Anal Swab in COVID-19 Patients

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ABSTRACT

In 2020, a new type of coronavirus (SARS-CoV-2) whose disease is called Coronavirus disease 2019 (COVID-19) has been reported. This virus was first discovered in Wuhan, China and has infected 90,308 people per March 2, 2020. As of the end of October 2020, more than 40 million people have been infected, with the death toll reaching 1,150,000 worldwide. Apart from respiratory tract infections, patients infected with this virus may exhibit other symptoms, such as diarrhea, abdominal pain, nausea, or vomiting. This means that the virus can be found in feces and anus, hence the anal swab can be used as a diagnostic tool for COVID-19 infection. The results of the specimen test show that the sensitivity of the nasopharyngeal swab positive detection rate is the highest and remains the gold standard for diagnosis. This sensitivity can also be influenced by the course of the disease that can infect the gastrointestinal tract so that anal PCR is performed for the diagnosis to detect the COVID-19 virus in patients.

Keywords: *Coronavirus; COVID-19, Pneumonia, Gastrointestinal disease, Anal swab.*

INTRODUCTION

The Coronavirus Disease (COVID-19) has spread widely in China and more than 190 other countries around the world. In 2020, more than 40 million people have been infected, with the death toll reaching 1,150,000 worldwide.[1,2] Apart from respiratory tract infections, patients infected with this virus may exhibit other symptoms, such as diarrhea, abdominal pain, nausea, or vomiting.[3,4] On March 20, 2020, WHO declared COVID-19 a pandemic.[5] As of March 24, 2021, there were 166,860,081 confirmed cases and 3,459,966 deaths worldwide. In Indonesia, 18,388 positive cases of COVID-19 and 142,952 deaths have been reported.[6,7] COVID-19 can be diagnosed by assessing patients' clinical condition as well as X-ray results of the lungs, and then confirmed using a PCR test.[8] PCR examination with nasopharyngeal and oropharyngeal swabs is the gold standard for diagnosing COVID-19.[9] In some cases not detected by PCR test, anal swab PCR test can be done as an alternative.[10] The following is a case report of anal swabs at a COVID-19 referral hospital. Anal swab was chosen as an evaluation for patients with gastrointestinal symptoms who also have COVID-19 symptoms. Anal swab is chosen to evaluate patients if the results of the nasopharyngeal swab are negative.

CASE ILLUSTRATION

Case 1

The patient is a female patient aged 81 years who had black stools for a week, with the onset of black stools 3-4 times a day and the most severe being in the last two days. Previously, the patient had a medical check-up at HGA Hospital and had received a PRC transfusion, with laboratory results of Hb 8.9, WBC 5,900, 171,000, and Hb 9.3 when examined in the ER. The patient had no comorbidities. An examination was carried out in the ER with the results as follows: blood pressure 122/77 mmHg, HR 83 beats/minute, respiratory rate 19x/minute, temperature 36.8° Celsius; the patient was diagnosed with probable COVID-19. An anal swab was performed (21/05/2020) with negative result and this was confirmed by PCR test. The results of the nasopharyngeal and oropharyngeal swabs (02/06/2020) were both negative. In addition, a chest X-ray was taken, showing a minimal infiltrate in the right lung and suggestive of pneumonia.

Case 2

A 59-year-old female patient presented with complaints of black stools for four days, Congestion (+), Heartburn (+), stomach feels full, and weight loss of 13 kg in a year. The patient did not experience fever, cough, runny nose, sore throat, and impaired smell. The patient was previously diagnosed with pulmonary TB and had been treated with Antitubercular Medications & SIDA since April 2020, but not yet received ARV treatment. History of HT, DM, heart disease, and asthma was denied. No drug allergies. An examination in the ER obtained the following results: blood pressure 114-72 mmHg; HR 87-95 beats/minute, strong; CRT <2 seconds. Several swabs were carried out with the results as follows: anal swab (4/06/2020): negative; anal swab (21/05/2020): negative; anal swab PCR test (31/05/2020): negative; and nasopharyngeal and oropharyngeal swabs PCR test (10/06/2020): negative. In addition, a chest X-ray was taken (18/05/2020), showing pneumonia with differential diagnosis of pulmonary tuberculosis. Meanwhile, heart size was within normal limits. The patient was diagnosed with probable COVID-19.

