Abstract # 431

SARS-CoV-2 environmental contamination in hospitalized COVID-19 patients' rooms

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Abstract (*revised*)

Background: The correlation between SARS-CoV-2 RNA and infectious viral contamination of the hospital environment is poorly understood.
Methods: We performed a prospective observational study of inpatients with SARS-CoV-2 infection who were housed in a dedicated COVID-19 unit at an academic medical center. Environmental samples were taken within 24 hours of the first positive SARS-CoV-2 test (day 1) and again on days 3, 6, 10 and 14. Patients were excluded if samples were not obtained on days 1 and 3. Surface samples were obtained with flocked swabs pre-moistened with viral transport media from seven locations inside (bedrail, sink, medical prep area, room computer, exit door handle) and outside the room (nursing station computer). RNA extractions and RT-PCR were completed on all samples. RT-PCR positive samples were used to inoculate Vero E6 cells for 7 days and monitored for cytopathic effect (CPE). If CPE was observed, RT-PCR was used to confirm the presence of SARS-CoV-2.
Results: We enrolled 20 patients (Table 1, Patient Characteristics) between October 2020 and June 2021. A total of 347 individual samples were obtained – 145 on day 1, 140 on day 3, 48 on day 6, and 14 on day 10. Overall, 19 (4.1%) samples were positive via RT-PCR – 9 from bedrails (9.2%), 4 from sinks (8.0%), 4 from room computers (8.0%), 1 from the medical prep area (2.0%) and 1 from the exit door handle (2.0%). Notably, all nursing station computer samples were negative (Figure 1). Of the 19 positive samples, 6 were from day 1, 10 on day 3, 2 on day 6 and 1 on day 10. Only one sample, obtained from the bedrails of a symptomatic patient with diarrhea and a fever on day 3, was culture-positive (Figure 2).
Discussion: Overall, the amount of environmental contamination of viable SARS-CoV-2 virus in rooms housing COVID-19 infected patients was low. As expected, more samples were considered contaminated via RT-PCR compared to cell culture, supporting the conclusion that the discovery of genetic material in the environment is not an indicator of contamination with live infectious virus. More studies including RT-PCR and viral cell culture assays are needed to determine the significance of discovering SARS-CoV-2 RNA versus infectious virus in the clinical environment.

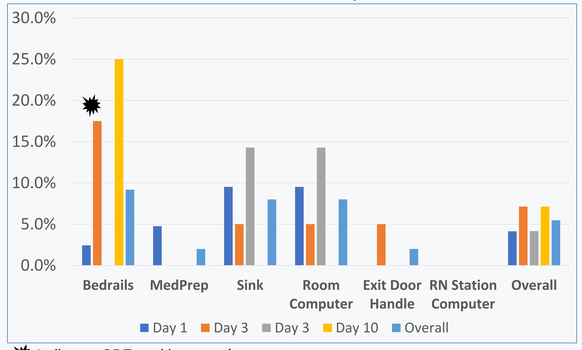
Background

- The correlation between SARS-CoV-2 RNA and infectious viral contamination of the hospital environment is poorly understood
- Goal: Study SARS-CoV-2 hospital room contamination and compare the presence of RNA to live infectious virus

Methods

- Cultured inpatient rooms housing COVID-19 patients from October 2020 – June 2021
- Cultures were taken on day 1 (within 24 hours of first positive SARS-CoV-2 test) and again on days 3, 6, 10 and 14
- Rooms were excluded if cultures were not obtained on sample days 1 and 3
- Sample locations:
  - Inside patient room - Bedrails, sink, medical prep area, and the room computer
  - Outside patient room – Assigned nurse's nursing station computer
- RT-PCR positive samples were used to inoculate Vero E6 cells for 7 days and monitored for CPE
- If CPE was observed, presence of SARS-CoV-2 was confirmed via RT-PCR

Figure 1. Proportion of SARS-CoV-2 Positive Cultures by Sample Location and Day



✹ Indicates CPE positive sample

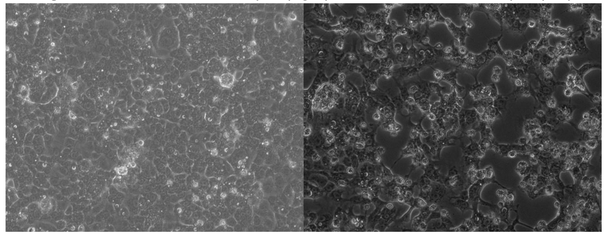
Results

Table 1. Patient Characteristics

	Total (%) n=20
Age, years (IQR)	65 (50-73)
Female	8 (40)
Hospital Length of Stay, days (IQR)	5 (3-11)
Room Length of Stay, days (IQR)	5 (3-10)
Prior Room Occupant COVID-19 Positive	17 (85)
On Supplemental Oxygen	11 (55)
Ventilator	0 (0)
Bipap	0 (0)
Facemask	0 (0)
Nasal O2	11 (55)
None	9 (45)
Aerosol-generating procedure	3 (15)
Nebulizer	3 (15)
Intubation	0 (0)
Bronchoscopy	0 (0)
Other procedure	0 (0)
Patient Wearing Facemask in Room	0 (0)
Providers Wearing Respirator in Room	19 (95)
Symptomatic	15 (75)
Fever	8 (40)
Cough	6 (30)
SOB	8 (40)
Diarrhea	5 (25)
Bedridden	0 (0)
Stool incontinent	1 (5)
Urine Incontinent	2 (10)

- Total Samples: 347 total, 140 on day 1, 140-day 3, 48-day 6, 14-day 10 and 0-day 14
- Overall, 19 (4.1%) samples were positive via RT-PCR – 9 from bedrails (9.2%), 4 -sinks (8.0%), 4-room computers (8.0%), 1 from-medical prep area (2.0%) and 1-exit door handle (2.0%)
  - All nursing station computer samples were negative
  - Of the 19 positive samples, 6 were from day 1, 10 on day 3, 2 on day 6 and 1 on day 10 (Fig 1)
- Only one sample, obtained from the bedrails of a symptomatic patient with diarrhea and a fever on day 3, was culture-positive (Fig 2)

Figure 2. CPE Positive sample (right) and CPE Control sample (left)



Conclusions

- Overall, the amount of environmental contamination of viable SARS-CoV-2 virus in rooms housing COVID-19 infected patients was low
- The discovery of genetic material in the environment is not an indicator of contamination with live infectious virus
- More studies including RT-PCR and viral cell culture assays are needed to better understand the implications of SARS-CoV-2 environmental contamination