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Opinion

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Potential Hazards of Concern in the Walk-Through Screening System for the Corona Virus Disease 2019 from the Perspective of Infection Preventionists

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▸ See the article "Walk-Through Screening Center for COVID-19: an Accessible and Efficient Screening System in a Pandemic Situation" in volume 35, number 15, e154.

Introduction

Korea is developing a number of innovative approaches in the midst of experiencing ordeal of corona virus disease 2019 (COVID-19). A drive-through screening system is one such example.[1]

However, with this drive-through as a starting point, newer screening methods that have been applied and modified are being developed, e.g., walk-through, and through an infection preventionists' view, the trend seems to be flowing in a somewhat undesirable direction.

The safety of the examiner is more emphasized than the examinee, and saving personal protective equipment (PPE) is a more important goal. We think something is going in a wrong direction. Above all, the priority is neither the safety of the examiner nor the saving of PPE. Examinees must be safe, more than anything else. We are forgetting the basics. Hence, we would like to criticize it by pointing out the problems one by one.

Disinfection of Coronavirus in the Walk-Through Booth

It is known that coronavirus can survive on the surface for several days depending on temperature and humidity.[2] Therefore, the surface inside the booth, which may be stained with aerosol after a screening test, must be properly disinfected. As disinfectants used in medical institution, 60%–70% ethanol, sodium hypochlorite (1,000 ppm), hydrogen peroxide, etc. are generally recommended.[2,3]

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Since 70% alcohol is used in relatively small areas such as stethoscopes, instrument surfaces, carts, counters, and laboratory benches,[4] it is inappropriate to disinfect the relatively large areas such as the inside of walk-through booths with alcohol.

If sodium hypochlorite is used, it needs to be maintained for at least 10 minutes after wiping. In addition, the floor or surface must be repeatedly wiped thoroughly with a disposable cloth moistened with disinfectant to prevent recontamination of the surface.[4]

In the case of surface disinfection, a method of spraying is also being used, but it is not recommended by Korea Centers for Disease Control and Prevention guidelines as it has uncertain coverage and may promote aerosol production. In addition, after cleaning and disinfection, it is necessary to ventilate sufficiently. Moreover, since personnel performing disinfection work can inadvertently inhale the aerosolized disinfectant in a small space, it is inevitably a little bit dangerous environment for employee's safety. Therefore, healthcare workers must wear adequate PPE for their safety during the disinfection work.

Ultraviolet light irradiation is difficult to expect good effect if the applied area and sufficient irradiation time are not secured.

Air Exchange

When designing an isolation room, it should be set to minimize the exposure of all persons entering the room to the source of infection. Negative pressure isolation room (NPIR) uses a ventilation system to keep the air pressure inside the room at negative value, allowing outside air to enter the room, but not indoor air. The diluting effect in NPIR has been reported to be influenced by the airflow pattern along with the air changing rate.[5] NPIR requires air exchange at least 6 times per hour (hospital room) or 12 times (new or renovated building).[6,7] An examinee in the booth will be asked to sampling procedure while he or she temporarily put off his or her mask, and the procedure could inevitably cause them to cough or sneeze. Therefore, the safety of the next examinee should be particularly ensured because there is a risk that aerosols containing viruses may remain in the booth.

To remove 99% of airborne contaminants from NPIR, a minimum of 23 minutes is required for 12 cycles of air circulation per hour, and 35 minutes is required to remove 99.9%.[7,8] Therefore, it is dangerous to think that it will be safe to conduct screening at short intervals without considering air changing per hour. NPIR doors should be always closed, but in the case of walk-through system, examinees frequently enter and exit, so there is a possibility that proper negative pressure may not be maintained due to the inflow of external air. Even if the air conditioning system is stopped due to a power or mechanical failure, a system such as a backflow prevention damper should be equipped to prevent the spread of infection and cross contamination due to backflow of air.

Glove

The principle of using gloves is as follows: Disposable gloves are recommended when there is a possibility of contact with contaminated objects. Gloves should be replaced for each patient, never reused, and should not be washed and reused.[4] In the walk-through system

where the gloves are fixed to the booth, this principle may not be strictly observed, and cross-infection due to contaminated gloves could occur. To prevent this, gloves should be replaced at every screening test.

Back to the Basics

Both drive-through and walk-through systems have advantages in terms of efficiency. Both methods can be quickly performed. Since the medical personnel and the examinees are separated from each other, consumption of PPE can be reduced, and contamination of medical staff that may occur when removing the PPE can be prevented.

However, as for walk-through, consideration should be given to minimizing cross-infection that a non-infected person may be contaminated during the screening test, and minimizing cross-contamination that a non-infected person may be erroneously diagnosed as an infected person. Safety issues of examiners and medical personnel that may occur due to exposure to disinfectants should be also considered. We think developing innovative methods is a very desirable trend, but we should not forget the basics.

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