Case 3

A 50-year-old male patient came with a complaint of fever for ten days, with the highest temperature of 39.3°C. The patient had taken paracetamol and undergone temperature therapy at home. Cough (+), runny nose (-), phlegm difficult to come out, drinking water > 1.5 liters/day. Urine not overflowing, dripping

Table 1. Case illustration.

No.		Case 1	Case 2	Case 3
1.	Primary diagnosis	Probable COVID-19	Probable COVID-19	COVID-19 ARDS
2.	Secondary diagnosis	Anemia ec Melena	Anemia ec melena & chronic disease	Septic shock Hypertension
3.	PCR test	nasopharyngeal and oropharyngeal swabs (25/05/2020): negative nasopharyngeal and oropharyngeal swabs (04/06/2020): negative	nasopharyngeal and oropharyngeal swabs (10/06/2020): negative	
4.	Anal swab	Anal swab (21/05/2020): negative	Anal swab (31/05/2020): negative Anal swab (4/06/2020): negative	Anal swab (29/04/2020): positive SARS-Cov-2
5.	Roentgen	Infiltration and consolidation	Infiltration and consolidation	Infiltration and consolidation
6.	Electrocardiogram	Normal	Normal	Normal
7.	CT scan	-	Ground glass opacity	-

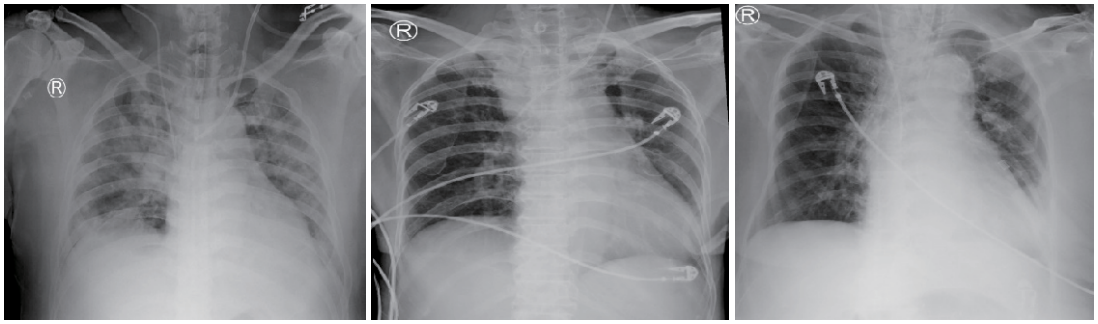

Figure 1. Result showing signs of worsening pneumonia.

with diarrhea for two days, frequency >5x/day. Decreased appetite. Examination in the ER obtained results as follows: systolic blood pressure: 106 mmHg, diastolic BP: 59 mmHg, respiratory rate: 40x/minute, temperature: 37.8° C, weight: 96.40 kg, height: 170 cm, HR: 91 beats/minute. A chest X-ray was taken with the results of suprahilal, perihilar, and pericardial infiltrates of both lungs, DD/Pneumonia, and pulmonary edema. Furthermore, an anal swab was performed on 29/04/20; the result was positive for SARS-Cov-2. Therefore, the patient was diagnosed with COVID-19 ARDS.

DISCUSSION

Based on the results of biopsies of gastric, duodenal, and rectal epithelial cells, SARS-CoV-2 has been shown to infect the gastrointestinal tract. This virus can be detected in feces; in 23% of patients, it was still found in feces even though it was not detected in respiratory samples.[11] This is in line with the third case of this case report which tested positive on anal swab. The collection was carried out at the time of onset, i.e., on the 3rd-7th day from hospital admission. This fact strengthens the suspicion of the possibility of fecal-oral transmission. In addition to being found in fecal specimens, the SARS-CoV-2 virus can also be identified using an anal or rectal swab. Upon further evaluation, the rectal swab ranks second in the positive detection rate.

