



Impact of Enteral and/or Parenteral Nutrition on Outcomes after Autologous Stem Cell Transplant for High-risk Neuroblastoma

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BACKGROUND

- Neuroblastoma is the most common extracranial solid tumor of childhood
- All cases of high-risk neuroblastoma are treated with autologous stem cell transplant
- The myeloablative conditioning regimen causes pancytopenia and often leads to mucositis, severe vomiting and diarrhea, malnutrition, and infections
- The effect of nutrition modality (enteral vs parenteral) on nutrition status, adverse events during treatment, and outcomes after autologous stem cell transplant remain understudied in this population

METHODS

- 23 patients and a total of 36 autologous stem cell transplants were analyzed
- Nutritional parameters consisting of height, weight, BMI, BMI z-score, weight change, caloric demand, and type of feeding tube were analyzed before, during, and after autologous stem cell transplant
- Clinical outcomes included days with diarrhea or vomiting, mucositis, time to neutrophil or platelet engraftment, number of transfusions, length of stay, and mortality
- Standard descriptive statistics in terms of number of observations, means, standard deviations, medians and ranges, stratified by nutritional intervention group and time for the primary endpoint of the study were utilized
- As secondary endpoints, adverse events during autologous stem cell transplant were analyzed with a generalized linear mixed effects model with patient specific random effects and a logit link function was used to evaluate the association incidence of treatment related adverse events and nutritional intervention.

Key Findings

- In the parenteral group, there were statistically significant increases in weight and BMI z-score compared to the enteral group
- There was a significant increase in weight and BMI z-score from pre- to post-transplant within the parenteral nutrition group
- There were a reduced number of days of diarrhea and vomiting observed in the enteral group versus the parenteral group
- Mean mucositis severity pain scores were reduced in the enteral group versus the parenteral group
- Time to platelet engraftment was shorter in the enteral group versus the parenteral group
- There were a reduced mean number of packed red blood cell transfusions used in the enteral group versus the parenteral group
- No differences in length of stay, or mortality at 100 days or 1 year post-transplant were seen

CONCLUSIONS

- High-risk neuroblastoma patients supported with parenteral nutrition during autologous stem cell transplant appear to have less decline in their nutritional status compared to those supported with enteral nutrition
- Recipients of enteral nutrition show less complications like length of diarrhea and vomiting as well as mucositis severity
- Recipients of enteral nutrition have faster time to engraftment of platelets and less number of blood transfusions.

ADDITIONAL KEY INFORMATION

- There were 6 autologous stem cell transplants in the enteral group, 7 in the parenteral group, and 23 in the combined group
- All transplants occurred at American Family Children's Hospital from 2011-2021
- Mucositis pain scores represented the number of days where pain medication dose/frequency was increased
- At 100 days post transplant, all patients in the enteral and parenteral group were alive
- At 100 days post transplant, there were two patients deceased in the combined group
- At 365 days, one patient was deceased in the parenteral group and three in the combined group

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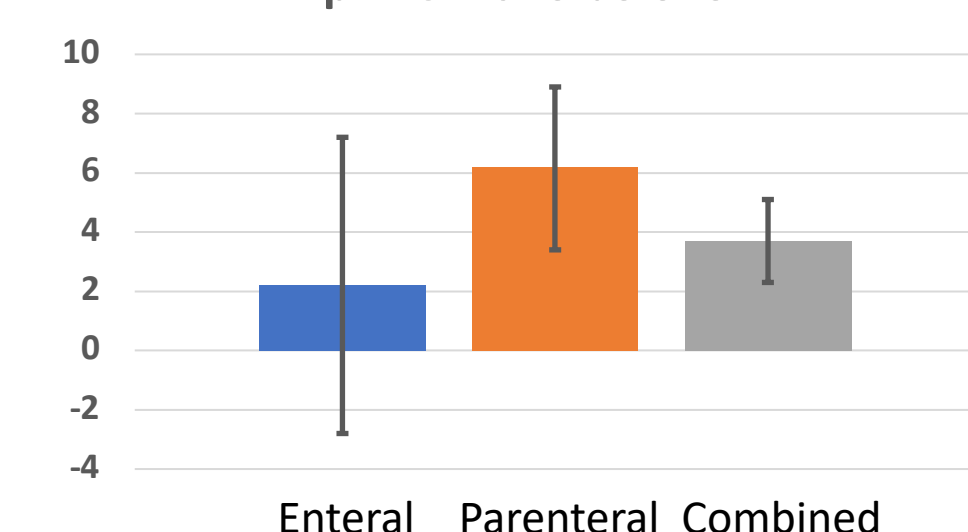
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RESULTS

