Hot Off the Press: SGEM#299—Learning to Test for COVID-19

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BACKGROUND

A novel coronavirus, SARS-CoV-2, or COVID-19, emerged in China in December 2019. In early 2020, the virus spread throughout the world in pandemic fashion. Diagnosis was made difficult due to inexperience with signs and symptoms, shared features with other respiratory viruses, and delays in testing.[1] Early versions of polymerase chain reaction (PCR) testing had high false-negative rates.[2] With an influx of patients to emergency departments (EDs) worldwide, it would be important to understand signs and symptoms, diagnostic accuracy of various testing modalities, and limitations of testing.[3]

ARTICLE SUMMARY

This study is a scoping review of published research, with the primary objective being descriptive information regarding the diagnostic characteristics of rapid reverse transcription PCR (rRT-PCR). In addition, possible biases of current research are discussed as well as a review of the diagnostic characteristics of history and physical findings and routine laboratory and imaging tests. In total 1,907 citations were screened, with 87 studies ultimately included, none of which met the Standards for Reporting of Diagnostic Accuracy (STARD) criteria. Fever is the most common finding, with loss of taste and smell also common. Cough and shortness of breath are common but not able to distinguish COVID-19 from other respiratory illnesses. Lymphopenia is common but not diagnostic. rRT-PCR is often used as the criterion standard, but has high false-negative rates. Imaging studies are neither sensitive nor specific.

QUALITY ASSESSMENT

This was a scoping review and as such not intended to be a systematic review and meta-analysis. Studies were limited to the English language, and while the majority of studies came from the non-English literature published in English, there remains the possibility of studies that may not have been included. For diagnostic accuracy of various signs/symptoms and tests, the criterion standard was often rRT-PCR, which is itself an imperfect criterion standard. None of the included standards rigorously followed criteria for standardizing research into diagnostic testing. Multiple biases exist in the published literature.

KEY RESULTS

Eighty-seven studies were included, of 1,907 citations that were screened. The main results can be seen in Table 1.

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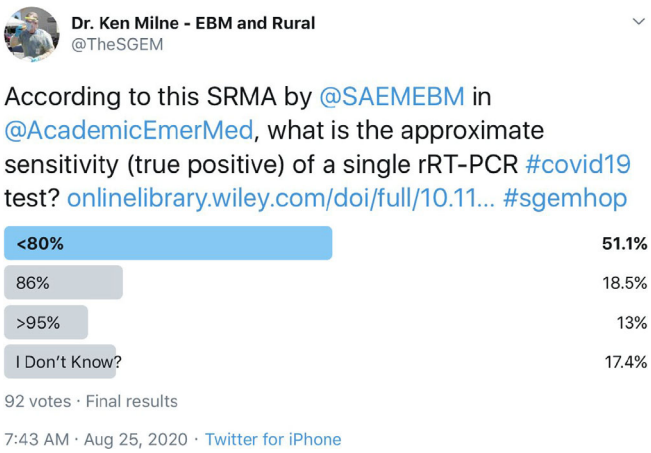
Table 1
Key Results

Diagnostic Finding	Frequency	Sensitivity and Specificity	LR+	LR–
Clinical examination				
Fever	84%–87%		5.3	0.61
Hyposmia			7.1	0.38
Hypogeusia	47-73%			
Anosmia	58%			
Cough				
Routine laboratory examinations				
Lymphopenia	>50%			
RT-PCR				
Single test		Sn 60%–78%		
Two testsTwo tests		Sn 86%		
Five tests		Sn 98%		
Serology				
IgM or IgG > 20 days		*Sn 82%–100%, Sp 87%–100%*		
Imaging				
Chest X-ray		*Sn 33%–60%*		
CT scan		*Sn 72%–94%, Sp 24%–100%*		

AUTHORS' COMMENTS

Diagnosis of COVID-19 is made difficult by overlapping signs and symptoms with numerous other respiratory illnesses as well as a lack of rigorous data regarding laboratory and viral-specific testing.

TWITTER POLL



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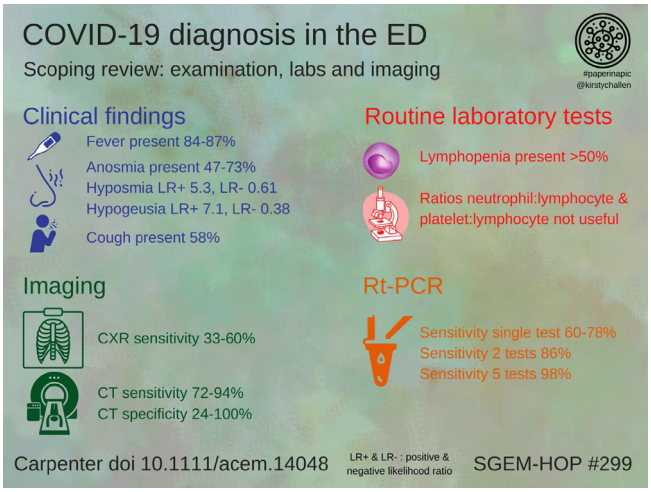

TAKE-TO-WORK POINTS

Diagnosis of COVID-19 is challenging. A single rRT-PCR test has a relatively high false-negative rate.

References

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