The pathogenesis of SARS-CoV-2 remains unusual, but it is suspected that it is not much different from the more widely known SARS-CoV pathogenesis. In humans, SARS-CoV-2 primarily infects cells in the airways lining the alveoli. Protein S is reported to be a significant determinant in viral entry into host cells. The entry of SARS-CoV into cells begins with the fusion of the viral membrane with the plasma membrane of the cells. In such cases, an increase in CD38+HLA-DR+ T cells (activated T cells), especially CD8 T cells, was observed on the 7th-9th days of the nasopharyngeal and oropharyngeal swab examinations.[12-14] Regarding the first and second cases in this report, the results of the swabs were negative since the time of collection had already passed the incubation period of the virus in the oropharynx. However, the adverse effects were associated with other supporting examinations such as laboratory results and chest X-ray results. Both patients of these cases had pneumonia, thus being categorized as probable cases.

There was an increase in antibody-secreting cells (ASCs) and cold blood T follicular helper (Tfh) cells on the 7th day; this onset occurred before symptoms. A progressive increase in SARS-CoV-2 IgM/IgG was also found from the 7th day to 20th day in the gastrointestinal tract.[15] In the third case, the time of collection was influenced by the onset and the availability of reagents at the referral hospital. The change in sensitivity persisted for up to 7 days after symptoms relieved. In the humoral immune response, IgM and IgG are formed against SARS-CoV. IgM against SARS-CoV is lost by the end of the 12th week, while IgG can persist in the long term. The results of a prior study on patients recovered from SARS show that CD4+ and CD8+ memory T cells were specific for SARS-CoV after four years, but their numbers decreased.[16]

Table 2.

	Nasopharynx	Oropharynx	Intestine	Anal
Incubation	69 days	7-14 days	7-10 days	7-10 days
Detection presentation	16 % - 61.5 %	16%- 61.5 %	23%-24 %	23%-24 %

This case report collected various specimens from COVID-19 patients with the course of disease of 7 to 30 days, including specimens taken from nasopharyngeal and anal swabs, saliva, blood, and urine. PCR was used for nucleic acid detection and absolute counting of these specimens. Meanwhile, ELISA test was performed to detect anti-N IgM/IgG and anti-S-RBD IgG in serum samples of the patients.[17] The results of the tests on nucleic acid specimens showed the highest positive detection rate for nasopharyngeal swabs at 7-20 days and the highest average number of virus was found in the oropharyngeal swabs.

Case reports indicate that viral infections can enter the gastrointestinal tract. In the advanced stages of the disease, the virus can be detected on anal swabs, and the results remain positive even after nasopharyngeal swabs show negative results. This phenomenon, and the relatively high positive detection rate of anal swabs, reached 24% at the 14^{th}–20^{th} days. A previous study has found that the positive detection rate of saliva specimens is high, up to 61.5%. In addition, the study proved that viral nucleic acids were detectable in posterior oropharyngeal saliva specimens.[18] A better percentage of favorable agreement was observed in samples obtained within seven days of symptom onset. Nevertheless, the positive detection rate of saliva specimens in the study was only 16%, which presumably related to the sampling method. False-negative results on virological tests can occur due to the poor quality of collection or specimen management, specimen collections in the early stage of infection, or technical difficulties in the laboratory. Therefore, a negative result does not rule out the possibility of SARS-CoV-2 infection, especially in patients with a high index of suspicion. This is also in connection with the availability of reagents as well as the day of specimen collection.

Collection and transportation of nasopharyngeal swabs, anal swabs, saliva, blood, and urine specimens were stored at 4° C until use. The sampling methods are as follows:

1. Nasopharyngeal swab
2. Anal swab
3. Saliva

The results of this case study show that the nasopharyngeal swab is the best method for detecting SARS-CoV-2. Adverse effects occurred in the first and second cases because the samples were taken at intervals of 10 days and 11 days after the onset of symptoms. Meanwhile, the third case tested positive on anal swab since the sampling was carried out at the beginning of the course of disease, namely on the 3^{rd} and 7^{th} days. This is also influenced by the method used to take the specimen, the availability of reagents, and the form of tube transportation. Furthermore, the results of this study also suggest that nucleic acid testing for recovered patients should be carried out on nasopharyngeal swabs and other specimens to obtain a more accurate diagnosis of complete recovery from coronavirus infection when using nasopharyngeal and oropharyngeal swabs.

CONCLUSION

In these three cases, anal swab was carried out with gastrointestinal patients who also suspected with COVID-19. In cases with positive anal swab results, positive results were found after 10 days of symptoms (early phase) faster than the previous case study which shown that positive results for anal swabs shown after 14-20 days of symptoms (late phase).

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