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Code Blue Implementation in Pandemic COVID-19

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***Abstract*—Pandemic COVID-19 has a bruthless strength which highly emphasize of all dimension in human life. It made a high turnover in all approach to achieve a better way to minimize the catastrophe. In emergency response the approach for cardiopulmonary arrest are highly debate for ethics and better prognosis and the utmost is safety for medical personnel. COVID-19 is caused by SARS-CoV-2 (severe acute respiratory syndrome coronavirus 2) is highly contagious. Out of Hospital Cardiac Arrest (OHCA) from French Registry (French National Cardiac Arrest Registry) between march 1st and april 31st 2020 revealed ROSC rate was reduction by six point (ROSC 19.5% vs 25.3%) and D30 survival rate (2.8% vs 6.4%) was halved compared to non COVID 19 period. In the regards of in-hospital cardiac arrest (IHCA) during pandemic, COVID 19 accounts for 16% of IHCA and increased in 30 day mortality 2.3 folds; odd ratio compared with non COVID-19 was 2.27% and adjusted 30-day survival were 23.1% in COVID 19, 39.5% in non COVID-19 compared with 36.4% in pre pandemic period. Health workers are the profession with the highest risk of contracting this disease. Resuscitation efforts increase the risk of transmission to health workers for a variety of reasons. To address the issues ILCOR, AHA and ERC have several changes from the recent guideline to confront resuscitation in COVID 19.**

Keywords—COVID 19, cardiac arrest, resuscitation, CPR

I. INTRODUCTION

Pandemic COVID-19 has a bruthless strength which highly emphasize of all dimension in human life. It made a high turnover in all approach to achieve a better way to minimize the catastrophe. In emergency response the approach for cardiopulmonary arrest are highly debate for ethics and better prognosis and the utmost is safety for medical personnel. COVID-19 is caused by SARS-CoV-2 (severe acute respiratory syndrome coronavirus 2) is highly contagious. A recent systematic review revealed 80% patients have a mild disease, 15% have moderate disease and 5% have severe disease which fatality rate was 3.1% [1]. In Wuhan, China at a tertiary hospital revealed 87.9% among 136 patients had a respiratory cause for cardiac arrest. The cardiac rhythm shown asystole in 89.7% (122), pulseless electrical activity in 4.4% (6) and ventricular fibrillation/pulseless ventricular tachycardia in 5.9% (8) [2]. From another case report series have shown 16.7% patients will developed arrhythmias and 7.2% had acute cardiac injury [3]. Complications such as hypoxemia due to acute respiratory failure, myocardial injury, ventricular arrhythmia and shock are common condition in critically ill patients and these lead to a greater risk of cardiac arrest. The use of hydrochloroquine and azithromycin have the side effect of prolonging the QT interval also has the potential to increase the risk of lethal arrhythmia. The infection rate of COVID 19 still increasing exponentially in various part of the world, so the incidence of cardiac arrest rate is likely to increase.

II. EPIDEMIOLOGY

Out of Hospital Cardiac Arrest (OHCA) from French Registry (French National Cardiac Arrest Registry) between march 1st and april 31st 2020 revealed ROSC rate was reduction by six point (ROSC 19.5% vs 25.3%) and D30 survival rate (2.8% vs 6.4%) was halved compared to non COVID 19 period. Similarly in bystanders and first aid providers for initiated CPR was less frequently (49.8% vs 54.9%) and used defibrillators less often (66.0% vs 74.1%) [4]. In London registry revealed OHCA presentations during March and April 2019 and 2020 was increased in 81% during the first peak of the pandemic and also poorer outcome (Figure 1) [5]. Recent systematic review has revealed pandemic are responsible not only for deaths among infected but also for excessive number of OHCA with lower rates of survival and ROSC; meanwhile this findings are direct consequences from social distancing, lockdown and subsequent reorganization of healthcare system leads to reducing bystander CPR, and increasing time of unwitnessed OHCA and EMS arrival [6]. In the regards of in-hospital cardiac arrest (IHCA) during pandemic, COVID 19 accounts for 16% of IHCA and increased in 30 day mortality 2.3 folds; odd ratio compared with non COVID-19 was 2.27% and adjusted 30-day survival were 23.1% in COVID 19, 39.5% in non COVID-19 compared with 36.4% in pre pandemic period [7].

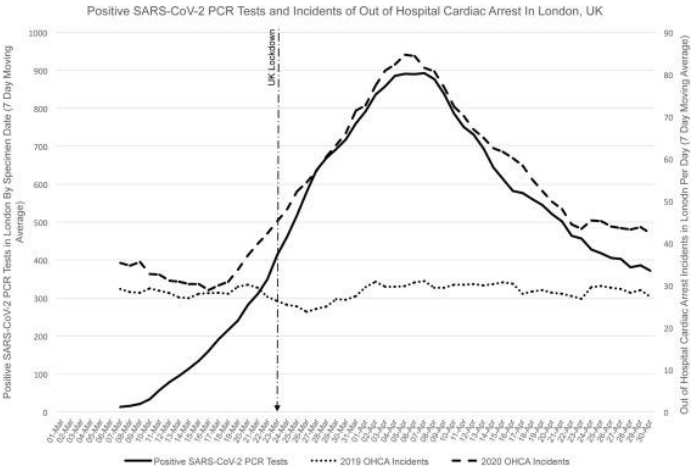

Fig. 1. OHCA incidents in London with daily number of positive PCR test [5].

