Comparison of Clinical Characteristics of Endemic vs. SARS-CoV-2 Coronavirus Infection in Patients Admitted to a Community Teaching Hospital

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Abstract

Background: Most endemic coronaviruses (EC) are associated with mild upper respiratory tract infections (RTI), but can be associated serious disease. More recently, novel coronaviruses associated with SARS, MERS, and COVID-19 caused by SARS-CoV-2 have emerged and are often associated with serious disease and death. With this report, we compare presenting clinical characteristics and some outcomes of patients hospitalized with RTI caused by EC or SARS-CoV-2 (COVID-19).

Methods: Patients admitted to the Summa Health System (SHS) with RTI associated with EC or COVID-19 were identified via rapid diagnostic technology. Patients were selected from two existing quality improvement registries encompassing EC and COVID-19 cases. We compared clinical characteristics and outcomes of EC patients to those of COVID-19.

Results: Significant differences in patient characteristics with EC vs. COVID-19 included: older age, primarily Caucasian, smoking history, requiring O_2 supplementation on admission, and having chronic heart, lung, or renal disease. Significant differences in patient characteristics with COVID-19 vs. EC included: admission from extended care facility, obesity, presenting with fever, gastrointestinal symptoms and/or myalgia, presence of radiographic infiltrates, abnormal liver tests, and longer length of stay (LOS).
Conclusion: There were significant differences in clinical characteristics between the two groups with EC patients more likely to have lung disease (often COPD) and requiring admission for need of O_2 supplementation. COVID-19 patients were more likely to present with a febrile illness associated with pneumonia and require longer LOS (often requiring O_2 supplementation later in hospitalization). Patients admitted with COVID-19 present with different clinical characteristics than those with EC, with numerically higher mortality rate.

Introduction

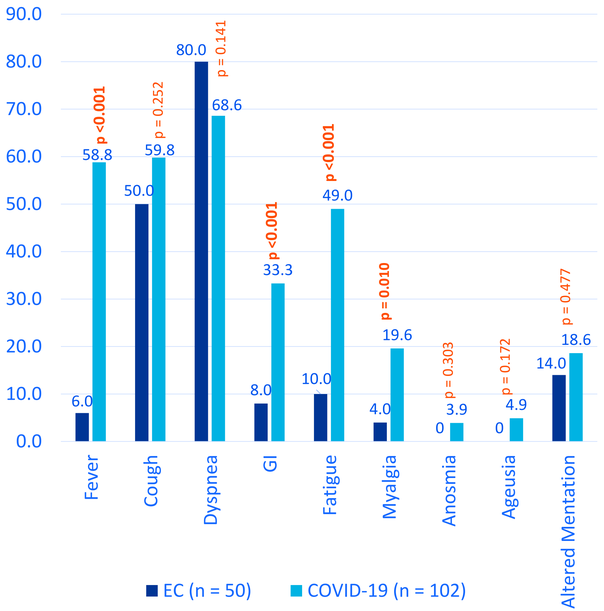
- EC (NL63, 229E, OC43, HKU1) have been identified in humans since the 1960s and are often associated with mild upper RTI[1,2]
- Novel coronaviruses associated with SARS, MERS, and SARS-CoV-2 have recently emerged and are associated with more severe respiratory illness and death[3]
- With this report, we aim to compare clinical characteristics and outcomes of EC vs. COVID-19

Materials and Methods

- Patients admitted to SHS with RTI associated with EC or COVID-19 were identified via multiplex PCR method (BioFire™) or by real-time, reverse transcriptase-PCR method using one of several platforms
- Patients were selected from two existing quality improvement registries encompassing EC and COVID-19 cases
- Clinical characteristics and outcomes of EC vs. COVID-19 patients compared using chi-squared tests for proportions and independent samples t-tests for means

Results

Figure 1: Presenting Symptoms (%)



