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Vasopressor De-escalation in Septic Shock Recovery and Incidence of Clinically Relevant Hypotension

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Background

In order to minimize morbidity and mortality, the Surviving Sepsis Campaign Guidelines specify care goals for patients in the acute and maintenance phase of septic shock. However, there is a lack of guideline recommendations for recovery phase management, particularly for the safe tapering and discontinuation of vasopressors. Outcome data for patients in the recovery phase of septic shock still show unacceptably high rates of hemodynamic instability, lengths of stay (LoS), and mortality. This demonstrates a need to study safety outcomes in vasopressor tapering, and its potential impact on clinically relevant secondary outcomes.[1-8]

Objective

To evaluate the incidence of hypotension in the recovery phase of septic shock.

Methods

This retrospective analysis evaluated adult Intensive Care Unit (ICU) patients admitted July 1, 2016 to July 1, 2018 with septic shock treated with concomitant norepinephrine (NE) and vasopressin (VP) with at least 2 hours (h) of overlap. The study will explore the following outcomes:

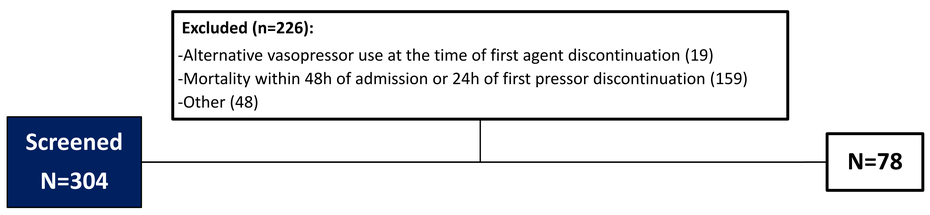
Outcome	Endpoint
Primary	Incidence of hypotension* within 24h of first study vasopressor discontinuation
Secondary	Time to hypotension
	Total vasopressor duration
	ICU LoS
	Hospital LoS
	ICU mortality

*Hypotension defined as:

Primary Criteria	+1 or more of the following:
Mean Arterial Pressure (MAP) <65 mmHg	Re-initiation of first discontinued vasopressor
	Initiation of an alternate vasopressor in order to maintain hemodynamic stability
	Administration of at least 250 mL crystalloid bolus
	Increase in remaining vasopressor rate by at least 25% from time of hypotension

The following data was collected from patients' electronic health record: source of infection, mechanical ventilator use, sedative use, use of medications impacting blood pressure, steroid use, and baseline Sequential Organ Failure Assessment (SOFA) scores.

Figure 1. Study flow



Results

Table 1: Baseline Demographics (N=78)

Characteristic	Hypotensive (n=26)	Non-hypotensive (n=52)
Mean Age (years)	71	65
Males, n (%)	12 (46.2)	30 (57.7)
Race		
Caucasian, n (%)	8 (30.8)	22 (42.3)
Black, n (%)	7 (26.9)	16 (30.8)
Asian, n (%)	2 (7.7)	0
Other, n (%)	9 (34.6)	14 (26.9)
Mechanical Ventilation, n (%)	18 (69.2)	36 (69.2)
Source of Infection		
Respiratory, n (%)	8 (30.8)	17 (32.6)
Intra-abdominal, n (%)	4 (15.4)	7 (13.5)
Urinary, n (%)	10 (38.5)	11 (21.2)
Cardiac, n (%)	1 (3.8)	2 (3.8)
SST, n (%)	0	5 (9.6)
Renal, n (%)	1 (3.8)	3 (5.8)
Other, n (%)	2 (7.7)	7 (13.5)
Narcotics & Sedatives, n	21	42
Benzodiazepines, n	15	36
Dexmedetomidine, n	1	0
Opioids, n	20	36
Propofol, n	12	30
Antihypertensives, n	17	36
ACEi/ARB, n	2	4
Clonidine, n	3	1
DHP CCB, n	4	7
Diuretics, n	15	36
Antiarrhythmics, n	20	31
Amiodarone, n	7	17
BB, n	16	25
Digoxin, n	7	11
Non-DHP CCB, n	6	11
Midodrine, n	9	17
Steroids, n	5	16
Mean Baseline SOFA Score, n	10	10

