Review of: "Virological characteristics of SARS-CoV-2 vaccine breakthrough infections in health care workers"

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This group looked at virologic characteristics of the 161 vaccine breakthrough infections in a population of nearly 25,000 vaccinated healthcare workers in the Netherlands. Viral culture and RT PCR were methodologies used. These cases occurred at a time when the delta variant (B.1.617.2) was circulating in great numbers. The results showed that despite similar CT values on RT PCR the probability of detecting infectious virus in respiratory samples was lower in those who had been vaccinated than those who were unvaccinated. Their conclusion that shedding of infectious virus was reduced in these cases was noted by an additional fact that the CT values increased throughout the first three days of illness.

They say decreased: should that be changed to increased?

This paper addresses the virologic kinetics of the SARS-CoV-2 breakthrough infections and the role of the vaccinated host in the transmission cycle. These types of studies are essential to dictate public health policies and prevention.

The healthcare workers were vaccinated with a variety of mRNA and viral vector vaccines. Viral cultures performed as a proxy for infectivity. They classified infections as breakthrough if they occurred greater than 14 days after completion of the recommended vaccine doses.

Limitations in the study are that a variety of COVID vaccines were employed with somewhat over an overrepresentation of the AD 26 COV2.S and BNT 162b2 vaccines. Potential co-factors could not be adjusted based on this. CT values were looked at as a surrogate for nasopharyngeal viral load, showing not unexpectedly that CT values were significantly lower in symptomatic breakthrough infections, corresponding to higher viral loads.

There were no statically significant differences in CT values between healthcare workers immunized with the four different vaccines. The time of administration of the last vaccine dose showed no specific relationship with CT values.

Their conclusion that SARS-CoV-2 infection virus shedding is lower in vaccinated individuals with breakthrough infections is encouraging and if this data pans out in other studies of vaccinated individuals it lends more support to vaccination as a primary preventive strategy.

Nonetheless, viral culture was positive in over two-thirds of breakthrough infections

Where it says line 100, CT values decrease throughout the first three days of illness, I wonder if the authors mean increased?

Using CT value as a proxy for infectivity is commonly done but not supported by robust data. Viral cultures may be inaccurate depending on laboratory methods, freezing and unfreezing of specimens, and dilution effects. I think the authors need to address this.

Another question would be: were antibody levels to either N-protein or spike protein obtained in this population prior to or concurrent with their evaluation? Did any of the healthcare workers have a previous history of SARS-CoV-2 infection?

Overall well-done methodology and paper.