



Fluid Stewardship and the ROSE Model: Pharmacy Recommendations in the Treatment of Critically Ill Adults with COVID-19

Rachel Rikard, PharmD Candidate; W. Anthony Hawkins, PharmD, BCCCP; Ryan Bok, PharmD Candidate; Diana Dang, PharmD Candidate; Susan E. Smith, PharmD, BCCCP, BCPS

BACKGROUND

- Intravenous fluids (IVFs) are the most commonly administered drug in critically ill adult patients
- Fluid optimization may be particularly important in COVID-19 patients based on the risk of acute respiratory distress syndrome (ARDS) and fluid overload
- The ROSE model of fluid therapy includes four stages: Rescue, Optimization, Stabilization, and Evacuation

Purpose: Identify and categorize pharmacy recommendations related to the four ROSE phases

Hypothesis: At least 20% of pharmacy recommendations would be related to fluid stewardship in COVID-19 patients

OUTCOMES

Primary

- Percentage of pharmacy recommendations related to fluid stewardship (FS)

Secondary

- Number and percentage of recommendations stratified by the stages of the ROSE model

STUDY DESIGN

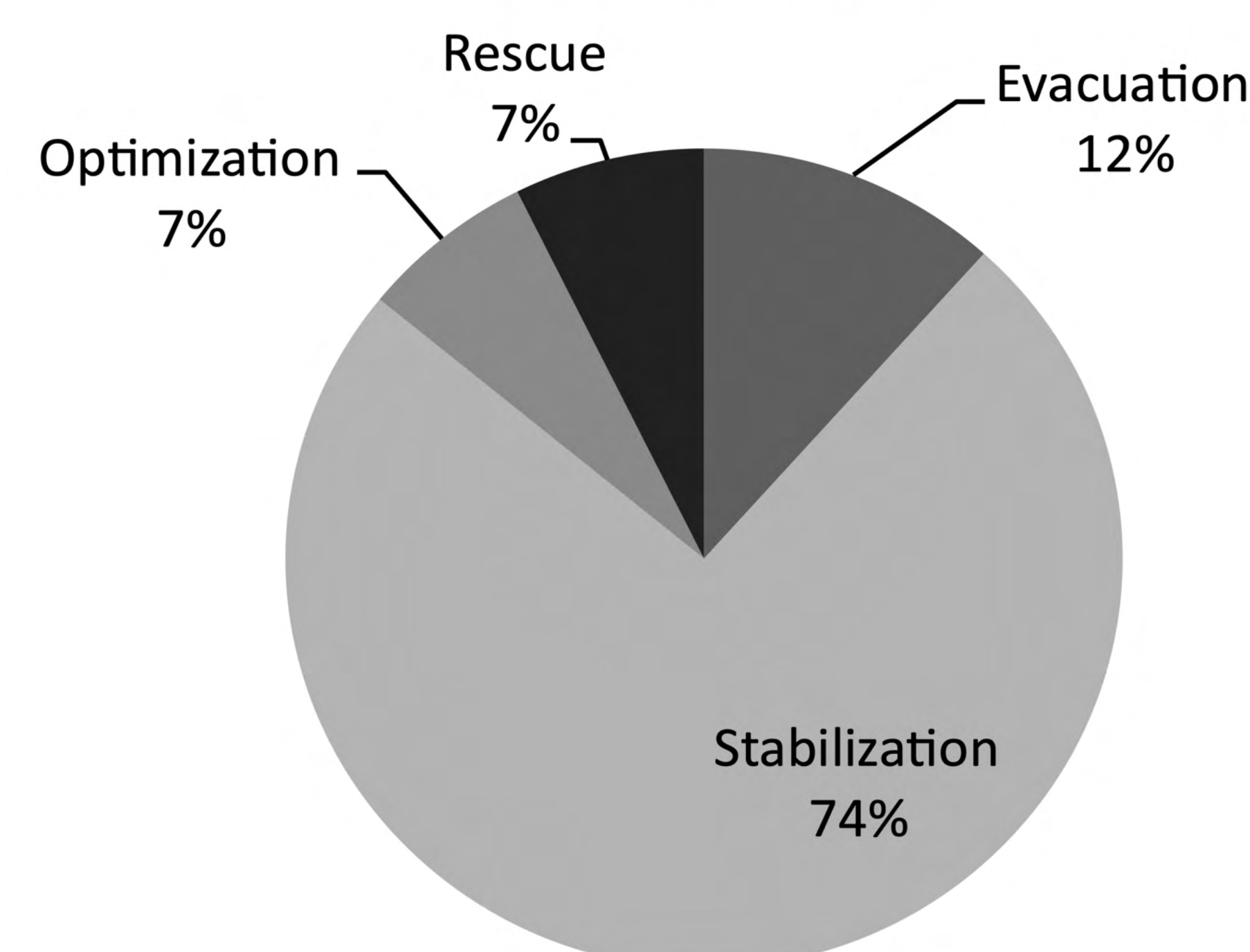
- **Design:** IRB approved, single-center, retrospective study
- **Time Frame:** May 19, 2020 through September 30, 2020
- **Setting:** Community hospital ICU
- **Inclusion Criteria:**
 - All COVID-19 positive adults admitted to the medical ICU and followed by the academic rounding team
- **Statistical Plan:**
 - Descriptive statistics were used to report all outcomes

