

INTRODUCTION

- Patients who present with severe sepsis and left ventricular (LV) dysfunction have higher rates of mortality compared to those without LV dysfunction^{1,2}
- Mortality is hypothesized to be influenced by hypoperfusion in sepsis and septic shock secondary to loss of systemic vascular resistance is further compounded in patients with low cardiac output (CO) due to ventricular dysfunction³
- The management of sepsis involves fluid administration and often vasopressors and in patients with poor CO, fluid overload and coronary vasoconstriction has potential to lead to poor outcomes⁴

PURPOSE

The purpose of this study was to characterize differences in sepsis management in patients with and without LV dysfunction

METHODS

- Single site retrospective chart review of patients from September 2017 – January 2018
- Data collected included patient demographics, vasopressors used, vasopressor max rate and duration, steroid use and milliliters of fluid intake and output on ICU days 1 and 2
- Descriptive data was reported in Mean (SD) and categorical as number (%)
- Primary endpoint was differences in fluid and vasopressor use
- Secondary endpoints were ICU length of stay, mortality and days of mechanical ventilation
- Descriptive statistics were used for analyzing endpoints
- Patients were included if they had diagnosis of sepsis, were treated with vasopressors for greater than 3 hours, and had an echocardiogram within 6 months
- This project is part of the health system medication use evaluation (MUE) and improvement program, which has been reviewed by the Augusta University Institutional Review Board and determined not to be human subjects research

DISCLOSURES

The authors have no conflicts of interest to disclose

RESULTS

Table 1. Demographics

Ejection Fraction (EF) Groups	≤40%	>40%
Patients (number)	12	17
Age (years)*	67 (10)	61 (9)
Admission weight (kg)*	70 (20)	90 (34)
Male**	8 (67)	7 (41)
Caucasian**	7 (58)	9 (53)
Average EF*	26 (5)	56 (8)

*Data described as mean (SD)
**Data described as number (%)

Table 3. Patient outcomes

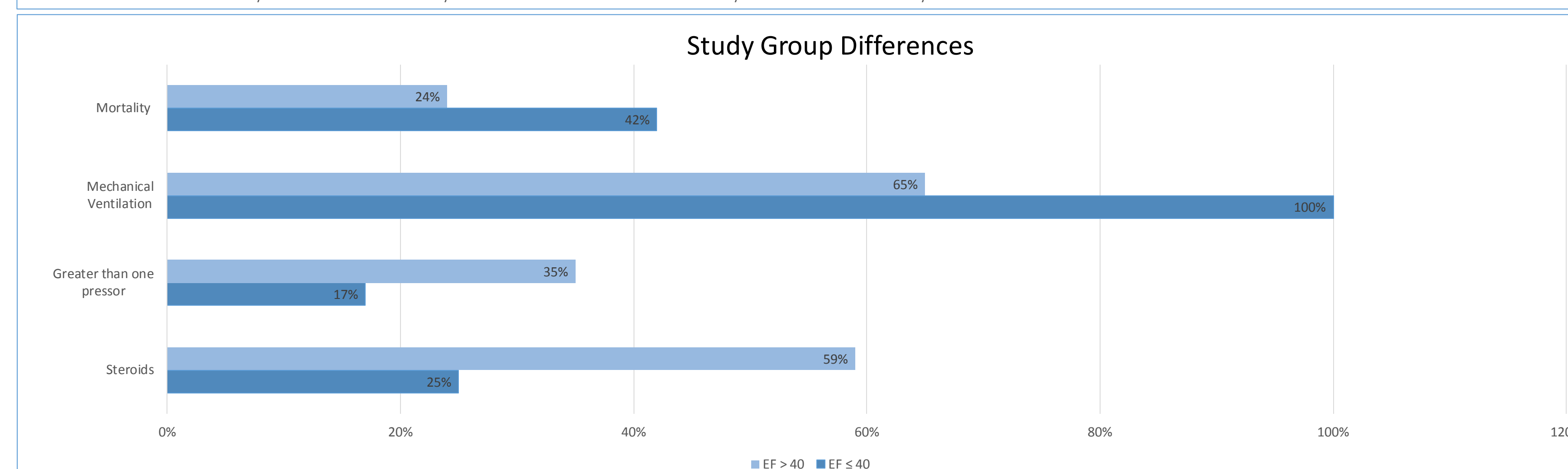
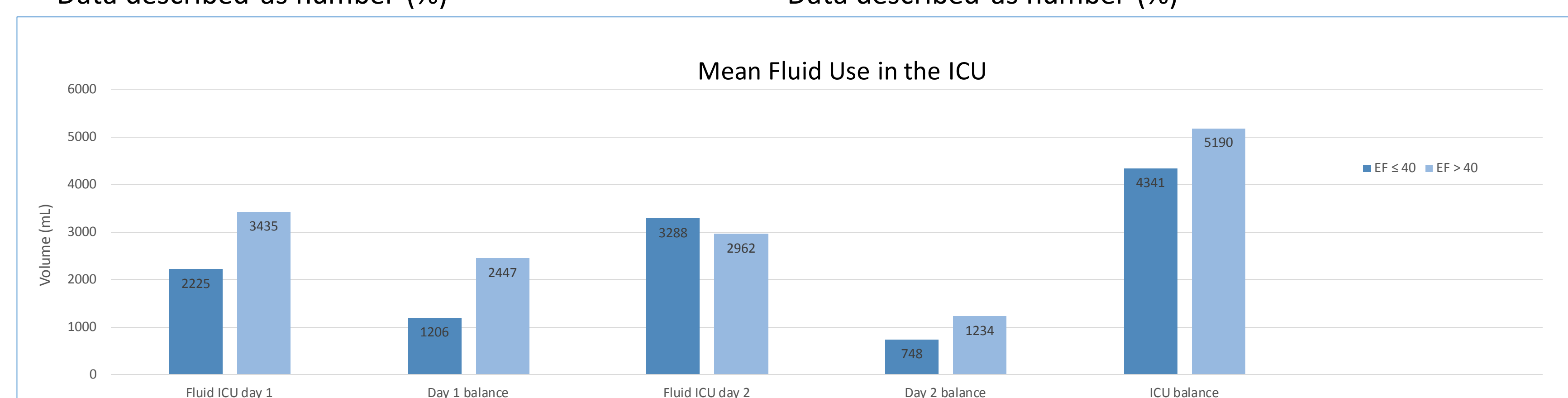
Ejection Fraction (EF) Groups	≤40%	>40%
Mechanical Ventilation (MV)**	12 (100)	11 (65)
Mechanical Ventilation Days (total)	97	58
Average MV days*	8 (7)	3 (4)
Mortality**	5 (42)	4 (24)
ICU Length of Stay*	9 (7)	5 (2)

