Non-face-to-face basic surgical skill education in the novel coronavirus disease 2019 (COVID-19) outbreak: obstacle vs. opportunity?

Chang Moo Kang1,2

1Division of Hepatobiliary and Pancreatic Surgery, Department of Surgery, Yonsei University College of Medicine, Seoul, Korea
2Pancreaticobiliary Cancer Clinic, Yonsei Cancer Center, Severance Hospital, Seoul, Korea

Since several cases of pneumonia were reported in Wuhan (Hubei Province, China) in December 2019 [1], the unexpected novel coronavirus disease 2019 (COVID-19) pandemic has greatly affected the world in a variety of ways, including health and economic issues. The newly confirmed infected patients with coronavirus-19 currently (as of June 20, 2020) has been reported to be 8,525,042, and 456,973 patients are succumbed estimating mortality rate of 5.35% (range, 0%–27.3%) [2]. Some countries have reported the end of infectious diseases, but new cases of novel COVID-19 infection continue to increase in most Asians, Europe, the United States, South America, and Africa. A high degree of infectivity of COVID-19 and relatively high mortality in patients with underlying comorbidity are well recognized [3]. Human-to-human transmission occurs through direct transmission, contact transmission, and aerosols of infected droplet [4]. Therefore, strict policy for reducing the chance of personal contact (guidelines for distancing in daily life [5]) has been proposed to prevent the spread of infection.

The novel COVID-19 pandemic, characterized by its high infectivity, also has a significant impact on the medical education system. Concerning about the outbreak of group infections, schools have delayed their opening of the new semester more than ever, and currently, most of them are conducting online lectures and very limited practice, raising the voice of concern about the inefficiency and deterioration of medical education. In particular, from the viewpoint of surgical education, basic surgical skills are as important as medical knowledge. In the present situation where face-to-face lectures are not being conducted, surgical education cannot be fruitful and dynamic. The students will not have a proper chance of surgical skill practice nor appropriate real-time feedback on their practice. Therefore, it is considered important to develop the systematic non-face-to-face education system for proper basic surgical skill education in the novel COVID-19 pandemic moment.

PORTABLE SURGICAL TRAINING KIT

The basic surgical techniques used here are skin suture, surgical tie, and bowel anastomosis. Timely, portable surgical training kit (Green Step, IROONIS, SINI Inc., Uiwang, Korea) has been developed, released, and currently available. This kit includes three individual simulation models for skin suture, surgical tie, and bowel anastomosis (Fig. 1). It is foldable, so it is comfortable for students and surgical residents to carry it and practice anywhere.

DEVELOPING CURRICULUM

The education program for basic surgical skills was largely composed of student’s surgical skill practice using a portable surgical training kit and several online lectures. In the case of personal individual surgical skill practice, portable surgical training kits were previously rented to students, and pretraining education materials, such as video files showing how to perform basic surgical skills were produced and provided before the class. In the class, students are supposed to perform basic surgical skills based on visual online instructions.
In particular, individual feedback from the supervisor to guide proper surgical skill performance is very important for the students because the supervisor cannot provide direct comments on what students did in the spot. Instead, the feedback was conducted through a group chatting room in the social network service (SNS) system, which is widely used in Korea. When students' performance outcomes are uploaded through video files or photos, the supervisor sees them directly, evaluates, and corrects surgical performance with positive and negative feedback. Students seem to be very good at this kind of SNS-based online communication. The characteristics and differences between open surgery, laparoscopic surgery, and robotic surgery were covered by online lectures for the students. This part can be properly modulated according to the purposes of surgical education.

**EVALUATION**

Performance evaluation was carried out based on the students' performance outcomes in the form of photos and video files uploaded by individual students after class. The contents and quality of the students' reports were also evaluated. Finally, all students simultaneously took a performance examination on skin suture using the video conference system and portable surgical training kit. In this system, all students are in the same condition, and the supervisor evaluated individual student's surgical performance skills and outcomes in a real-time manner (Fig. 2).

With the spread of the novel COVID-19, it is changing from face-to-face activities to online-based non-face-to-face activities in various fields of our societies. Accordingly, medical education should also actively try to get accustomed to a new environment of non-face-to-face education. In particular, surgical education containing surgical skill training is more urgent at present. According to this author's experience, through the development of portable surgical training kit and the running an appropriate online lecture system, it was found that that basic surgical skill can be well trained and evaluated even in the non-face-to-face online education curriculum. To establish a more effective non-face-to-face surgical education system, not to mention of more suitable portable surgical training kit, the development of a specialized SNS-based education system that can provide effective feedback between students and supervisors, and appropriate device for recording student surgical basic skills are necessary. Also, the surgical simulation and training of laparoscopic surgery and robotic surgery had many limitations to proceed in a non-face-to-face surgical education environment. Therefore, the development of a simple portable simulator using a personal computer and props is also necessary. by which students can learn and understand the principles of laparoscopic and robotic surgery. This moment may be the prime time to think over the establishment of a well-organized non-face-to-face surgical educational system for effective basic surgical skill education. It is thought that the novel COVID-19 outbreak is not a huge obstacle in surgical education, but a strong stimulator to establish a more effective surgical education system in near future.
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CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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