Table 1. Fluid Stewardship Definitions Classified by the ROSE Model

Rescue	Optimization	Stabilization	Evacuation
<ul style="list-style-type: none"> • Initiate bolus IVF NOT based on fluid responsiveness • Discontinue bolus IVF NOT based on fluid responsiveness 	<ul style="list-style-type: none"> • Initiate bolus IVF based on fluid responsiveness • Discontinue bolus IVF based on fluid responsiveness • Recommend to assess volume responsiveness • Initiate albumin • Discontinue albumin • Change albumin concentration • Change type of bolus IVF • Change the fluid that bicarbonate is diluted in • Add stop date/time for bolus IVF • Concentrate infusions of sodium bicarbonate, vasopressors, or antibiotics 	<ul style="list-style-type: none"> • Initiate maintenance IVF • Discontinue maintenance IVF • Initiate enteral water • Discontinue enteral water • Change type of maintenance IVF • Convert maintenance IVF to enteral fluid or oral diet • Initiate parenteral nutrition • Discontinue parenteral nutrition • Convert parenteral nutrition to enteral route • Adjust dose of enteral fluid • Adjust dose of maintenance IVF • Adjust volume of parenteral nutrition • Add stop date/time for maintenance IVF • Convert route of medication from IV to non-IV route (direct or indirect) 	<ul style="list-style-type: none"> • Initiate diuretic (loop or thiazide; NOT spironolactone) • Discontinue diuretic (loop or thiazide; NOT spironolactone) • Adjust dose of diuretic (loop or thiazide; NOT spironolactone) • Adjust timing of diuretic administration (loop or thiazide; NOT spironolactone) • Initiate spironolactone (ONLY if cirrhosis/liver disease/ascites) • Discontinue spironolactone (ONLY if cirrhosis/liver disease/ascites) • Adjust dose of spironolactone (ONLY if cirrhosis/liver disease/ascites)

RESULTS

Figure 1. Recommendations Categorized by the ROSE Model



RESULTS CONTINUED

Table 2. Most Common Recommendations Made

Rescue	
Initiate bolus IVF NOT based on fluid responsiveness	11
Optimization	
Recommend to assess volume responsiveness	4
Stabilization	
Convert route of medication from IV to non-IV route	59
Adjust dose of enteral fluid	16
Discontinue maintenance IVF	14
Initiate enteral water	8
Evacuation	
Initiate diuretic (loop or thiazide; NOT spironolactone)	8

CONCLUSIONS

- Of all pharmacy recommendations in critically ill COVID-19 positive patients, 13.2% were related to fluid stewardship
- The majority of recommendations (68.4%) fell into the stabilization phase
- It is suggested that COVID-19 patients with ARDS benefit from conservatively managed IVFs
- However, dehydration in these patients can also lead to poor outcomes
- Pharmacists have an important role to play in regard to fluid stewardship in COVID-19 positive patients
- The limitations of this study include the single-center design and lack of comparator group

Future research should compare FS recommendations in critically ill patients with and without COVID-19

REFERENCES