Evaluating Pegaspargase Infusion Reactions

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BACKGROUND

- Acute Lymphoblastic Leukemia/Lymphoma (ALL/LBL) are the most common forms of cancer amongst the pediatric population, accounting for more than 30% of all cancer cases in this age group
- While not originally, survival rates currently have drastically increased, with current cure rates around 90%
- An integral component of treatment protocols for these disease states involves agents that work by depleting cellular asparagine concentrations
- The first of these agents was native Escherichia coli-derived L-asparaginase, but it has since been replaced with Pegasparagase
- Pegaspargase, a pegylated form of the native compound, has revolutionized the care that patients now receive due to it's lower emetogenicity potential, enhanced circulation time and less frequent administration
- While pegasparagase is an effective and necessary component of ALL treatment regimens, it is complicated with the potential for infusion reactions and antibody-mediated hypersensitivity reactions
- Differentiating between the ammonia-based infusion reactions and hypersensitivity reactions remains challenging, but is very important for the care of the patients
- Previously, true hypersensitivity reactions would lead to substitution of treatment with erwinia asparaginase. Erwinia asparaginase requires multiple doses for each dose of pegasparagse, has a much higher cost and is frequently impacted by manufacturer production shortages

OBJECTIVE

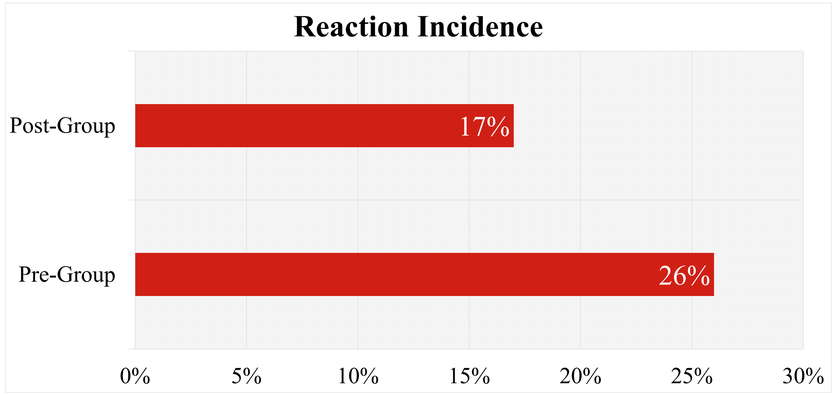
- In late 2019, the hospital decided to alter the way in which that they administered pegaspargase to decrease the incidence that they were seeing in system-wide infusion-related reactions
- Previously, pegaspargase had been administered as an infusion over 1-hour. Moving forwards, infusions would be done over 2-hours while being concurrently given with maintenance fluids
- Primary Objective:
- Compare the incidence of infusion-related reactions prior to implementation of new administration techniques
- Secondary Objective:
- Comparing the severity and presentation of reactions experienced
- Assessing the outcomes of reactions that were experienced

