Editorial

Surface Viability of COVID-19

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Currently, SARS-CoV-2 (COVID-19)-transmission evaluating data are limited and controversy. The majority of our knowledge is based on severe acute respiratory syndrome coronavirus1 (SARS-CoV-1), middle east respiratory syndrome coronavirus (MERS-CoV),and influenza virus **(**1**)**. The longest survival of SARS-CoV on surfaces have done by placing a very large initial virus titer sample (107 infectious virus particles) on the surfaces was 6 days **(**2**)**. SARS-CoV-1 can survive in the sputum, stool, and serum for at least 96 hours **(**3**)**. Recent study demonstrated that under controlled experimental conditions, fomite transmission of SARS-CoV-2 (COVID-19) can remain viable for days on surfaces **(**4**)**.

This study demonstrated that SARS-CoV-2 (COVID-19) was more stable on plastic and stainless than copper and cardboard, and viable virus was detected up to 72 hours after application to these surfaces, although the virus titer was reduced from 103.7 to 100.6TCID50 (50 % tissue-culture infectious dose) per millimeter of medium after 72 hours on plastic and from 103.7 to 100.6 TCID50 per millimeter after 48 hours on stainless steel **(**4**)**. SARS-CoV-2 (COVID-19) remained viable in aerosols throughout 3 hours of this experiment duration **(**4**)**. Several previous studies used a sample of 107, 106, and 104 particles of infectious influenza virus on a small surface area **(**2, 4, 5**)** that are much higher concentration than those in the real-life-situation droplets, with possible several orders of magnitude of the actual virus deposition on the surfaces **(**6**)**. Dowell et al demonstrated that no viable SARS-CoV was identified on fomites **(**7**)**.

Goldman E proposed that the chance of transmission through inanimate surfaces are very small, except someone touches the surface with coughs or sneeze of an infected individual after the cough or sneeze within 1-2 hours **(**8**)**. Holmes E revealed that at room temperature, SARS-CoV-2 (COVID-19) remains viable up to 4 days on glass, up to 3 days on plastic and stainless steel, up to 2 days on clothes, up to 1 day on paper or cardboard, and up to 4 hours on copper and the surface viability of SARS-CoV-2 (COVID-19) is decreased by heat and simulated sunlight **(**9**)**.

The National Academies of Sciences of Engineering Medicine claims that the surface viability of SARS-CoV-2 (COVID-19) are up to 3 hours on printing paper and tissue paper, up to 4 hours on copper, up to 24 hours on cardboard, up to 2 days on clothes, up to 2 days on wood, up to 4 days on paper money, up to 4 days on glass, during 3-7 days on plastic, during 2-7 days on stainless steel, and after 7 days on the outside of the surgical mask **(**10**)**. Interestingly,metals containing copper demonstrates viricidal properties **(**11**)**.

Casanova et al revealed that the association between inactivation of the SARS-CoV and the relative humidity (RH) was not monotonic, at low RH (20 %) and high RH (80 %), there was greater survival or greater protective effect than at moderate RH (50 %) **(**12**)**. Kampf et al demonstrated that SARS-CoV-2 (COVID-19) can persist on surfaces up to 9 days **(**13**)**. Nevertheless, recently, Gale J demonstrated that SARS-CoV-2 (COVID-19) can survive for 28 days on smooth surfaces, such as glass found on mobile phone screen and plastic banknotes at room temperature, or 20 degrees Celcius (68 degrees Fahrenheit), compared to 17 days of survival for flu virus **(**14**)**.

Conclusion

In conclusion, also to aerosol transmission, infection via surfaces should be considered. Surface disinfection could be done with 62-72 % ethanol or 0.1 % sodium hypochlorite.

References

1.Otter JA, Donskey C, Yezli S, Douthwaite S, Goldenberg SD, Weber DJ. "Transmission of SARS and MERS coronaviruses and influenza virus in healthcare settings : the possible role of dry surface contamination". J Hosp Infect 2016; 92 : 235-250.

2.Rabenau HF, Cinatl J, Morgenstern B, Bauer G, Preiser W, Doerr HW. "Stability and inactivation of SARS coronavirus". Med Microbiol Immunol 2005; 194 : 1-6.

3.Chowell G, Abdirizak F, Lee S, Lee J, Jung E, Nishiura H, et al. "Transmission characteristics of MERS and SARS in the healthcare setting : a comparative study". BMC Med 2015; 13 : 210.

4.van Doremalen N, Bushmaker T, Morris DH, Holbrook MG, Gamble A, Williamson BN, et al. "Aerosol and surface stability of SARS-CoV-2 as compared with SARS-CoV-1". N Engl J Med 2020; 383 : 1564-1567.

5.Duan SM, Zhao XS, Wen RF, Huang JJ, Pi GH, Zhang SX. "Stability of SARS coronavirus in human specimens and environment and its sensitivity to heating and UV irradiation". Biomed Environ Sci 2003; 16 : 246-255.

6.Lindsley WG, Blachere FM, Thewlis RE, et al. "Measurements of airborne influenza virus in aerosol particles from human coughs". PLoS One 2010; 5 : e15100.

7.Dowell SF, Simmerman JM, Erdman DD, et al. "Severe acute respiratory syndrome coronavirus on hospital surfaces". Clin Infect Dis 2004; 39 : 652-657.

8.Goldman E. "Exaggerated risk of transmission of COVID-19 by fomites". Lancet 2020; 20 : 892-893.

9.Holmes E. "Viability of SARS-CoV-2 on surfaces". Rapid Research Information Forum 2020; 9 pages. Published on May 27, 2020.

10. "The National Academies of Sciences Engineering Medicine How long does coronavirus live on surfaces ?". 2020. pages.

11.Fiorillo L, Cervino G, Matarese M, Amico CD, Surace G, Paduano V, et al. "COVID-19 surface persistence : a recent data summary and its importance for medical and dental settings". International Journal of Environmental Research and Public Health 2020; 10 pages. Published on April 30 2020.

12.Casanova LM, Jeon S, Rutala WA, Weber DJ, Sobsey MD. "Effects of air temperature and relative humidity on coronavirus survival on surfaces". Applied and Environmental Microbiology, May 2010. p : 2712-2717.

13.Kampf G, Todt D, Pfaender S, Steinmann E. “Persistence of Coronaviruses on inanimate surfaces and their inactivation with biocidal agents”. J Hosp Infect 2020; 104 : 246-251.

14.Gale J. Prognosis : “coronavirus may stay for weeks on banknotes and touchscreens”. Bloomberg Equality : Letter from Bloomberg. Published on October 11, 2020.

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