Critical Care Collaborative
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Hidden Fluids Stewardship: Pharmacy-driven Recommendations for Critically Ill Patients with COVID-19

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BACKGROUND

- Intravenous fluids (IVFs) are routinely administered in the intensive care unit (ICU). [1]
- This includes hidden fluids, which are defined as fluids requisite to routine care, but the volumes of which are not explicitly prescribed (e.g., medication diluents, flushes). [1]
- Improper administration of IVFs can lead to volume overload, which is associated with organ dysfunction and mortality. [1]
- With the overwhelming number of patients in the ICU with coronavirus disease 2019 (COVID-19), proper management of fluids is crucial to minimize the risks of acute respiratory distress syndrome and fluid overload. [2]

PURPOSE

Identify pharmacy recommendations related to hidden fluids in the treatment of critically ill patients with COVID-19

OUTCOMES

Primary

- Percentage of pharmacy recommendations related to hidden fluids

Secondary

- Classification of hidden fluids recommendations according to the following:
  - Conversion of medications from IV to non-IV route
  - Adjust dose of enteral fluid
  - Discontinue enteral water
  - Adjust volume of parenteral nutrition
  - Change albumin concentration
  - Concentrate infusions of sodium bicarbonate, vasopressors, or antibiotics

STUDY DESIGN

- **Design:** IRB-approved, single-center, retrospective cohort
- **Time Frame:** May 2020 through September 2020
- **Setting:** 450-bed community teaching hospital
- **Inclusion Criteria:**
  - Critically ill adults admitted to the ICU with COVID-19
  - Followed by academic rounding team
  - Recommendations documented in TheraDoc®
- **Methods:** Recommendations were assessed for relevance to fluid stewardship and hidden fluids
- **Statistical Plan:**
  - Descriptive statistics were used to report outcomes

RESULTS

Figure 1. Screening and Recommendation Types

13% of pharmacy recommendations were related to fluid stewardship

Figure 2. Fluid Stewardship Recommendations

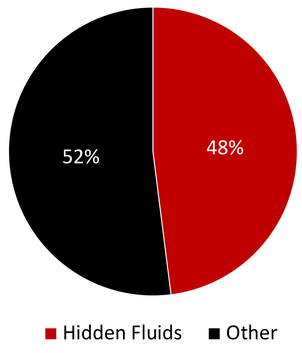


Figure 3. Average Number of Recommendations Per Patient Day

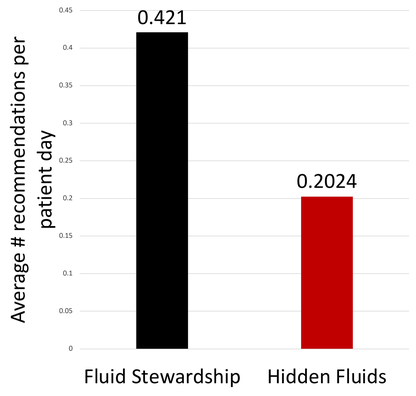


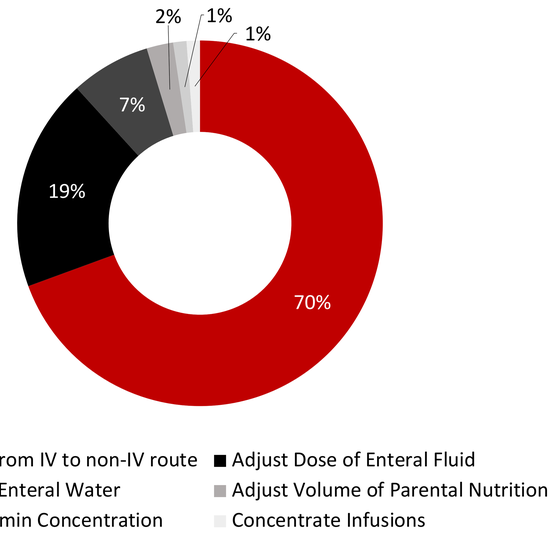
Table 1. Classification of Hidden Fluids Recommendations (n=85)

	n	# per patient day
Conversion of medications from IV to non-IV route	59	0.143
Adjust dose of enteral fluid	16	0.038
Discontinue enteral water	6	0.014
Adjust volume of parenteral nutrition	2	0.005
Change albumin concentration	1	0.002
Concentrate infusions of sodium bicarbonate, vasopressors, or antibiotics	1	0.002

**Classifications established by investigators a priori*

RESULTS CONTINUED

Figure 4. Hidden Fluids Recommendations



CONCLUSIONS

- Roughly 1 in 8 pharmacy recommendations were related to fluid stewardship, and nearly half of those were related to hidden fluids.
- The most common hidden fluids recommendation involved converting medications from IV to non-IV route.
- Pharmacists play a role in minimizing the volume of this oftentimes unrecognized hidden fluids.

Limitations

- Single center, retrospective design
- Potential for inaccurate classification of recommendations by reviewers

Future Direction

- Compare hidden fluids recommendations in critically ill patients with and without COVID-19

REFERENCES

1. Hawkins, W. A., Smith, S. E., Newsome, A. S., Carr, J. R., Bland, C. M., & Branan, T. N. (2019). Fluid Stewardship During Critical Illness: A Call to Action. Journal of Pharmacy Practice. https://doi.org/10.1177/0897190019853979

2. Kazory, A., Ronco, C., & McCullough, P. A. (2020). SARS-CoV-2 (COVID-19) and intravascular volume management strategies in the critically ill. *Proceedings (Baylor University. Medical Center)*, *0*(0), 1–6. https://doi.org/10.1080/08998280.2020.1754700