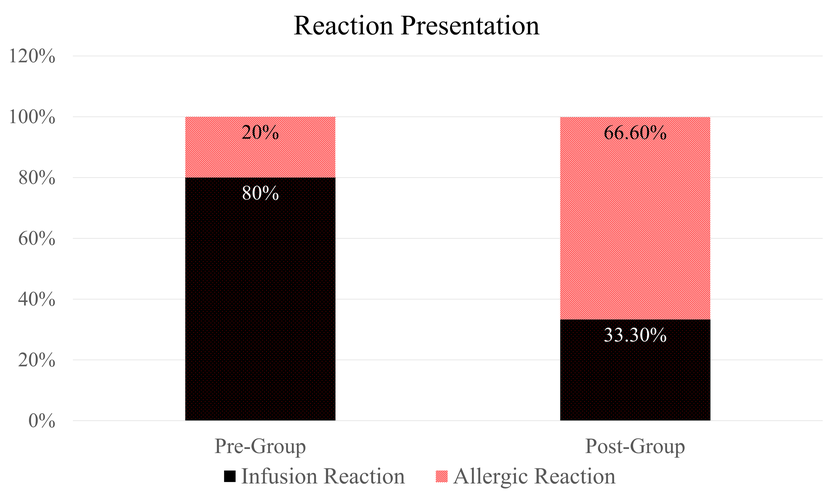
METHODS

- Retrospective chart review
- Patients were divided into two groups, taking place before the institutional changes were made and subsequently after
- The Pre-Group involved patients over a 1-year span from May 1st, 2018 to April 30th, 2019
- The Post-Group involved patients over a 1-year span from August 1st, 2019 to July 31st, 2020
- Patients in both groups had to have received at least two doses of pegaspargase
- In the Post-Group, patients had to have had two doses of pegaspargase while also being given maintenance fluids at the same time as PEG

RESULTS

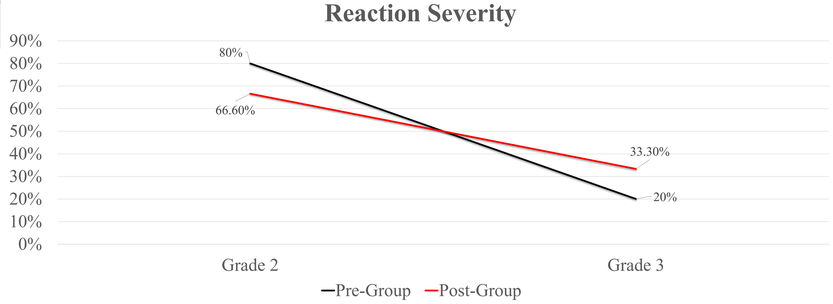
Baseline Demographics		
	Pre-Group (n%)	Post-Group (n%)
Number of Patients	19	18
Females	8 (42%)	9 (50%)
Age Range	11 mos – 17 years 11 mos	2 years 11 mos – 18 years 8 mos
Median Age	13 years	11 years 1 mo
Pre-B Cell Standard Risk	3 (15.8%)	4 (22.2)
Pre-B Cell High Risk	10 (52.6%)	8 (44.4%)
Pre-B Cell with Trisomy 21	5 (26.3%)	0 (0%)
T Cell	1 (5.3%)	5 (27.8%)
B Cell	0 (0%)	1 (5.6%)

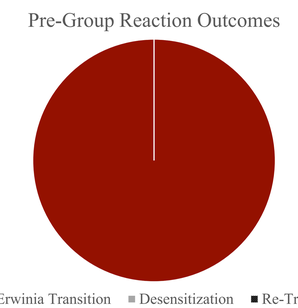


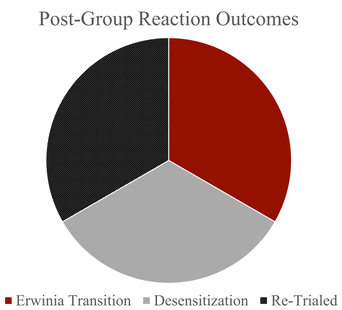


RESULTS

Adverse Event Grading	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
Infusion-related Reaction	Mild transient reaction; no intervention or interruption	Infusion interrupted, responds to treatment. Prophylaxis <24hrs	Prolonged response to treatment, recurrent symptoms	Life threatening, urgent intervention	Death
Allergic Reaction	Systemic intervention not indicated	Oral intervention indicated	Bronchospasm, hospitalization; IV intervention indicated	Life-threatening, urgent intervention indicated	Death
Anaphylaxis Reaction	-	-	Symptomatic bronchospasm +/- urticaria; parenteral intervention indicated, allergy related edema/angioedema, hypotension	Life-threatening consequences, urgent intervention indicated	Death







CONCLUSION

- Over comparable time spans, there was an observed difference in incidence of infusion reactions following administration changes
- Reaction severities were similar between both groups, while the presentation in the Post-Group was more typical of true hypersensitivity reactions
- Future studies with larger patient populations, not limited in duration should be conducted to establish the true significance that these changes have had

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