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Sardjito score accuracy value in enforcing COVID-19 diagnosis in surgical patients in general hospital DR. Zainoel Abidin Banda Aceh

Yudi Nugraha[1*], Safrizal Rahman[2], Jufriady Ismy[2]

[1]Resident of Surgery, Faculty of Medicine, Universitas Syah Kuala, Banda Aceh
[2]Department of Surgery, Faculty of Medicine, Universitas Syah Kuala, Banda Aceh

*Corresponding Author:
Yudi Nugraha; Resident of Surgery, Faculty of Medicine, Universitas Syah Kuala, Banda Aceh;
odiet933@gmail.com

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ABSTRACT

Background: SARS-CoV-2 (Severe Acute Respiratory Syndrome Coronavirus 2) is a virus with a positive chain of RNA (RiboNucleic Acid) This viral infection spread rapidly with subsequent human-to-human transmission and increase in the number of cases in other countries around the world. Aceh is one of the areas affected by COVID-19 in Indonesia. Despite the need for fast and precise diagnostics, facilities capable of carrying out RT-PCR are still limited in some places. This study aims to determine the accuracy of the Sardjito score in establishing the diagnosis of Covid 19 in surgical patients..

Methods: Consecutive sampling is included in the non-probability sampling technique where all subjects who come sequentially will be used as research samples until the required number of samples is met. The data obtained will be presented using tables and curves. For the analysis of the data results, the Spearman-Pearson correlation test was carried out, and for the correlation between the Sardjito Score and the PCR swab results, it was continued by analyzing the sensitivity and specificity values.

Results: Based on the cross tabulation, it shows that the majority of patients' Sardjito scores are moderate probability. Research subjects with moderate probability and negative PCR results were 83 people (91.2%). The specificity of the Sardjito score is 87% compared to the PCR results. In addition, the positive predictive value of 62%. While the negative predictive value of 96%.

Conclusions: This Sardjito Score can be used as a tool for COVID-19 diagnostic tests.

Keywords: Accuracy, COVID-19, Diagnosis, Sardjito Score
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INTRODUCTION

SARS-CoV-2 (Severe Acute Respiratory Syndrome Coronavirus 2) is a virus with a positive chain of RNA (RiboNucleic Acid) genus Betacoronavirus. This virus is from the same family as the virus that causes SARS and MERS (Middle East Respiratory Syndrome), but has a faster transmission nature.[1] This virus was the cause of a cluster of pneumonia cases in Wuhan, a city in Hubei Province, China at the end of December 2019.[2] The initial transmission was thought to have been carried by bats, snakes and wild animals from one of the markets in Wuhan.[3] This virus infection spread quickly with subsequent transmissions, human-to-human and resulted in an epidemic across China, followed by an increase in the number of cases in other countries around the world.[4–8]

June 30, 2020, WHO (World Health Organization) reported 43,514,678 confirmed cases with 1,159,708 deaths worldwide. The countries that reported the most confirmed cases were the United States, Brazil, Russia, India, and the United Kingdom. Meanwhile, the countries with the highest death rates were the United States, United Kingdom, Italy, France, and Spain.[9] The first case of COVID-19 in Indonesia occurred on March 2, 2020 and the number continues to increase. The Indonesian Ministry of Health reported 1,877,050 confirmed cases of COVID-19 (Corona Virus Disease 19) with 52,162 deaths spread across 34 provinces until the period of 09 June 2021.[5,10] Aceh is one of the areas affected by COVID-19 in Indonesia. The Aceh government reported 15,869 confirmed cases with 618 deaths spread across 23 regions until the period of 5 June 2021.[11]

