Source : www.thehindu.com Date : 2022-02-13

HUMAN CHALLENGE STUDY FINDS HIGH VIRAL SHEDDING IN ASYMPTOMATIC PEOPLE

Relevant for: Developmental Issues | Topic: Health & Sanitation and related issues

Close up of a young man having a nasal swab test done by his doctor | Photo Credit: Geber86

The Imperial College London has concluded the first study on 36 participants aged 18–29 years who were deliberately exposed to low dose of SARS-CoV-2 virus through the nose, and the various facets of infection were studied. All the volunteers had no previous infection or vaccination. In all, only 18 of 36 participants became infected, and the viral load in these people increased steeply before peaking on day five post-exposure.

Virus was first detected in the throat but the viral load increased to significantly higher levels in the nose than in the throat. Viral shedding began within two days of infection and the viral load increased to high levels and remained detectable for as long as 12 days after exposure to the virus. The results are posted as a preprint server *Research Square.* Preprints are yet to be peer-reviewed.

“This paper is the first of a series of deep analyses that this unprecedented consortium will produce. The manufacture of a Delta challenge agent is nearly complete,” immunologist Dr. Christopher Chiu from the Imperial College of London who led the team tweeted.

The study did not find any quantitative correlation between viral load and symptoms; high viral load and high viral shedding were seen even among participants who were asymptomatic. This suggests how wrong it is to consider asymptomatic people as less likely to infect others as such people are believed to have low viral load.

While it is estimated that the incubation period is about five days post-exposure before symptoms show up, the human challenge study found that symptoms were found to be associated with viral shedding within two–four days of inoculation. Importantly, virus was first detected in the throat and then the nose about two days before peak symptoms showed up. Viral load in the throat and nose increased steeply to achieve a sustained peak, in many cases before peak symptoms were reached. This corresponds to many modelling studies that indicated up to 44% of transmissions occur before symptoms show up.

“With virus present at significantly higher titres in the nose than the throat, these data provide clear evidence that emphasises the critical importance of wearing face coverings [masks] over the nose as well as mouth,” they write.

Mild-to-moderate symptoms were reported by 16 (89%) infected participants. The symptoms began two–four days after being deliberately exposed to the virus. Loss of smell developed “more gradually” in 12 volunteers. “In this first SARS-CoV-2 human challenge study, no serious safety signals were detected,” they write.

Since this is the first time a human challenge study is undertaken using the SARS-CoV-2 virus, and with incomplete understanding of long-term effects following COVID-19 disease, the study progressed in small steps. They investigators from the Imperial College of London undertook maximum risk reduction at the beginning and proceeded by adding more participants once clinical features of the disease were collected from the earlier sets of people who were deliberately exposed to the virus.

Initially three participants were enrolled followed by seven. All the 10 participants were given remdesivir pre-emptively once nose or throat swabs showed quantifiable SARS-CoV-2 virus. The purpose behind this was to mitigate any risk of progression to severe disease. External experts found that pre-emptive remdesivir treatment was unnecessary.

Of the first 10 participants who received pre-emptive remdesivir on PCR-confirmed infection, six became infected. There was no difference between the viral load between those who received pre-emptive remdesivir and those who did not. Among the six remdesivir-treated individuals, there was an apparent trend towards lower viral load in the nose during treatment and peaking of viral load was also delayed. But no such difference was observed in the throat. Hence pre-emptive remdesivir treatment was discontinued in other volunteers who were enrolled later.

“This study was not designed nor powered to assess the efficacy of early treatment with remdesivir so this remains to be tested,” they write.

Once pre-emptive remdesivir was no longer used, clinical severity criteria based on certain symptoms such as persistent fever, persistent severe cough, greater than mild CT imaging changes were used for providing treatment with monoclonal antibodies (Regeneron), but no such treatment was ultimately required, they write.

In the 18 infected individuals, viral shedding was detected from the throat 40 hours after deliberate introduction. Viral shedding from the throat was detected earlier than in the nose. This is because viral load peaked in the throat earlier than in the nose. Viral load peaked in the throat 112 hours (about 4.7 days) after inoculation, while viral load peaked in the nose 148 hours (about 6.2 days) after the virus was introduced into the nose of participants. “However, at its peak, viral load was significantly higher in nasal samples,” they write.

Since some participants continued to shed infectious virus even 12 days after virus introduction, and, on average, viable virus was detectable 10 days post-inoculation (up to eight days after symptom onset). “These data therefore support the isolation periods of 10 days post-symptom onset advocated in many guidelines to minimise onward transmission,” they note.

Neutralising antibodies were generated in all infected participants 14 days post inoculation and further increased at 28 days.