VOLUME-CHASERS: A Multicenter Observational Study of Fluid Resuscitation in Septic and Non-septic Shock

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Introduction:

Fluid resuscitation is a mainstay of treatment for patients in shock. The VOLUME-CHASERS study aims to characterize the usual practice in fluid resuscitation and vasopressor use in different shock types and treatment areas.

Method:

- Prospective observational study of 34 hospitals between 9/1/2017 - 12/31/2017.
- Inclusion criteria:
  Adult ICU patients with shock:
  - systolic blood pressure < 90
  - mean arterial blood pressure < 65
  - on vasopressor to maintain normotension
- Patients with shock onset at outside hospital, during surgery, or after cardiac surgery were excluded.

Statistical Analysis:

We performed ANOVA, Kruskal-Wallis, and $\mathcal{X}^2$ test to determine univariate associations between shock types and fluid administration. We also performed hierarchical multivariate linear regressions with hospital site as random intercept to determine the predictors of fluid administration during shock.

Results

- Enrolled 1,639 patients from 34 hospital sites.
- The most common shock type was septic shock.
- In usual practice of shock resuscitation, there was variation in the amount of fluid and vasopressor use by
  - shock type
  - shock location
  - ICU type
- Site to site variation was small in terms of fluid administration (ICC 0.05, 95%CI 0.02, 0.12).

Table 1: Characteristics by shock type, N= 1639

Variable	All	Septic	Hypovolemic	Cardiogenic	Others	p- value
Number	1639	977 (60%)	308 (19%)	192 (12%)	150 (9%)	
Age, years mean ± SD	62.45 ± 16.37	62.57 ± 16.2	61.67 ± 16.37	67.06 ± 14.86	57.18 ± 17.52	<0.0001
APACHE III score, mean ± SD	86.6 ± 28.21	90.74 ± 27.98	78.54 ± 25.4	81.83 ± 26.6	79.41 ± 28.98	<0.0001
Male gender, n (%)	901 (55)	535 (54.8)	171 (55.5)	113 (58.9)	79 (52.7)	0.65
Race, n (%)						0.024
White	991 (60.5)	589 (60.3)	175 (56.8)	135 (70.3)	85 (56.7)	
Black	266 (16.2)	169 (17.3)	53 (17.2)	16 (8.3)	28 (18.7)	
Other	382 (23.3)	219 (22.4)	80 (26)	41 (21.5)	37 (24.7)	
In-hospital mortality, n (%)	*412 (25.3)*	*289 (29.6)*	*50 (16.2)*	*38 (19.8)*	*35 (23.3)*	*< 0.001*

