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Does a younger host make the virus weaker? Presenting a new hypothesis

A B S T R A C T

Keywords: Covid-19 Transmission Mortality Virulence

Background: COVID-19 is a pandemic, resulting in large number of deaths all over the world. Methods: The risk factors for mortality are not clearly understood. We are presenting a new hypothesis. Results: Virus become more virulent as it passes through weaker hosts and vice versa. Conclusions: Viruses become more virulent when it passes through weaker and older hosts. It will be worth analysing the transmission chain of COVID-19 from this perspective.

While compiling the data about doctors’ deaths in India during the COVID-19 pandemic, the case of a 50-year-old doctor who contracted the infection while taking care of his mother at home was observed. The mother did not survive the illness, and the son succumbed 13 days later [1]. Although the twin deaths could be potentially explained by high levels of unprotected droplet exposure or perhaps an inherited defect in innate immunity, an alternative explanation might be considered in this case. Did the son get a more virulent selection of virus after it passed through his mother, who was an older and weaker host? In other words, would the mother and son have survived, had the direction of transmission been reversed?

Host traits are known to affect the natural selection of RNA viruses, which are relatively more prone to mutate due to lack of proof-reading ability [2]. For instance, Arboviruses undergo rapid natural selection within the body of the mosquito. After a mosquito consumes a blood meal containing a virus, only the ablest viruses among the progeny survive the long multi-stage journey from the gut till the salivary gland of the mosquito [3]. Coxsackie virus CVB3 is known to become more virulent as it passes through weaker and older mice hosts [4].

In the study of 108 COVID-related deaths among doctors in India, nearly half were general practitioners, who saw older patients [5]. By contrast, there were only two deaths among paediatricians, who also see large numbers of patients. It is now known that children are equally likely to carry the virus. In fact, younger children are reported to host up to 100 times more viruses in their upper respiratory tracts compared to adults. The question is, did the general practitioners receive a more virulent form of the SARS-CoV-2 virus from their older patients?

It will be worth analysing the transmission chain of COVID-19 from this perspective, specifically to see if the age and frailty of the donor of the virus made a difference in the outcome in the host. In other words, if the infection was acquired from a younger person, could the illness be milder? (Fig. 1)

This could be one of the reasons for the apparently low case fatality rates in countries such as India where the average age of a citizen is only 28.4, when compared to UK with an average age of 40 and France, where the average age is 41. The extraordinarily high COVID-19 mortality observed in nursing homes is also consistent with this hypothesis.

If found to be true, it will have considerable impact on pandemic control strategies.
None needed.

None indicated.

None.

Patients or the public WERE NOT involved in the design, or conduct, or reporting, or dissemination plans of my research.

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