



Diagnostic Patterns of Suspected Covid-19 Patients Using Scor Covid-19, PCR Test and Serological Test in Dr. Soetomo Hospital Surabaya, Indonesia

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ABSTRACT

Introduction: To find out the diagnostic pattern of COVID-19 using RT-PCR or a rapid antibody test in the suspected group patients.

Methods: The study was conducted in Dr. Soetomo General Hospital (referral hospital for covid-19, 1500 beds). The study used data on patients with suspected covid-19 who were hospitalized at the Dr. Soetomo General Hospital in Surabaya.

Results: There were 200 suspected COVID-19 patients enrolled in this study, the main complaints of cough, fever, dyspnoea, around 69.5%, 75%, and 76.5%, respectively. Although not a common symptom, it seems that anosmia (14%) is typical for COVID-19. Based on this scoring system, a total of 196 patients had a high risk of being infected with COVID-19, and 125 (64%) of them finally showed a positive PCR test. PCR test mostly positive (62.5%), while serological test (rapid immunoglobulin test) mostly non reactive, but there were nonsignificant different between PCR and Serological test ($p=0.16$ OR: 1.5(0.84-71). Furthermore, if we compare the various existing variables, namely the covid-19 score, immunoglobulin rapid test, and radiological examination, only the radiological examination results can be used as a strong predictor of positive PCR results ($p=0.005$, OR: 1.68 (0.17-16.43). In this study, we found that abnormal chest radiographs are a good parameter for diagnosing COVID-19, (OR: 2.92; 95% CI, 1.34 -6.34).

Conclusion: The initial radiological examination combined with the clinical symptoms of Covid-19 is the most important thing to predict the presence of this disease.

Keywords: Covid-19, Immunoglobulin rapid test, Anosmia, Indonesia

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INTRODUCTION

Corona virus disease -19 (COVID-19) was identified in January 2020 in the city of Wuhan, China. This disease is caused by SARS-CoV-2. This virus is very contagious, spreading in all over the world and become pandemic in 20 March 2020 (WHO-A, 2020).

This disease mainly affects the respiratory system, although it can affect other organ system, mostly around 80% symptoms resolve without treatment within five to seven days of symptom onset. However, about 20% of patients will develop serious disease most notably pneumonia, acute respiratory distress syndrome, sepsis or septic shock, thrombotic stroke and myocardial infarction (WHO-A, 2020; Salehi et al., 2020; Huang et al., 2020; Yang et al., 2020).

To establish a definite diagnosis using real-time PCR using nasal and throat swab. While using serology rapid test for diagnosis COVID-19, the accuracy is only 30% up to 70% after the second week.

Antibody rapid test especially is used for epidemiological purposes. Clinical sign or symptoms and serological examination or radiological examination can be used to make a presumptive diagnosis, in areas that do not have PCR facilities (WHO-B, 2020).

The morbidity and mortality rates in Indonesia are still quite high. Currently, there are more than 580 000 cases, with the death of more than 15000 patients. Therefore it is necessary to do further research to find out the diagnostic pattern of COVID-19 using RT-PCR or a rapid antibody test in the suspected group patients.

This study aims to determine the diagnostic pattern of COVID 19 at Dr. Soetomo Academic General Hospital Surabaya, the difference between the use of RT-PCR and rapid test in the suspected group, in Dr. Soetomo Hospital Surabaya. So that in the end the detection of COVID 19 cases can be mapped for use of RT-PCR or with an appropriate antibody rapid test or radiological examination.

METHODS

Population and health care setting

The study was conducted in Dr. Soetomo General Hospital (referral hospital for covid-19, 1500 beds). The study used data on patients with suspected covid-19 who were hospitalized at the Dr. Soetomo General Hospital in Surabaya from April 2020 to June 2020 in accordance with the inclusion and exclusion criteria.

Study design and inclusion procedure.

Inclusion Criteria

Suspected Covid-19 patients who were hospitalized at the Dr. Soetomo General Hospital in Surabaya from April 2020 to June 2020.

Exclusion Criteria

Suspected Covid-19 patients with incomplete data, namely no date of admission to the hospital, and incomplete records, especially the diagnosis.

Prosedure of the research

The study was conducted by looking back at the medical records of Covid-19 patients who were hospitalized at the isolation room. Demographic data, subject characteristic, and underlying comorbidities, symptoms and signs at presentation, value of Covid-19 score, also complication and outcome were collected and evaluated.

Rreal time polymerase chain reaction (RT-PCR) testing was performed for confirmation of SARS-CoV-2, and laboratory test of SARS-CoV-2 IgM/IgG was also performed for all patients. A chest radiograph were obtained at baseline and as determined clinically by health care practitioners on case by case basis.

RESULTS

Characteristics of research subjects

There were 200 suspected COVID-19 patients enrolled in this study in dr Soetomo General Hospital. All patients underwent rapid antibody test, RT-PCR, laboratory, and imaging examination during treatment. The patient is stratified using a scoring system to assess the risk of being infected with COVID-19. Based on this scoring system, a total of 196 patients had a high risk of being infected with COVID-19, and 125 (64%) of them finally showed a positive PCR test.

Most patients presented with complaints, the main complaints of cough, fever, dyspnoea, around 69.5%, 75%, and 76.5%, respectively. Although not a common symptom, it seems that anosmia (14%) is typical for COVID-19.

PCR test mostly positive (62.5%), while serological test (rapid immunoglobulin test) mostly non reactive, but there

were nonsignificant different between PCR and Serological test ($p=0.16$ OR: 1.5(0.84-71).

