion protein and heparan sulfate. Journal of virology 86(6): 3230-3243.

9. Gálvez NMS, Andrade CA, Pacheco GA, Soto JA, Stranger V, et al. (2021) Host components that modulate the disease caused by hMPV. Viruses 13(3): 519.

10. Feuillet F, Lina B, Rosa-Calatrava M, Boivin G (2012) Ten years of human metapneumovirus research. Journal of clinical virology 53(2): 97-105.

11. Hamelin MÈ, Abed Y, Boivin G (2004) Human metapneumovirus: a new player among respiratory viruses. Clinical infectious diseases 38(7): 983-990.

12. Leung J, Esper F, Weibel C, Kahn JS (2005) Seroepidemiology of human metapneumovirus (hMPV) on the basis of a novel enzyme-linked immunosorbent assay utilizing hMPV fusion protein expressed in recombinant vesicular stomatitis virus. Journal of clinical microbiology 43(3): 1213-1219.

13. Haas LEM, Thijsen SFT, Van Elden L, Heemstra KA (2013) Human metapneumovirus in adults. Viruses 5(1): 87-110.

14. Edwards KM, Zhu Y, Griffin MR, Weinberg GA, Hall CB, et al. (2013) Burden of human metapneumovirus infection in young children. New England Journal of Medicine 368(7): 633-643.

15. Wilkesmann A, Schildgen O, Eis-Hübinger AM, Geikowski T, Glatzel T, et al. (2006) Human metapneumovirus infections cause similar symptoms and clinical severity as respiratory syncytial virus infections. European journal of pediatrics 165: 467-75.