*Data described as mean (SD)
**Data described as number (%)

Table 2. Medication use

Vasopressor/Steroid Use	EF ≤40%	EF >40%
Norepinephrine**	12 (100)	17 (100)
Duration (hours)*	56 (38)	52 (31)
Max Rate (mcg/min)*	56 (75)	57 (100)
Vasopressin**	1 (8)	4 (24)
Duration (hours)*	11	31 (31)
Max Rate (units/min)*	0.04	0.038 (0.005)
Dopamine**	0 (0)	0 (0)
Epinephrine**	0 (0)	1 (6)
Duration (hours)*	-	6.5
Max Rate (mcg/min)*	-	0.91
Phenylephrine**	2 (17)	1 (6)
Duration (hours)*	35 (33)	40
Max Rate (mcg/min)*	584 (334)	108
Steroids**	3 (25)	10 (59)
Duration (days)*	2.7 (2)	3.3 (2.4)

*Data described as mean (SD)
**Data described as number (%)



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DISCUSSION

- Patients with low ejection fractions received more conservative fluid and vasopressor treatment indicated by ICU day 1 fluids (2225 ± 2158 mL) in the low EF group compared to the higher EF group (3418 ± 2587 mL)
- The conservative treatment approach was further supported by the disparity between the EF ≤ 40% and EF > 40% groups in the use of steroids (n=3, 25% vs n=10, 59%) and 2nd line vasopressors (n=2, 17% vs n=6, 35%) indicating possible withholding of second line therapies in patients with poorer EF
- The concern for fluid overload is peaked by every patient in the lower EF group being mechanically ventilated
- Mortality and mechanical ventilation rate were higher in the patients with the reduced EF, which supports evidence that reduce left ventricular function contributes to worse outcomes in sepsis and septic shock

CLINICAL IMPLICATIONS

- Limited evidence supports alternative strategies for patients with depressed left ventricular and they should be treated with the same management strategies as those with more preserved cardiac function
- Even the moderate amount of fluids used to resuscitate the patient may contribute to respiratory complications
- Patients presenting with diminished cardiac function can be treated as having a poorer prognosis and it may be appropriate to start 2nd line therapies such as steroids early and to treat more conservatively with fluids, using markers of fluid response such as passive leg raise and central venous pressure
- Obtaining echocardiograms on patients presenting with septic shock or who may develop septic shock may be a useful prognosticator and director for therapies

NEXT STEPS

- Further analyses of patient outcomes across multiple centers with larger study population should be done to assess correlation between left ventricular function, fluids, and vasopressors
- A large randomized controlled trial that stratifies patients according to cardiac function for the treatment of sepsis and septic shock is needed to assess clinical implications of fluid and vasopressor use in these patient populations