The development of diagnostic tools and immune-based assays are really important as early interventions towards COVID-19 since its availability that target a wide and diverse range of antigen.[12] The need of rapid diagnostics in hospital is really important, particularly in emergency situation in order to giving rapid diagnostic and giving the best decision.[13,14] Despite the need for rapid and precise diagnostics, facilities capable of carrying out RT-PCR are still limited in several places. For this reason, an initial screening process for patients suspected of being infected needs

to be carried out.[15,16] The COVID-19 early warning score (COVID-19 EWS) is a stratification system based on the findings of a NLR (Neutrophil Lymphocyte Ratio) >5.8. The use of the COVID-19 EWS has a training dataset of 0.956 and a validated dataset of 0.966 so it is potentially useful in initial screening, isolation indications, contact tracing and priority RT PCR examinations.[17]

At the beginning of the pandemic, Aceh also needed accurate rapid diagnostic facilities and RT-PCR examinations at that time were still limited, while the need and the number of patients continued to increase. General hospital dr. Zainoel Abidin Banda Aceh (RSUDZA) is the main referral center for COVID-19 or other diseases such as trauma, infection and non-infection.

The use of the Sardjito Score system can help in the initial screening of patients, COVID-19 but the accuracy of this scoring system has not been reported in Indonesia.[18] Based on this, researchers are interested in evaluating the accuracy of the Sardjito Score on the findings of the COVID-19 RT-PCR results for surgical patients at RSUDZA dr. Zainoel Abidin Banda Aceh. This study aims to determine the accuracy of the Sardjito score in establishing the diagnosis of Covid 19 in surgical patients at dr. Zainoel Abidin Banda Aceh.

METHODS

Study Design

This study was a diagnostic study with cross-sectional design. The research sample was taken by consecutive random sampling. Consecutive sampling is included in the non-probability sampling technique where all subjects who come sequentially will be used as research samples until the required number of samples is met. In this study, the sample is all surgical patients with a probable, suspected or confirmed diagnosis who have undergone clinical, laboratory, radiology and PCR swab at RSUDZA Banda Aceh from March 2020 to March 2021. The data obtained will be presented using tables and curves.

Statistical analysis

For the analysis of the data results, the Spearman-Pearson correlation test was carried out, and for the correlation between the Sardjito Score and the PCR swab results, it was continued by analyzing the Receiver operating characteristic (ROC) curve to determine the best cut of point along with the sensitivity and specificity values.[19]

RESULTS

As many as 219 samples in the study, most of the subjects were male subjects, namely 129 subjects (60.3%). The age of the subject based on the analysis, obtained an average age of 40 years.

Table 1. Baseline characteristics of the study population

Characteristics	Frequency (n)	Percentages (%)	P Value
Sex*			**0.803**
Male	129	60.3	
Female	85	39.7	
Patient Age (Mean±SD)	**40.40 ± 21.930**		**0.025***
17- 25 Years	57	26.3	
26- 35 Years	32	15.0	
36- 45 Years	29	13.6	
46- 55 Years	37	17.3	
56- 65 Years	36	16.8	
>65 Years	23	10.7	

