May 13th, 11:30 AM - 1:30 PM

Improving Nutritional Delivery to Pediatric Patients While Using Continuous Renal Replacement Therapy

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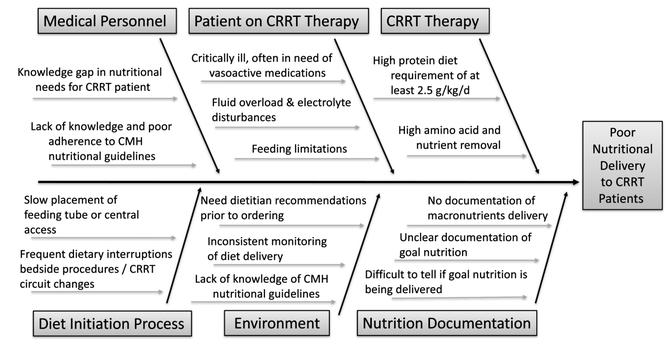
Introduction

- Continuous renal replacement therapy (CRRT) helps treat acute renal failure in critically ill children. However, the use of CRRT is associated with risk of malnutrition by removal of essential proteins and micronutrients.
- Malnutrition in critically ill children is associated with worse outcomes and increased mortality. CRRT nutritional guidelines recommends early nutrition and high protein intake (> 2.5 g/kg/d).
- This Quality Improvement project aims to optimize early nutrition and increase the percentage of patient achieving ≥ 75% of goal protein and caloric intake by day 5 of CRRT therapy by 15% by May 2024.

Methodology

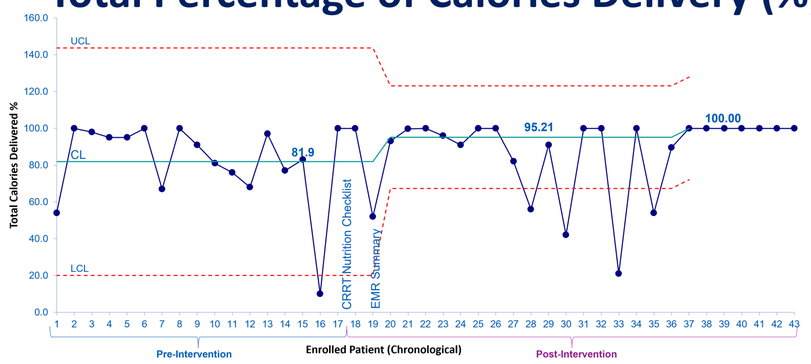
Stake Holders & Problem	•Multidisciplinary group: dieticians, nurses, nephrologists, and intensivists •Knowledge gap of nutritional goals, poor adherence to CMH CRRT nutrition guidelines, poor communication between dietitians and providers (Figure 1 : fishbone diagram)
Outcome Measures	•Percentage of total protein delivery of their goal by day 5 of CRRT initiation (Daily Protein Intake /Goal Protein) % •Percentage of total caloric delivery of their goal by day 5 of CRRT initiation (Daily Caloric Intake /Goal Calories) %
Interventions	•**Intervention #1**: Education nutrition requirements for CRRT patients & Nutrition Checklist for CRRT Initiation. •**Intervention #2**: Electronic Medical Documentation "CRRT Nutrition Summary"
Process Measures	•Completion of the Nutrition Checklist for CRRT Initiation at least once after starting CRRT therapy within 5 days. •Completion of EMR Note-"CRRT Nutrition Summary" for first 5 days of CRRT Initiation



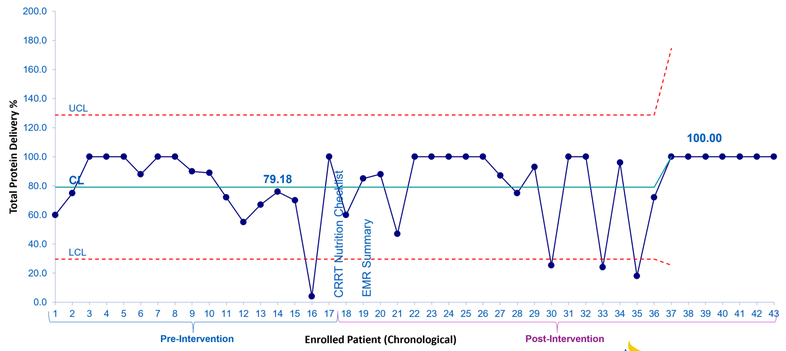
Quality Improvement Results

Patient Population Demographics	Pre-Implementation January - December 2021	Post-Implementation October 2022 – March 2024	P value
Patients on CRRT therapy > 5 days, n	17	26	
Mean age, years (± SD)	5.9 (± 6.9)	4.6 (± 5.9)	0.51
Female (%)	33	23	0.74
CRRT indication, n			
Acute Kidney Injury	12	19	
Fluid overload	3	15	
Metabolic, Genetic, Liver Failure	3	6	
Total days of CRRT, mean (± SD)	48 (± 78)	25 (± 23)	0.26
ICU Length of Stay, mean (± SD)	79 (± 85)	25 (± 107)	0.96
Hospital Length of Stay, mean (± SD)	99 (± 103)	63 (± 100)	0.99
Mechanical Ventilatory Support (%)	94	96	1.0
Vasoactive Use (%)	61	81	0.29
ECMO Support (%)	22	38	0.34
Mortality (%)	39	23	0.30

Total Percentage of Calories Delivery (%)



Total Percentage of Protein Delivery (%)



Discussion

- Following our intervention, CRRT patients showed increased early calorie and protein intake delivery, exceeding our smart goal of patients achieving 75% of goal nutrition.
- This project emphasizes the positive impact of multidisciplinary discussion and the active role of a dietitian in the ICU by utilizing checklist tools and electronic medical record documentation that facilitates feedback on nutrition delivery.
- The nutritional initiation checklist and EMR "CRRT Nutrition Summary" note were completed 76% and 100% of the time, respectively.
- Interruptions for surgical interventions and slow progression to PN or EN were common obstacles in meeting nutritional goals, especially for patients without contraindications for these interventions.

Conclusions

- We improved nutrition delivery for pediatric CRRT patients by providing comprehensive education and resources to increase communication and documentation for dietary goals.
- Through the development of checklist and EMR Note, we aim to ensure sustained access to high-nutrient dietary recommendations and optimize patient outcomes.

References & Acknowledgement

Special thanks to the ICU dietitian for their collaboration with the project and contribution to data collection.

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