Figure 1: Cumulative fluid in the 24 hours following shock onset

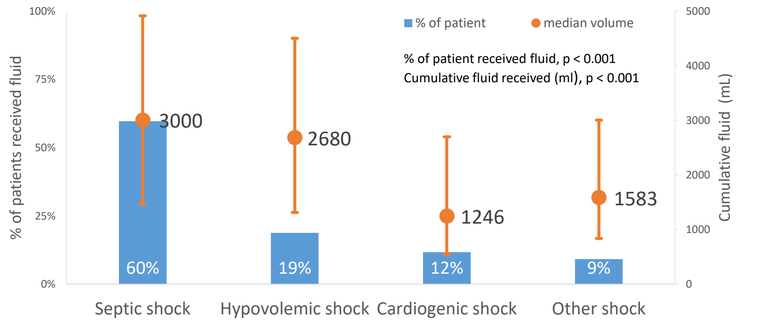


Figure 2: Cumulative vasopressor in 24 hours following shock onset

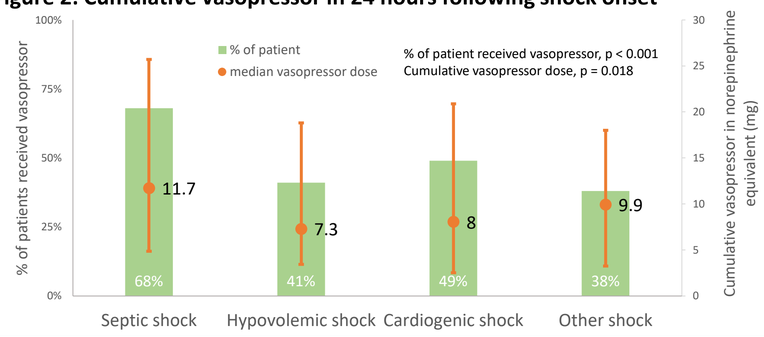


Figure 3: Location of shock onset

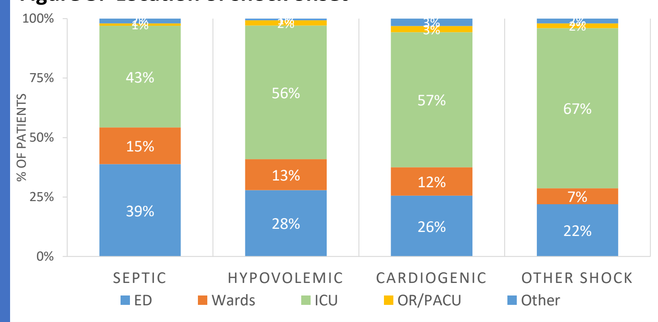


Figure 4: Type of ICU admission

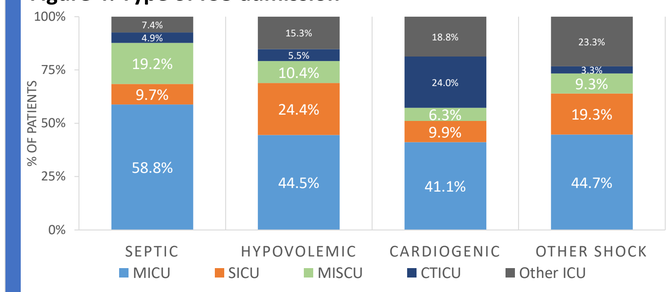
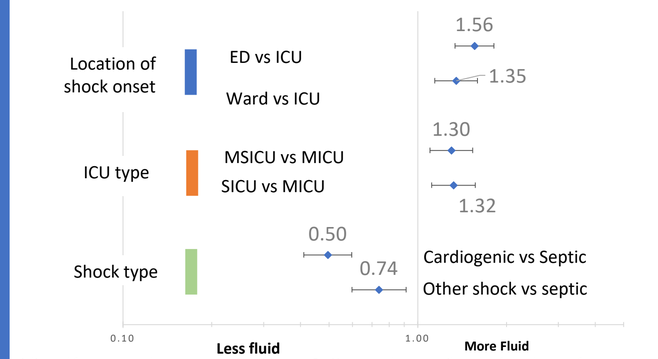


Figure 5: Predictors of fluid in 24 hours following shock onset



Adjusted for: age, gender, race, severity of illness, PmHx, secondary contributors of shock, use of vasopressor and mechanical ventilation

Strength/Limitations:

- Observational study that was efficiently conducted.
- Granular data on resuscitation strategies.
- Reflecting usual practice.

Conclusion:

- There is significant variation in fluid and vasopressor use in the 24 hours following shock onset.
- Usual practice of fluid resuscitation varies by shock type, shock location, and ICU type.

Acknowledgements:

- Discovery Network, Society of Critical Care Medicine
- All 34 hospital sites across the US and in Jordan

Bridgeport Hospital
Brigham and Women's Hospital
Cleveland Clinic Foundation
Duke
Emory University
Geisinger Wyoming Valley Medical Center
Intermountain
King Hussein Cancer Center
Lahey Hospital
Lake Region Medical Center
Mayo-MCA
Mayo-MCF
Mayo-MCR
MD Anderson UT
MGH
Montefiore Medical Center
Mt Sinai
NYU
Ohio Health/Riverside Methodist Hospital
Oregon Health and Science University
Rush University
St Agnes
Truman Medical Center
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U Cincinnati
U Kentucky
U Maryland
U Michigan
UCLA
University of Oklahoma Health Sciences Center
University of Utah
URMC Rochester
USC
Vidant Medical Center
Wake Forest Baptist Health
Yale-New Haven

DISCOVERY
The Critical Care Research Network
Montefiore Einstein
Albert Einstein College of Medicine
Emory University School of Medicine
MGH 1811 Massachusetts General Hospital

Supported by NIH/National Center for Advancing Translational Science (NCATS) Einstein-Montefiore CTSA Grant Number UL1TR001073