**p-value <0.05*

Table 2. Results table of PCR results

PCR	Valid N (listwise)
Positive[a]	44
Negative	175

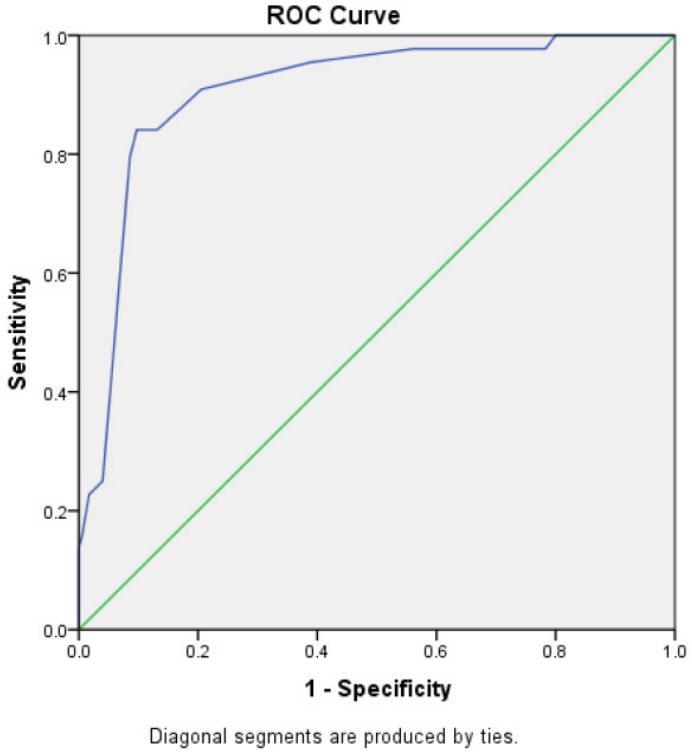

Figure 1. ROC Curve of Sardjito Score

Table 3. Sardjito Score Diagnostic Test Results and PCR Results with a cut-off point of 8.50

Score Sardjito	PCR Results		Total
	Negative	Positive	
< 8.50	152	7	159
≥8.50	23	37	60
Total	175	44	219

- Sensitivity = 37/(37+7) x 100 = 84.09% ~ 84%
- Specificity = 152/(152+23) x 100 = 86.85% ~ 87%
- Positive Prediction = 37/(37+23) x 100 = 61.66% ~ 62%
- Negative Prediction = 152/(152+7) x 100 = 95.5% ~ 96%

Diagnostic calculation

To show the accuracy of the sardjito score, a curve test was carried out to get a better analysis. The result is as follows.

Larger values of the test result variable(s) indicate stronger evidence for a positive actual state. The output above shows that the prevalence of PCR results in research subjects is 11 people out of 179 patients or 6.1%. When the results of the Sardjito score are entered into a curve, it looks like this:

DISCUSSION

This study assessed the accuracy of the Sardjito score in surgical patients. This study assesses clinical, radiological, blood laboratory examinations according to the items in the sardjito score, then from the sardjito score the probability level of a COVID-19 diagnosis is determined which will be compared with the COVID-19 PCR examination (Gold Standard).

The dominant subject is male, the average age is 40.40 years, this study was in line with previous study where the proportion of male patients in the COVID-19 early warning score assessment group is 63.0% and the average age is 53 years.[17] Another study by Denny *et al,* found the age of the most patients at the age of 18-35 years.[20] In line with the previous studies, a study conducted by Ying *et al,* in assessing the prognostic accuracy of EWS also found male as dominant study subjects, namely 55 patients (47.4%), and this study stated that male sex had a significant effect on the incidence of COVID-19.[21]

In addition, the ROC curve also shows the AUC value obtained is 0.906 with a confidence interval (85.7% to 95.5%). This is not much different from study by Song *et al*, where the EWS score has an AUC value of 0.96. Although the AUC value of the EWS score is higher than the sardjito score, the sardjito score can still be used as a COVID-19 diagnostic test tool because the value of the AUC criteria in this study is still classified as excellent classification.[17,22] Furthermore, from table 3, a true negative value can be determined, false negatives, false positives and true negatives. Calculation using a cut off of 8.50, the sensitivity and specificity values obtained from the Sardjito score in the COVID-19 screening were 84% and 87%, respectively, while using a cut off of 9.50 the sensitivity and specificity values were 84% and 90%. The results of this study are not much different from the study by Song *et al,* in assessing the sensitivity and specificity of the EWS score, which are 93.2% and 87.4%, respectively.[17]

CONCLUSION

The Sardjito score can be considered as diagnostic tools of COVID-19 in surgical patients in RSUDZA by showing fair classification based on Area Under Curve (AUC). However, further studies that related to the subject are still required in the future.

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CONFLICT OF INTEREST

The author declares that there are no conflict of interest in this study.

AUTHOR CONTRIBUTION

All of the authors contribute in this article preparation.

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