Influence of Patient Body Weight on Probability of Return of Spontaneous Circulation Following Out-of-Hospital Cardiac Arrest: An Exploratory Analysis

Michael W. Hubble, PhD, MBA, NRP; Ginny R. Kaplan, PhD, MHS, Paramedic, FAEMS; Melisa Martin, Ed.D, MHS, Paramedic

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Introduction

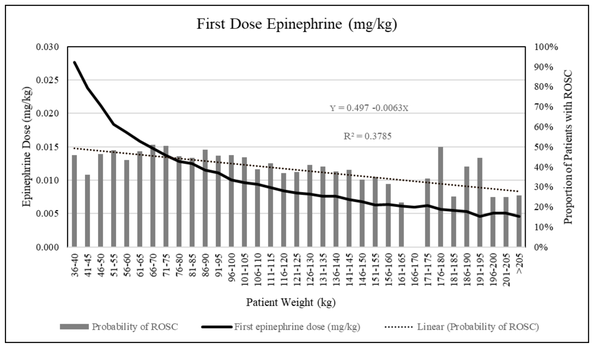
- Return of spontaneous circulation (ROSC) is associated with several patient-level factors, including a shockable presenting rhythm, younger age, Caucasian race, and female sex.
- An additional patient-level factor that may influence outcomes is patient weight, yet this attribute has not been extensively studied within the context of prehospital resuscitation despite rising rates of global obesity.

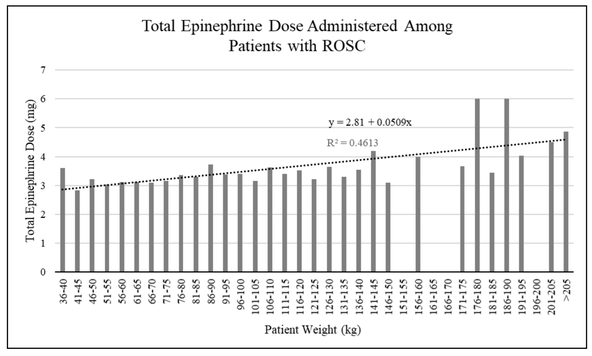
Study Objective

- To assess the relationship between patient body weight and ROSC during OHCA.

Methods

- We conducted a retrospective analysis using the 2020 ESO Data Collaborative dataset.
- The inclusion criteria consisted of adult patients who experienced witnessed, non-traumatic OHCA prior to EMS arrival.
- The primary outcome measure was the relationship between patient weight (dichotomized as ≤ 100 kg or > 100 kg) and ROSC of any duration during the prehospital phase of resuscitation.
- Adjusted odds ratios (OR) were derived via logistic regression to control for confounding variables.
- Confounding variables were selected a priori and included patient age, sex, and non-Caucasian race; etiology of arrest; shockable presenting rhythm; layperson CPR; AED shock prior to EMS arrival; EMS response time; and placement of an advanced airway.





	Odds Ratio	95% CI	p-value
Age (per year)	0.994	0.991-0.997	<0.001
Male sex	0.782	0.714-0.856	<0.001
Minority	0.976	0.883-1.078	0.628
Weight (>100kg)	0.709	0.646-0.778	<0.001
Etiology of Arrest			
Presumed Cardiac	(reference)		
Respiratory	1.686	1.478-1.922	<0.001
Drug overdose	2.816	2.103-3.769	<0.001
Other	1.074	0.849-1.358	0.554
Received layperson CPR	1.170	1.066-1.285	<0.001
Initial shockable rhythm	1.790	1.620-1.977	<0.001
Received AED shock prior to EMS arrival	1.658	1.396-1.969	<0.001
Received advanced airway placement	0.969	0.874-1.075	0.555
EMS response time (per minute)	0.970	0.962-0.979	<0.001

Results

- A total of 9,096 patients met the inclusionary criteria and had complete data for analysis:
  - 65.01 (±15.8 SD) mean years of age
  - 93.52 (±31.5 SD) mean kg body weight
  - 64.3% males
  - 81.8% presumed cardiac etiology
  - 30.3% initial shockable rhythm
  - 30.6% bystander CPR
  - 44.0% experienced ROSC
- ROSC was less likely with patient weight >100kg (OR=0.709, p<0.001)
- Although the mean first epinephrine dose (mg/kg) followed a negative curvilinear trend due to its non-weight-based dosing scheme, the mean total epinephrine dose administered to achieve ROSC demonstrated an upward linear trend of 0.05 mg for every 5 kg of body weight.
- No weight-based differences in the time required to complete defibrillation, airway placement, and vascular access.

Conclusion

- Patient weight was negatively associated with ROSC and positively associated with the total epinephrine dose required to attain ROSC.

Limitations

- Retrospective study design.
- Accuracy and completeness of patient records.
- Unknown accuracy of estimated weights.
- No data on CPR quality.
- No data on longer-term outcomes.