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Place of prefilled syringes in COVID-19 patient based on current evidence



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To the Editor

Effective implementation of both basic and advanced life support in children and adults requires rapid and accurate performing of all procedures, including the administration of drugs in appropriate doses and at the right time. Preparation of drugs for resuscitation when wearing personal protective equipment resulting from the COVID-19 pandemic may pose many problems related to limitation of movement range and speed of action of medical personnel. Mistakes in preparation of drugs for resuscitation occur even under typical conditions, without wearing protective clothing, visors and goggles and result from rush and action under difficult conditions, especially in the case of child resuscitation.

Personal protective equipment creates additional problems related to reduced visibility, fatigue resulting from working in extremely difficult conditions, fears for one's own safety, and reduced mobility. Not without significance is the reduction in the number of staff resulting from working in special conditions and work fatigue. Under such conditions, the conduct of cardiopulmonary resuscitation is technically more difficult, more tiring and requires special concentration.

Rapid vascular access and the implementation of appropriate pharmacotherapy and/or fluids is one of the key elements of the treatment of patients in severe conditions, including in particular during cardiopulmonary resuscitation. As shown by the study of Eve et al. when epinephrine is administered in the early phase, there is an improvement in neurological outcome from OHCA [1]. However, in the current COVID-19 pandemic, emergency staff during contact with patients with suspected/confirmed COVID-19 should wear full personal protective equipment (PPE) for aerosol generating procedures to reduce the risk of infection. However, the use of such personal protective equipment because of its felt to impair comfort, sensitivity and dexterity may hinder the performance of medical procedures [2].

Therefore, the best ways of performing medical procedures, including the preparation and administration of drugs, should be sought. The influence of PPE on the prolongation of drug preparation time and supply is confirmed by our meta-analysis of studies [3,4] on time of intravenous access with/without PPE conditions (MD = 6.64; 95% CI, 4.88–8.41; $p < 0.001$) (Supplementary Fig. 1).

As indicated in the Castle et al. [5] study conducted in CBRN-PPE conditions comparing the time of preparation and supply of drugs from different types of ampoules, the use of drugs from pre-filled syringe (Aurunm prefilled syringe and Minijet prefilled syringe) compared with glass ampoule with syringe and needle (GSN) was associated with significantly shorter distribution of time for drawing up drugs (MD = -74.45 ; 95% CI (-79.22 , -69.69); $p < 0.001$; Table 1).

Another element in favors of using pre-filled syringes is the fact that in the case of pre-filled syringes the distribution of amount of volume drawn compared to GSN was statistically significantly higher for both types of pre-filled syringes (Table 1), while the analysis in subgroups with consideration of the type of pre-filled syringe showed that Aurunm prefilled syringe is the most effective method of drug supply among those studied by Castle. Additionally, reduction of both glass ampoules and additional needles for drug delivery may reduce the risk of needlestick injuries, and it should be taken into account that in the era of the COVID-19 pandemic, needlestick injuries, which require consultation/treatment in infectious wards, should be particularly avoided, as medical personnel, whose deficiencies are now so clearly visible and problematic, is excluded.

In conclusion, in emergency medicine, especially during cardiopulmonary resuscitation of patients with suspected/confirmed COVID-19 emergency staff should consider a combination of intraosseous access and drugs in prefilled syringes to reduce the time of infusion and the risk of infection.

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Declaration of competing interest

No potential conflict of interest relevant to this article was reported.

Table 1

Distribution of time for drawing up drugs and distribution of amount of volume drawn characteristics

	MD (95%CI)	P value
Distribution of time for drawing up drugs by different device comparing with standard glass ampoules		
Aurunm prefilled syringe	-82.10 (-98.86 , -72.34)	$P < 0.001$
Minijet prefilled syringe	-66.70 (-76.66 , -56.74)	$P < 0.001$
Distribution of amount of volume drawn up by device comparing with standard glass ampoules		
Aurunm prefilled syringe	0.19 (0.14 , 0.23)	$P < 0.001$
Minijet prefilled syringe	0.16 (0.12 , 0.21)	$P < 0.001$

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Kobi Ludwin
Polish Society of Disaster Medicine, Warsaw, Poland

Krzysztof J. Filipiak
First Department of Cardiology, Medical University of Warsaw, Warsaw, Poland

Milesz Jaguszewski
First Department of Cardiology, Medical University of Gdansk, Gdansk, Poland

Michał Pruc
Michał Paprocki
Faculty of Medicine, Łazarski University, Warsaw, Poland

Jacek Smereka
Polish Society of Disaster Medicine, Warsaw, Poland
Department of Emergency Medical Service, Wrocław Medical University, Wrocław, Poland

Lukasz Szarpak
Polish Society of Disaster Medicine, Warsaw, Poland
Faculty of Medicine, Łazarski University, Warsaw, Poland

Marek Dabrowski
Chair and Department of Medical Education, Poznan University of Medical Sciences, Poznan, Poland

Michael Czekajlo
Hunter Holmes McGuire Center for Simulation and Healthcare, Virginia Commonwealth University, Richmond, VA, USA

Corresponding author at: Hunter Holmes McGuire Center for Simulation and Healthcare, Virginia Commonwealth University, Richmond, VA, USA

E-mail address: Czekajlomichaek.er@gmail.com

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