III. Main Problem

Health workers are the profession with the highest risk of contracting this disease. The risk is increasingly for real as the scarcity of Personal Protective Equipment (PPE) around the world increases. Resuscitation efforts increase the risk of transmission to health workers for a variety of reasons. First CPR includes a variety of aerosol- producing procedures, including chest compressions, positive pressure ventilation, and installation of an advanced airway. During this procedure, viral particles can be suspended in the air with a half-life of approximately 1 hour and be inhaled by people around them. Second, resuscitation efforts rquire a number of rescuers to work in close proximity to both one another ant the patient. Finally cardiac arrest is an emergency where the patients need to be resuscitated quickly and this has the potential to lead a decline in the practice of standard precautions for infection control (Figure 2).

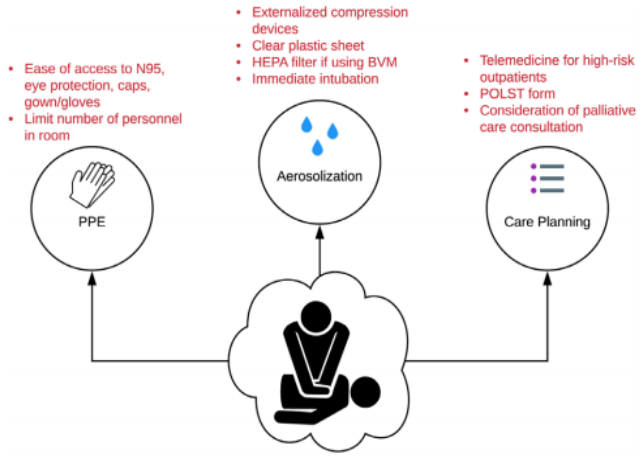

Fig. 2. Challenge and solution in CPR during pandemic COVID-19 [8].

IV. COVID 19 Transmission

Current recent evidence have revealed the main way virus transmission is by respiratory secretions. There are two main secretions, first droplets (>5-10 micron) who transmit in people who closed each other (droplets fall onto surface around 1-2 meters) and second is airborne (< 5 microns) which can transmit in an area and can suspend in the air. Cough, Sneeze, or touch on surface by infected people can also spread the virus and surrounding people might become infected by touching this contaminated surfaces [9,10].

There are 3 concern from ILCOR (International Liaison Committee on Resuscitation) regarding systematic review: first, are chest compression and defibrillation generating aerosol; second, all CPR intervention increase infection transmission, and the last what kind of protective equipment was suitable for preventing the infection [11].

V. What Guideline Said

AHA has published the review for Advanced Life Support in the pandemic according to Interim Guidance; there are several changes that include for non COVID 19 patient (standard procedure) and COVID 19 patient (table 1) [12].

TABLE I. Key Changes from AHA [12]

Reduce Provider Exposure	• Don PPE before entering the room/scene • Limit personnel • Consider using mechanical CPR devices for adult and adolescence who meet height and weight criteria • Communicate COBID-19 status to any new providers
Prioritize oxygenation and ventilation strategies with lower aerosolization risk	• Use HEPA filter, if available, for all ventilation • Intubate early with a cuffed tube, if possible, and connect to mechanical ventilator if able • Engage the intubator with highest chance of first pass success • Pause chest Compression to intubate • Consider use of video laryngoscopy, if available • Before intubation, use a bag-mask device (or T – pieces in neonates) with HEPA filter and tight seal • For adults, consider passive oxygenation with nonbreathing face mask as alternative to bag-mask device for short duration • If intubation delayed, consider supraglottic airway • Minimize closed circuit disconnections
Consider Resuscitation Appropriateness	• Address goals of care • Adopt policies toi guide determination, taking into account patient risk factor for survival

European Resuscitation Council (ERC) has new changes based upon ILCOR statement for resuscitation in patients with COVID-19 (Table 2) [13].

TABLE II. CPR RECOMMENDATIONS FROM ERC [13]

ILCOR treatment recommendations for cardiopulmonary resuscitation (CPR) in COVID-19
• We suggest lthat chest compressions and cardiopulmonary resuscitation have the potential to generate aerosols (weak recommendation, very low certainty evidence) • We suggest that in current COVID-19 pandemic lay rescuers consider compression-only resuscitation and public-access defibrillation (good practice statement) • We suggest that in the current COVID-19 pandemic, lay rescuers who are willing, trained and able to do so, may wish to deliver rescue breaths to children in addition to chest compressions (good practice statement) • We suggest that in current COVID-19 pandemic, healthcare professionals should use personal protective equipment for aerosol-generating procedures during resuscitation (weak recommendation, very low certainty evidence) • We suggest that it may be reasonable for healthcare providers to consider defibrillation before donning aerosol generating personal protective equipment in situations where the provider assesses the benefits may exceed the risks (good practice statement)

VI. CONCLUSION

The changing approach for CPR in COVID 19 should be warrant for healthcare safety to do a best result for managing the cardiac arrest. Healthcare professional should be pay a close attention to the use of Personal Protective Equipment in dealing cardiac arrest in patient COVID 19.

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