

Drones Delivering Automated External Defibrillators



Out-of-Hospital Cardiac Arrest (OHCA) is a dangerous condition with high mortality and poor health outcomes. According to the International Liaison Committee for Resuscitation (ILCOR), the global incidence of OHCA treated by emergency medical services (EMS) is 30.0-97.1 per 100,000 population, with discharge/30-day survival rates of 3.1-20.4% and good neurological outcomes of $2.8 \pm 18.2\%$. OHCA incidence in Europe is 67-170 per 100,000, with an 8% survival rate at discharge. The U.S. has an incidence rate of 76.5 per 100,000 with a 10.6% survival rate. In Asia, it's 45.9 per 100,000 with a $3 \pm 6\%$ survival rate.

Current EMS has limitations, making it challenging to treat OHCA patients promptly. Rapid defibrillation is crucial for OHCA survival, but timely access to AEDs is challenging. This review covers the feasibility & benefits of AED delivery by drones, highlighting their role as a new OHCA strategy. It suggests new solutions for current drone system issues.

After OHCA, the chances of survival decrease by 7-10% per minute due to a lack of brain circulation, causing neuronal damage. Consciousness is lost quickly due to oxygen depletion, and irreversible brain cell damage occurs after 4 minutes of sustained hypoxia. High-quality CPR must be started promptly. CPR improves outcomes, and early defibrillation is the key. Ventricular fibrillation/tachycardia in the first 5 minutes of cardiac arrest increases the heart's responsiveness to defibrillator shock. Defibrillation becomes less effective after 5 minutes due to the depletion of the myocardial energy substrate. Hence, AED should ideally be delivered within 3-5 minutes of cardiac arrest. This increases the survival rate to 50-70%.

Many countries have set up PAD networks with static AEDs in public places to improve defibrillation rates. However, it is crucial to remember that most OHCA occur at home. Drones are already used for military purposes and in fields such as education, medicine, and rescue. Drones have the potential to deliver AEDs in areas with complex road conditions and remote rural areas for OHCA incidents at home and outdoors. Drones may solve issues unaddressed by traditional EMS as they can deliver AEDs in complex urban areas and remote rural areas for home and outdoor cardiac arrests.

Advancements in drone technology can benefit OHCA patients, as drones have shown potential for rapid delivery of AEDs. Drones offer advantages over traditional EMS, but drone delivery of AEDs for OHCA has challenges in real-life implementation. Drones are a promising and innovative tool for OHCA treatment and have proven to be feasible and cost-effective in multiple studies. However, challenges still exist in implementing this new strategy and more research is needed in the future.

Source: [Resuscitation](#)
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