Results

Table 1: Demographics

Characteristic	EC n = 50	COVID-19 n = 175	P-value
Age, mean (SD)	71.6 (10.6)	64.5 (16.5)	**<0.001**
Male, no. (%)	22 (44.0)	93 (53.1)	0.254
Race, no. (%) Caucasian	36 (72.0)	86 (49.1)	**0.006**
African American	13 (26.0)	64 (36.6)	
Other	1 (2.0)	25 (14.3)	
Admission from ECF, no. (%)	6 (12.0)	49 (28.0)	**0.020**
Admission from home, no. (%)	44 (88.0)	113 (64.6)	**0.002**
Comorbidities, no. (%)			
Chronic heart disease	31 (62.0)	70 (40.0)	**0.006**
Chronic lung disease	33 (66.0)	34 (19.4)	**<0.001**
Asthma	6 (12.0)	32 (18.3)	0.294
Diabetes Mellitus	17 (34.0)	73 (41.7)	0.326
Renal disease	23 (46.0)	31 (17.7)	**<0.001**
Hypertension	34 (68.0)	108 (61.7)	0.417
Obesity	11 (22.0)	86 (49.1)	**<0.001**
Cerebrovascular Disease	9 (18.0)	24 (13.7)	0.450
Cancer	11 (22.0)	24 (13.7)	0.154
Smoking Status no. (%)			**0.006**
Current/Former	38 (76.0)	52 (52.5)*	
Never/Unknown	12 (24.0)	47 (47.5)*	

*n = 102 for COVID-19 patients for these characteristics

Table 2: Presenting Characteristics

Characteristic	EC n = 50	COVID-19 n = 175	P-value
Disease Severity, no. (%)			0.837
General Ward	37 (74.0)	132 (75.4)	
Intensive Care Unit	13 (26.0)	43 (24.6)	
WBC (10^3/uL), mean (SD)	10.4 (7.6)	6.9 (3.3)	**0.002**
SCr (mg/dL), mean (SD)	1.7 (2.1)	1.7 (2.1)	0.999
Platelets (10^3/uL), mean (SD)	243.4 (101.7)	218.4 (98.5)	0.118
Procalcitonin (ng/mL), mean (SD)	3.6 (11.0)	0.6 (2.2)	0.094
Abnormal LFTs, no. (%)	8 (16.0)	96 (56.8)	**<0.001**
Infiltrates noted on CXR, no. (%)	20 (40.0)	82 (83.7)*	**<0.001**
Supplemental O_2 required on admission, no. (%)	43 (86.0)	89 (50.9)	**<0.001**

*n = 102 for COVID-19 patients for these characteristics

Results

Table 3: Outcomes

Characteristic	EC n = 50	COVID-19 n = 175	P-value
Mechanical ventilation required, no. (%)	7 (14.0)	35 (20.0)	0.337
Hospital length of stay (days), mean (SD)	6.7 (5.5)	9.3 (8.7)	**0.015**
30 day mortality	6 (12.0)	38 (21.7)	0.127
30 day readmission	11 (22.0)	27 (15.4)	0.274

Discussion

- EC patients were more likely to have chronic lung disease (COPD), require O_2 supplementation on admission due to deterioration of respiratory status, less likely to have febrile illness and infiltrates
- Coronavirus OC43 accounted for 54% of EC strains, followed by 229E (24%), HKU1 (16%) and NL63 (6%)
- COVID-19 patients presented more acutely ill with febrile illness and infiltrates on imaging, were initially less likely to require supplemental O_2 on admission
- Additional data collected revealed that 73.7% of COVID-19 patients required supplemental O_2 later in the admission

Conclusions

- Although EC is associated with mild infection, it can be associated with severe disease requiring admission and O_2 supplementation, particularly in patients with chronic lung disease
- COVID-19 patients were more likely to present with a febrile illness associated with pneumonia and require longer length of stay, often requiring O_2 supplementation later in hospitalization
- Patients admitted with COVID-19 present with different clinical characteristics than those with EC with numerically higher mortality rate

References

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