



SARS-CoV-2 is not found in the sweat of COVID-19 positive patients

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Abstract

Background As the SARS-CoV-2 virus made a pandemic all over the world, its transmission routes became significant. Transmission from human to human is known, but other possible routes are not determined well.

Aims This study aimed to reveal the presence of SARS-CoV-2 virus in sweat.

Methods This prospective study was conducted in a tertiary care education and training hospital.

Fifty patients were included in this study. Skin disinfection was done with an alcohol-based solution. Swabs for RT-PCR (real-time reverse transcriptase polymerase chain reaction) were taken from forehead and axilla skin after sweating patients for 30 min. After collection of sweat, swabs were placed into 2 ml of sterile viral transport medium, then transported quickly to the microbiology laboratory.

Results No SARS-CoV-2 virus was detected in RT-PCR of forehead and axilla swabs.

Conclusion This study showed that there is no transmission of SARS-CoV-2 virus via sweat. However, general precautions must be taken while doing interventional procedures.

Keywords SARS-CoV-2 · Sweat · COVID-19 · Transmission

Introduction

In early December, atypical pneumonia cases emerged in Wuhan, China, and spread all over the world. This disease was called as coronavirus disease 2019 (COVID-19). The reason of the disease is severe acute respiratory syndrome virus 2 (SARS-CoV-2) [1]. The disease was declared by the World Health Organization (WHO) as a pandemic. The most frequently seen symptoms are fever, cough, dyspnea, and myalgia [2]. Ear nose and throat (ENT) symptoms

like anosmia, headache, and sore throat are likely to be seen in COVID-19. [3]. Majority of the patients are asymptomatic, so transmission easily occurs. It is known that the transmission of the SARS-CoV-2 is from human to human but some excretions like urine, feces, and semen contain SARS-CoV-2 virus [4]. In our daily life, sweating plays a crucial role in detoxification and balancing the water content of the body [5]. Especially, asymptomatic COVID-19 patients get in contact with others in daily lives and expose their sweat to patients as is the case when trying on the same clothing in the shop or using the same towel which in turn could affect healthy individuals. On the other hand, frequent physical examination and temperature monitoring are essential while screening COVID-19 patients. Temperature monitoring is applied at least 5 times a day in pandemic hospitals. Although infrared thermometers are used frequently, some other methods are also present. In that concern, sweat contamination becomes more crucial, namely, contacting the patient's sweat during examination, administering daily medical orders, and care giving.

The aim of this study is to investigate the presence of SARS-CoV-2 virus in sweat.

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Material and method

A prospective cross-sectional study was designed in our tertiary care education and training hospital. Permissions from Ministry of Health and local ethics committee were acquired. Fifty patients newly diagnosed with COVID-19 by RT-PCR test within 24 h were included in this study. Exclusion criterium was patients who administered any medication for disease.

Detection of SARS-CoV2 in swab samples was performed by RT-PCR method for SARS-CoV-2-specific ‘Orf1ab’ and ‘N’ genes targeting human ‘RNaseP (Ribonuclease P)’ genes. RNaseP was used as internal control to evaluate sample-based inhibition control and kit reagent control.

Sample collection

Disinfection of forehead and axillary skin with an alcohol-based product was done. Patients were asked to walk back and forth in the room until they sweated, and in order to help sweating, we exposed them to a room temperature 30 °C. After sweating was seen, samples were taken 5 times from forehead, 5 times from one axilla, and 5 times from other axilla by pressing on the skin. Sterile nylon, dacron, or rayon swabs with flexible plastic shafts were used to collect sweat samples from patients followed up with the diagnosis of COVID-19. After sample collection, swabs were placed into 2 mL of sterile viral transport medium (VTM; various manufacturers). Samples were transported and tested as soon as possible after collection.

RNA extraction from swab samples was performed by using BioRobot EZ1 Advanced XL® system (Qiagen, Hilden, Germany) using the EZ1 Virus Mini Kit (Qiagen, Hilden, Germany) according to the manufacturer’s instructions.

