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Clinical Opinion

Effectiveness of augmented reality telesurgery: Lessons learned from Covid-19 pandemic.

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Virtual reality (VR) is an artificially simulated environment that permits multiple interactions. Augmented reality (AR) is an interactive experience of a real-world environment where the objects are enhanced by computer-generated perceptual information [1,2].

Enhanced versions of these concepts were being used in several clinical practices. Virtual Interactive Presence (VIP) is a technology by which surgeons located remotely can simultaneously view each other's visual field, allowing them to tele-collaborate long distance surgeries [3]. Virtual interactive presence and augmented reality (VIPAR) platform allows a surgeon from a remote location to deliver real-time assistance to a local surgeon using a standard internet connection.

Pandemic typically led to a surge in demand for healthcare services overwhelming usually local capabilities. The SARS-Cov-2 outbreak was a big challenge for both patients and health practitioners. Surgical procedures were reserved only to most critical cases. Long lockdown limited patients' access to different health facilities. Most of the savant societies recommended implementing telemedicine and incorporating telemedicine as part of COVID-19 outbreak response systems [4].

Telemedicine involves not only consultation, radiodiagnosis and clinical follow up but also surgical procedures and surgeon's assisting guidance.

Telemedicine is no longer a futuristic tool. It becomes a need in the present situation where human interaction has been made difficult by the pandemic. The touch sense haptic technology and teledactyl were predicted since 1878. Nowadays it may provide a more realistic and "physical" doctor- patient interaction remotely. Since the first successful tele-laparoscopic cholecystectomy in 2001, telesurgery allowed collaboration between different surgeons located distantly across world. This Tele-collaboration contributed to complex wound repairs in war zones. The same concept was useful in the management of some high-risk procedures such as emergency surgeries in COVID-19 positive patients [5,6].

Telesurgery could revolutionize training concept as well. Real-time access to three-dimensional reconstructions in patient imaging and remote interaction with colleagues may provide comprehensive high-quality skills transfer [7].

Before 2020, telesurgery was always an exciting technology but with unclear endpoints. The limited access to tele-guided procedures was mostly explained by the lack of patient's trust and the high cost. The pandemic outbreak taught us a lot about its safety and effectiveness. Nowadays, health care delivery is feasible anytime in all restricted areas.

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