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Seoul, South Korea – Video-assisted CPR

Video-assisted CPR Experience in Seoul, South Korea

BRIEF BACKGROUND

Established in 2002, the Seoul Emergency Operations Center (EOC) covered a population of 10 million residents in the capital city of South Korea. In 2018, the number of calls treated was over 2.2 million, including 30% emergency cases. Among emergency calls, the majority are EMS-related and handled by the 119 Emergency Management Center of Seoul EOC. In 2018, the 119 Emergency Management Center responded to 1,400 EMS calls and provided over 749 medical consultations on average per day. In January 2017, the Smart Video-assisted First-aid System was introduced in Seoul EOC, in order to overcome the limitation of providing audio-assisted bystander first-aid guidance. One of the main goals of the system was to increase survival of out-of-hospital cardiac arrest (OHCA) cases through early recognition of OHCA patients by dispatchers and by improving quality of bystander CPR.

STEPS TAKEN

Two-way video communication permitted bystanders to receive not only real-time supervision and guidance from dispatchers based on visual information, but also gave dispatchers the ability to transmit video images of CPR to assist callers in performing high-quality CPR until an ambulance arrived. Even after an ambulance was on the scene, medical directors from the Seoul EOC used the system to relay real-time instructions to EMTs onsite for any necessary pre-hospital treatments.

CHALLENGES

To begin video assistance, the existing audio call needed to be disconnected so the dispatcher could call back using video, resulting in a delay administering chest compressions.

RESULTS

In 2017, among adult OHCA calls in Seoul EOC, bystander CPR was performed in 881 cases with either telephone- or video-assisted CPR. In 2018, a total of 510 OHCA calls received video-assisted first aid instructions, including CPR, and numbers are continuously increasing. Overall, both survival at discharge (16.7% vs. 11.3%) and good neurological recovery (15.7% vs. 11.0%) outcomes were higher among OHCA patients who received video-assisted bystander CPR, compared to those receiving telephone-assisted bystander CPR.

Outcome	Telephone-assisted CPR (Total 671 cases)	Video-assisted CPR (Total 210 cases)
Survival at discharge	76 (11.3%)	35 (16.7%)
Good neurological recovery	74 (11.0%)	33 (15.7%)

Source: Unpublished internal report data.

Two examples of note:

Case 1 — The parent of a four-month-old baby suspected agonal breathing and called 119. After cardiac arrest was recognized by the dispatcher, telephone-assisted CPR was performed by the baby’s father. The dispatcher switched to video call and confirmed agonal breathing and detected inaccurate chest compressions being performed by the father. The infant CPR video instruction was transmitted to the caller and the father’s CPR efforts instantly improved. Upon ambulance arrival, the baby had return of spontaneous circulation and was transported to the hospital.

Case 2 — A twenty-four-year-old male collapsed and was found by a co-worker. When the caller described periodic breathing, the dispatcher switched to video call and confirmed OHCA. The caller, who received CPR training two years prior, immediately performed video-assisted CPR. Upon the arrival of an ambulance, VF was observed and the patient had ROSC after receiving one shock.

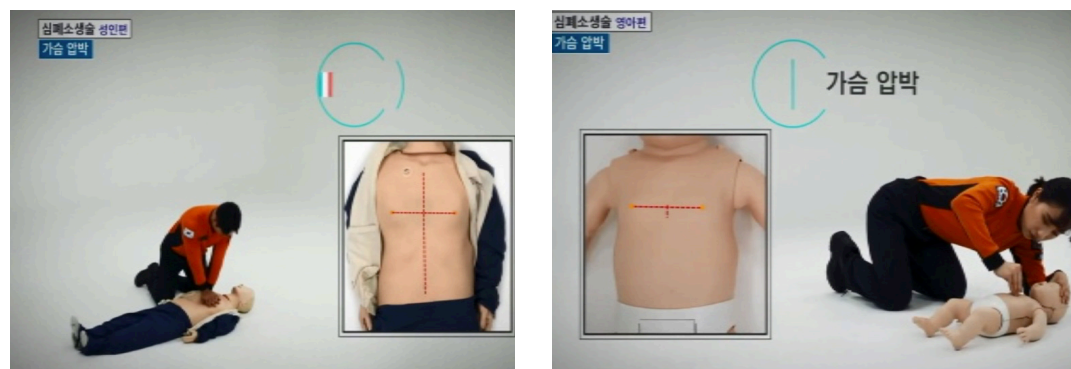


Figure 1: Video CPR instructions are transmit to the caller (Adult CPR on the left and infant CPR on the right)

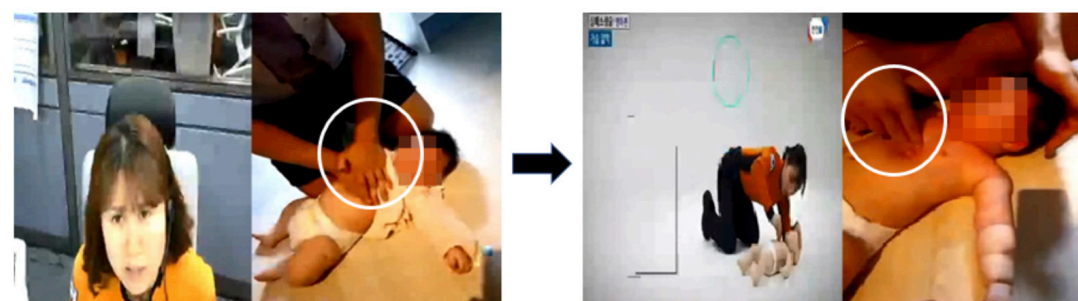


Figure 2: Video-assisted infant CPR and improvement of CPR quality

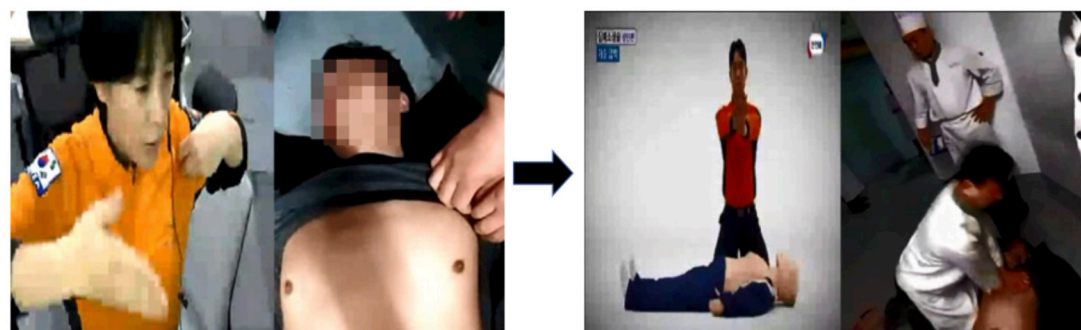


Figure 3: Video-assisted CPR on adult OHCA patient

OUTLOOK

Currently, the Smart Video-assisted First-aid System is only available for the Android operating system due to the Apple iOS security policy. Technological limitations, such as audio-to-video synchronization and low video quality, also exist. However, with the development of communication technologies such as 5G, there is room to improve the system, and the 119 Emergency Management Center of Seoul EOC is poised to identify a solution for the iOS security issue. An evidence-based video-CPR dispatcher protocol through ongoing video-CPR simulation studies is also in development.

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