Table 1 Characteristic Patients

Demographic Characteristic	Dr. Soetomo Hospital N(%) (200 patients)
Age, mean (SD), y	51.2 (14.1) years
Age > 60 y	55 (27.5)
Female	85 (42.5)
Cough	139 (69.5)
Nasal congestion	60 (30)
Dyspnea	150 (75)
Fever	153 (76.5)
Anosmia	29 (14)
Diarrhea	39 (19.5)
Nausea or vomiting	61 (30.5)
Abdominal pain	33 (16.5)
Comorbid conditions	Dr. Soetomo Hospital N(%)
Diabetes mellitus	82 (41.0)
Hypertension	74 (37.0)
Chronic kidney disease	60 (30)
Obesitas	3 (1.5)
Malignancy	19 (9.5)
Autoimmun diseases	7 (3.5)
Heart disease	15 (7.5)
HIV	3(1.5)
Scoring at admission	Dr. Soetomo Hospital N(%)
5-8	4 (2)
9 >	196 (98)
Prior hospitalization symptoms	Dr. Soetomo Hospital N(%)
2- 3 days	37 (18.5)
4 – 7 days	131 (65.5)
8-14 days	32 (16)

Table 2 Diagnostic Laboratory

	Positive or reactive: N(%)	Negative or non reactive:N(%)
PCR	125 (62.5)	75 (37.5)
Rapid immunoglobulin test (IgM/IgG)	90 (45)	110 (55)

Furthermore, if we compare the various existing variables, namely the covid-19 score, immunoglobulin rapid test, and radiological examination, only the radiological examination results can be used as a strong predictor of positive PCR results ($p=0.005$, OR: 1.68 (0.17-16.43).

Table 3 Comparison between Serological, scor Covid-19, and Chest X-ray Result with PCR Test on Admission

	PCR (-)	PCR (+)	Chi-Square test
IgG/M: non reactive	46	64	$p=0.106$
IgG/M: reactive	29	61	OR: 1.5 (0.84-71)
Scor: 5-8	2	73	$p=0.482$
Scor: 9 >	2	123	OR: 1.68 (0.17-16.43)
Chest X rays: normal	19	56	$p=0.005$
Chest X rays: infiltrat +	13	112	OR: 2.92 (1.34 -6.34)

In this study, we found 65.5% of the final confirmatory diagnosis of Covid-19, this shows that there is still a possibility that non-Covid-19 (discharged) sufferers will

enter initial care as Covid-19.

Table 4 Final Diagnosis on Discharge

Final Diagnosis	Dr. Soetomo N(%)
Suspected Covid-19	46 (23)
Probable Covid-19	29 (14.5)
Confirmed Covid-19	125 (62.5)

DISCUSSION

To control the impact of its spread, early detection procedures are needed. WHO recommends RT-PCR examination as the gold standard for examining COVID-19, because as a developing country the fulfillment of these facilities cannot be achieved ideally. Therefore, a rapid antibody test that can be widely used is needed, does not require special facilities and is cheap to help detect COVID-19. A study reported that the antibody rapid test sensitivity and specificity were 64.8% and 98%, respectively (Ricco et al., 2020). Supports another study that divided the rapid test according to its working principle, which reported a combined sensitivity for LFIA of 66% (95% CI 49.3-79.3), and a combined specificity of 96.6% -99.7% (Bastos et al., 2020). In this study, the sensitivity obtained was only 55.28% and the specificity was much lower, namely 60.38%. These results are due to patients presenting for treatment varying in duration of symptoms from onset.

In this study, we found that abnormal chest radiographs are a good parameter for diagnosing COVID-19, (OR: 2.92; 95% CI, 1.34 -6.34). This finding is in line with previous studies that indicated chest radiographs were stated in COVID-19 patients often show bilateral lower zone consolidation, which peaks in 10-12 days from the onset of the disease (Wong et al., 2020). Another report showed that chest radiograph had a sensitivity of 89.0% (95% confidence interval (CI), 85.5% -91.8%), a specificity of 60.6% (95% CI, 51.6% -69.2 %), 87.9% positive predictive value (95% CI, 84.4% -90.9%), and a negative predictive value of 63.1% (95% CI, 53.9% -71.7%). These results indicate that the CXR examination together with RT-PCR for triage of suspected COVID-19 patients can provide a safe and efficient workflow (Salehi et al., 2020; Schiaffino et al., 2020; Shi et al., 2020).

A scoring system for COVID-19 triage is established in our hospital based on the latest reports on the risk factors, signs and symptoms of patients with COVID-19. This system is created to determine the need for isolation protocols. This study is the first study to evaluate the performance of our scoring system. The results showed that the scoring system was not correlated with the PCR test. A scoring system for COVID-19 triage is essential for alerting health workers and implementing the necessary protocols to prevent disease transmission. Several researchers developed an early warning system to identify highly suspicious COVID-19 patients during surgical planning. Based on literature search, the risk

factors for COVID-19 are as follows: history of exposure, fever, cough, and radiographic infiltrates (Greenhalgh et al., 2020; Jacobi et al., 2020; Aljondi et al., 2020; Bhaskar et al., 2020). The components in this scoring system are relatively similar to our in-hospital scoring system, although the higher scores do not reflect a higher probability of COVID-19 confirmation. These results may be due to the limited sample size of our study, and we only included suspects or confirmed COVID-19 patients admitted to internal medicine isolation wards, so there would be patient selection bias.

CONCLUSION

Examining COVID-19, according to WHO standards, is still a challenge for developing countries such as Indonesia. The workload of the RT-PCR examination laboratory leads to a longer waiting period for examination results. On the other hand, the shortest possible diagnostic time is the key to controlling a pandemic. The initial radiological examination combined with the clinical symptoms of Covid-19 is the most important thing to predict the presence of this disease.

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CONFLICT OF INTEREST

The authors declare there is no conflict of interest.

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