Abbreviations: SST, Skin & Soft Tissue; ACEi/ARB, Angiotensin Converting Enzyme Inhibitors/ Angiotensin Receptor Blockers; DHP CCB, Dihydropyridine Calcium Channel Blockers; BB, Beta Blockers; Non-DHP CCB, Non-dihydropyridine Calcium Channel Blockers

Figure 2: Clinically Relevant Hypotension Requiring Intervention

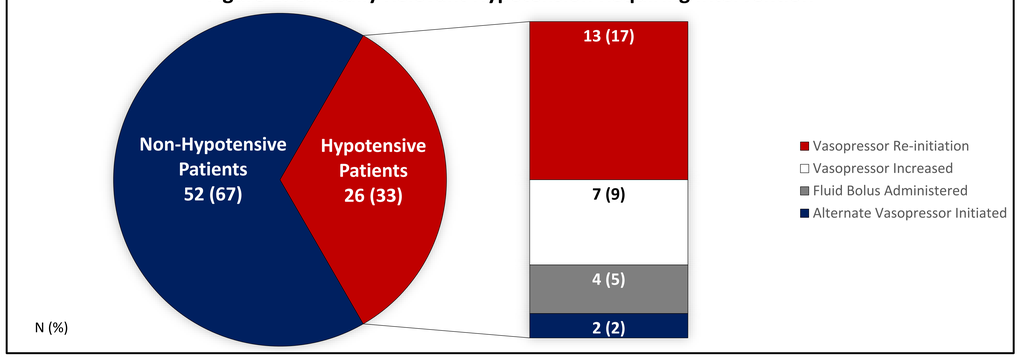
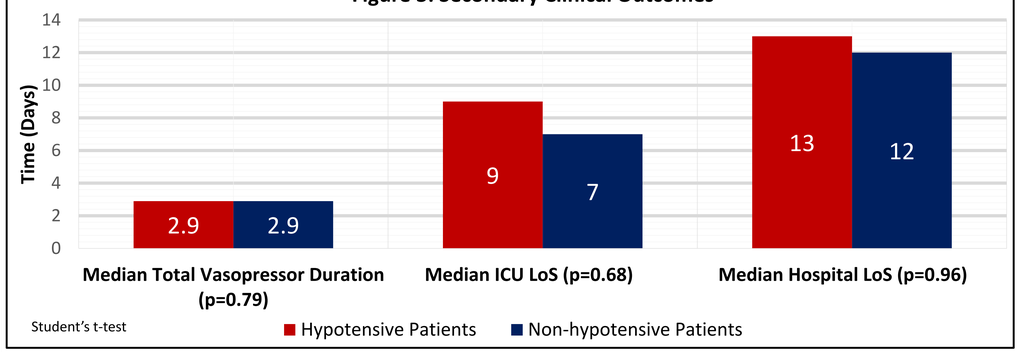


Figure 3: Secondary Clinical Outcomes



Of the 304 patients evaluated, 78 met inclusion criteria. Of the 78 patients, clinically relevant hypotension requiring intervention was found in 26 patients (33.3%). In those 26 patients, the median time to hemodynamic instability was 7.5h (IQR 4.25–15.5). The median total vasopressor duration was 2.9 days (IQR 0.78–1.87) in the hypotensive group and 2.9 days (IQR 0.57–1.77) in the non-hypotensive group (p=0.79). The median ICU LoS was 9 days (IQR 6–11) in the hypotensive group and 7 days (IQR 6–13) in the non-hypotensive group (p=0.68). The median hospital LoS was 13 days (IQR 10–16) in the hypotensive group and 12 days (IQR 9–19) in the non-hypotensive group (p=0.96). Overall there was a 46.2% (36/78 patients) mortality rate. There was a 57.7% (15/26 patients) mortality rate within the group of patients who experienced clinically relevant hypotension.

Conclusion

An incidence of 33% demonstrates an unaddressed hazard when tapering vasopressors in recovering patients. Without a powered study, a conclusion cannot be drawn on the potential negative impact to vasopressor duration, LoS, or mortality. Our event rates resemble those in other published literature of similar patient populations that also lacked protocolized vasopressor de-escalation. We believe the primary event rate may be reduced with standardized or guided tapering practice and through the optimization of adjunctive medications. Our results suggest the need for a multi-pressor de-escalation guideline to reduce the incidence of hypotension in the recovery phase of septic shock.

References

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The authors of this study have no conflicts of interest to disclose.