Nutritional Outcomes

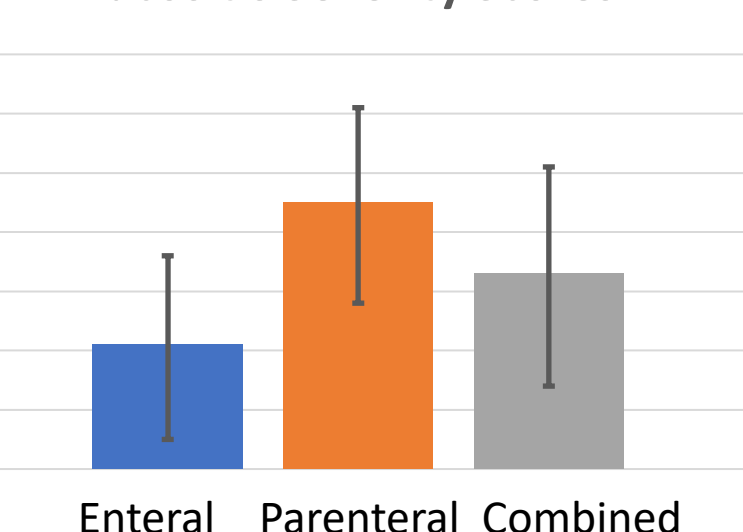
Outcome	Group	Adjusted Mean	Lower 95% CI	Upper 95% CI	p-value Within Group	p-value Enteral vs Parenteral	p-value Enteral vs Combined	p-value Parenteral vs Combined
Change in Weight	Enteral	-0.5	-1.2	0.2	0.1616	0.0006	0.1583	0.0411
	Parenteral	0.8	0.01	1.6	0.0421			
	Combined	0	-0.4	0.4	0.9126			
Change in BMI	Enteral	-0.3	-1	0.4	0.4063	0.0055	0.2602	0.0983
	Parenteral	0.7	0	1.4	0.0558			
	Combined	0.1	-0.3	0.5	0.5364			
Change in BMIZ	Enteral	-0.37	-0.88	0.14	0.1353	0.0003	0.1377	0.0353
	Parenteral	0.55	0.01	1.1	0.0379			
	Combined	0.01	-0.26	0.28	0.9393			

pRBC Transfusions



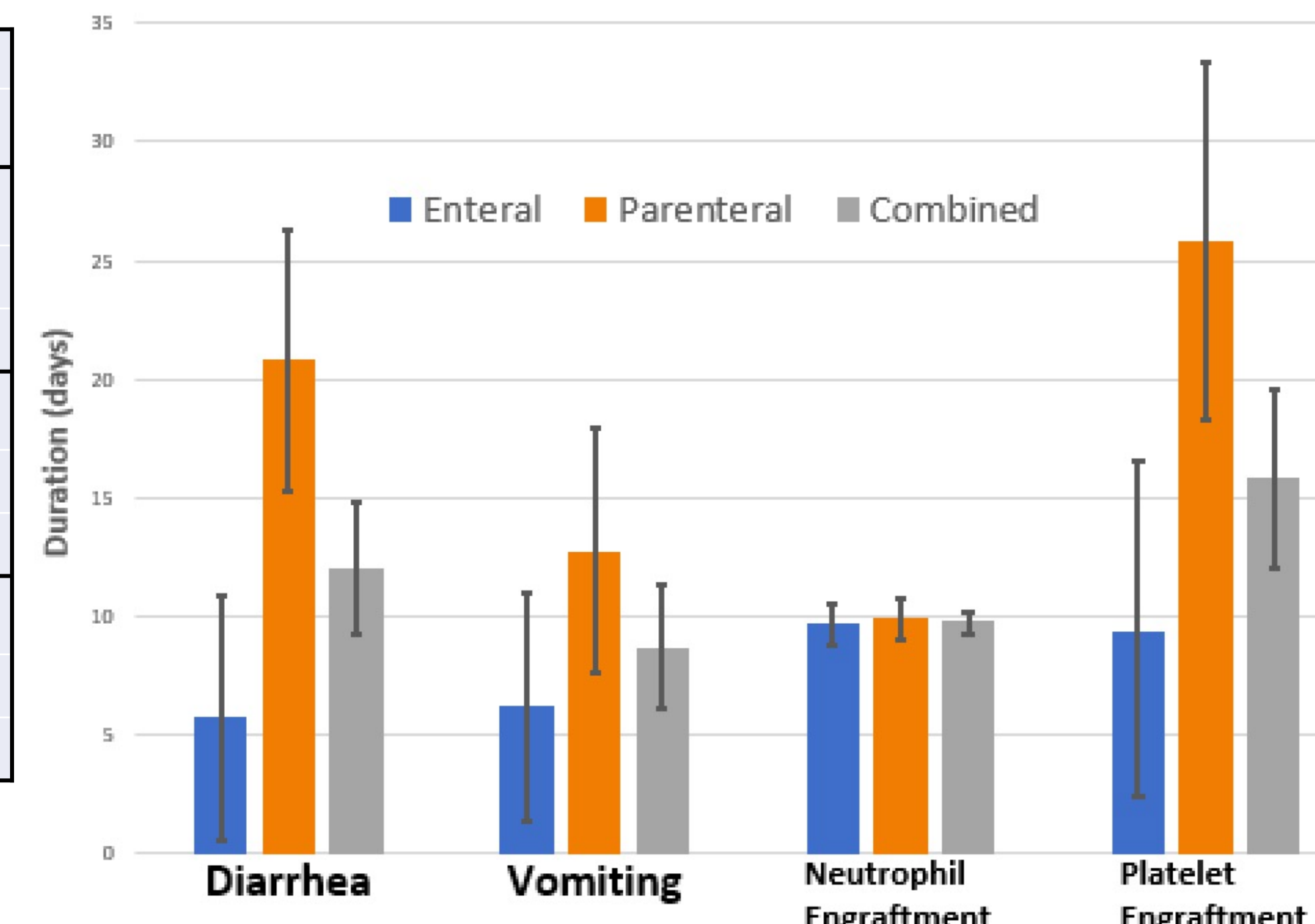
Enteral group had less pRBC transfusions than the parenteral group (p = 0.0023)

Mucositis Severity Scores



Enteral group had less severe mucositis than the parenteral group (p = 0.0022)

Secondary Outcomes



Statistically significant results:

- Days diarrhea enteral versus parenteral (p = 0.0001)
- Days vomiting enteral versus parenteral (p = 0.0075)
- Time to platelet engraftment enteral versus parenteral (p = 0.0001)