Real-time reverse transcription PCR

Real-time reverse-transcription PCR was performed by using Coronex-COVID19 (Ver.2.0) Multipleks RT-qPCR Diagnosis Kit (DS Bio and Nano Technology, Ankara, Turkey).

A 20- μ L reaction mix contained 5 μ L of RNA, 12.5 μ L of CORONEX-Covid 19 DS Mix E [RT-qPCR master mix], and 2.5 μ L of CORONEX-COVID-19 DS PP1 primer and prob mix [Orf1ab and N genes for SARS-CoV-2 detection, Rnase P gene for internal control]. Positive control for amplification control and no-template control to assess contamination were used. Thermal cycling was performed at 48 °C for 20 min for reverse transcription, followed by 95 °C for 5 min, and then 35 cycles at 95 °C for 5 s, 60 °C for 10 s in Rotor-Gene Q device (Qiagen, Hilden, Germany). Cycle threshold (Ct) values of less than 33 were defined as positive.

Results

The mean age of the patients was 57.4 (33 to 83). Thirty-five patients (70%) were male; 15 patients (30%) were female.

All of the patients had positive PCR tests for SARS-CoV-2 and radiologically positive findings in chest CT (computed tomography) for COVID-19. All of the patients had COVID-19-specific symptoms like fever, myalgia, and cough. SARS-CoV-2 was not detected in the sweat of PCR samples which were taken from axilla and forehead in none of the 50 patients.

Discussion

In December 2019, SARS-CoV-2 virus-associated pneumonia cases emerged in Wuhan, China, and became epidemic all over the world [6]. Symptoms altered from mild upper respiratory infection to severe systemic thrombotic immunological disease [7]. There is no effective prevention other than using face masks, social distancing, and paying attention to personal hygiene, but vaccines are promising. Trials on new vaccines are in progress and vaccines which completed phase 3 investigations were started to be used by many countries [8, 9]. Asymptomatic transmission from person to person is well known; however, different routes of contagion are possible. [10]. The existence of the virus in anal swabs of an infant was found [11]. Isolation of the blood samples in transfusion showed the existence of the virus in the blood [12]. In a recent study, SARS-CoV-2 viral shedding in different secretions was examined, and no virus was detected in tears, but in another study, SARS-CoV-2 was found in 55.3% of the patients’ tears [13]. The presence of SARS-CoV-2 was studied and two different results were found in two different studies. In the first study, SARS-CoV-2 was not detected in the cerumen, but in the other study, 39.5% of cerumen samples contained SARS-CoV-2. The presence of SARS-CoV-2 in eccrine glands drew an attention to whether or not if sweat is one of the transmission routes. Skin biopsies from SARS-CoV-2 adult patients showed a lymphocytic perivascular and peri-eccrine infiltration [14]. ACE2 is the receptor for SARS-CoV-2 to enter the cell. The receptor is found abundantly in the eccrine and sebaceous glands [15]. In one study, the presence of SARS-CoV-2 virus in the sweat of infected patients was investigated, and no positive result was found [16]. This is one of the first studies which investigate sweat in COVID-19 patients. Other studies like cerumen studies have different results so we wanted to investigate sweat again in a greater patient population to clarify the literature [13, 17].

In this study, we investigated the presence of SARS-CoV-2 virus in the sweat of 50 COVID-19 patients. Sweat samples were taken from forehead and axilla skin after cleaning with alcohol-based solutions. There is no virus detected in any of the samples.

Limitations of our study are the small number of the study sample, but our study has more patients than the first study, and every single PCR test is very valuable during pandemics. There is also no contamination of the sweat samples in our study.

Conclusion

In this study, SARS-CoV-2 was not isolated in the sweat of the COVID-19 patients. Hence, strict precautions and measures should be continued.

Authors' contribution All authors declare they all cover the authorship criteria of the journal

Declarations

Ethical approval Ethical approval was obtained from our tertiary center ethical committee

Conflict of interest The authors declare that they have no conflict of interests.

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