A member of the Global Resuscitation Alliance

2022 CASE STUDY RESUSCITATION ACADEMY

AED-equipped drones in Sweden

AED delivered on the ground with signal to attract attention from bystanders, Göteborg city Sweden 2020

BACKGROUND

Mortality from out-of-hospital cardiac arrest (OHCA) is approximately 90% in Sweden and Emergency medical services (EMS) response times have increased over the last decade. Publicly available automated external defibrillators (AEDs) are seldom used. Novel technologies using unmanned aerial vehicles (UAVs) commonly called drones, is a promising methodology with potential to facilitate early defibrillation prior to EMS arrival in OHCA. The optimal placement of AED-drones may be visualized using geographical information system models (1) and the integration with dispatch centres and EMS-services for deployment to suspected OHCA is feasible.

STEPS TAKEN

The Centre for Resuscitation Science at Karolinska institutet initiated this current drone-program in 2014. Simulations have been ongoing since then as well as GIS-studies, to evaluate placement of such system based on historical OHCA-data. During 2019 development of the current drone-system was initiated together with amongst others, Everdrone AB as the drone operator, and on June 1st 2020 the system was integrated and live. A feasibility trial described below during 2020 was followed by a logistics trial during 2021-2022. Focus onwards will be on the dispatch centre performance prior to a main study planned to be launched 2023.

RESULTS

Schierbeck et al. reported in a feasibility trial using a 3 drone-systems in West-Sweden during four months in 2020, that AED-drones could be dispatched and arrive to the scene of real cases of suspected OHCA prior to EMS arrival in a majority of cases 7/11 (64%). Additionally, delivery was made with a time benefit of about 2 minutes. The AED was winched down from the drone to the ground and placed at a median distance of 10 meters from the house/object (figure 1 and 2). (2)

OUTLOOK

A follow up study was initiated on 21st of April 2021 - ending 31 May 2022, using 5 AED-drones. Preliminary unpublished results indicate that delivery of an AED using a drone is still made in about half of all cases of suspected OHCA prior to EMS, however with an even larger median time benefit than in the feasibility trial. A case report of a 71-year-old man suffering an OHCA while shoveling snow and where the drone delivered an AED, which was used to defibrillate the patient, is published in the New England Journal of Medicine (NEJM) May 2022. (3)

CHALLENGES

The early delivery of an AED in OHCA has been tested over several years in two consecutive trials.

Although the dispatchers are aware of the delivery of the AED, they often hesitate to refer the bystander(s) to retrieve the AED so it can be used. As of 1st June 2022, a follow up study is initiated to evaluate obstacles and success factors for retrieval of a drone delivered AED.

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