2023

Evaluation of infusion wait times after process change for compounding fosaprepitant and pembrolizumab

Heather Beugli
Providence, heather.beugli@providence.org

Ian Ingram
Providence, ian.ingram@providence.org

Evaluation of infusion wait times after process change for compounding fosaprepitant and pembrolizumab

Heather Beugli, PharmD; Ian Ingram, PharmD, BCOP, BCPS

OBJECTIVES

- Analyze the impact of batching commonly used intravenous compounds
- Quantify the amount of time saved by batching high-volume intravenous medications prior to patient arrival to clinic

Primary Endpoint

- Difference in minutes from time of order dispense to time of medication administration for batched versus non-batched products

Secondary Endpoints

- Monetary value of batched products wasted as a result of advance preparation
- Impact of order volume and time of order on wait times

BACKGROUND

- Fosaprepitant and pembrolizumab are both high-volume medications.
- Fosaprepitant and aprepitant are common premedication to prevent chemotherapy induced nausea and vomiting.
- Pembrolizumab is an immunotherapy used to treat a wide variety of cancers.
- All infusions are administered as fixed doses.
- Historically, intravenous fosaprepitant and pembrolizumab were compounded on a patient-specific basis upon arrival to the clinic.
- Recently published extended stability studies led the clinic to consider batching fosaprepitant and pembrolizumab.
- In 2022, the pharmacy began batching fosaprepitant 150 mg and pembrolizumab 200 mg to expedite the delivery of medication.
- Due to a formulary change, aprepitant became the preferred anti-emetic agent in some cases.
- Aprepitant is available as a prefilled syringe and loaded into medication dispensing cabinets.
- Fosaprepitant 150 mg and pembrolizumab 200 mg is compounded upon patient arrival to the clinic in the pre-intervention group, and batched prior to arrival in the post-intervention group.
- Pembrolizumab 400 mg is compounded upon arrival to the clinic.
- Pharmacy technicians are responsible for compounding and delivering medication to nursing stations.

METHODS

Study Design

- Single-center, retrospective, observational study at an outpatient oncology infusion center associated with a 483-bed tertiary care facility

Data Collection

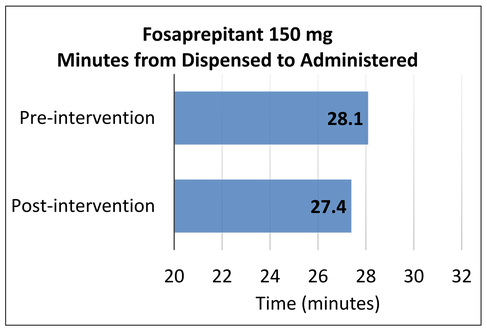
- Control group 1: 2/2/2022 – 8/2/2022
- Control group 2: 12/6/2022 – 2/25/2023
- Treatment group: 8/17/2022 – 2/17/2023
- Statistical analysis: Student's T-test, α = 0.05

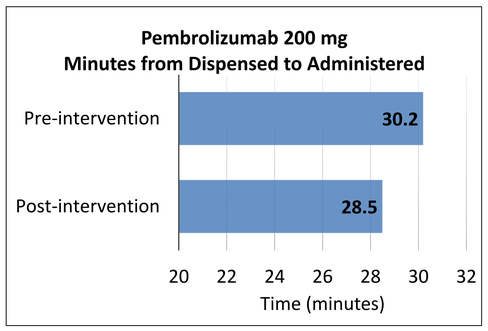
INCLUSION AND EXCLUSION CRITERIA

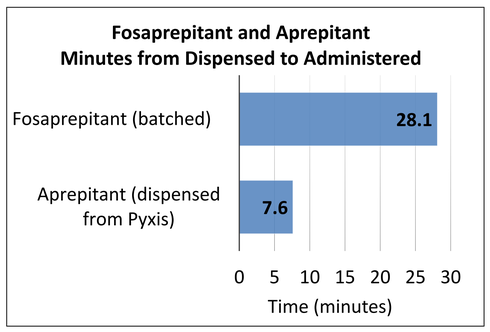
		Pre-intervention (2/2/2022–8/2/2022)		Post-intervention (8/17/2022–2/17/2023)		12/6/22–2/25/23
		Pembro 200 mg	Fosa 150 mg	Pembro 200 mg	Fosa 150 mg	Aprep 130 mg
Exclusion	Study drugs	95	0	89	0	-
	Patient supplied	15	3	36	0	-
	Not administered	4	3	2	8	-
	Outliers	3	34	7	29	-
Inclusion		550	631	740	571	-
Total		667	671	874	608	204

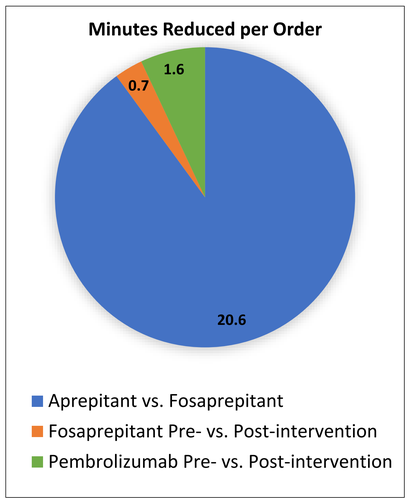
RESULTS

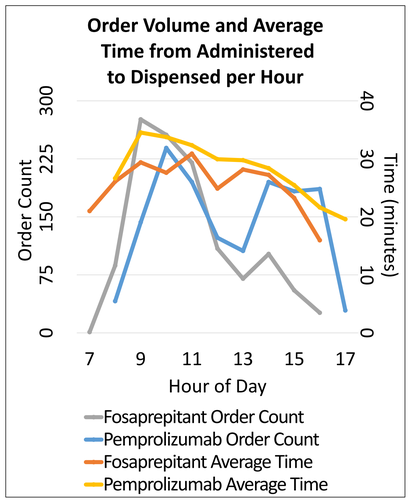
Primary Outcomes	Difference (min)	P Value
Fosaprepitant 150 mg (batched) vs. Aprepitant 130 mg (loaded into Pyxis)	20.56	**<0.005**
Pembrolizumab 200 mg Pre- vs. Post-intervention	1.64	**0.0289**
Fosaprepitant 150 mg Pre- vs. Post-intervention	0.69	0.2215
Secondary Outcome	**Wasted Product (dollars)**	
Pembrolizumab 200 mg and Fosaprepitant 150 mg	$0.00	
Other Outcome	**Difference (min)**	**P Value**
Pembrolizumab 200 mg (batched) vs. Pembrolizumab 400 mg (compounded on arrival)	0.03	0.4943











DISCUSSION

- Aprepitant 130 mg compared to fosaprepitant 150 mg led to a 20.6 minute decrease in wait times on average (7.6 vs. 28.1; p=<0.005).
- Pembrolizumab 200 mg pre- to post-intervention led to a 1.6 minute decrease in wait times on average (30.2 vs. 28.5; p=0.02).
- Fosaprepitant 150 mg pre- to post-intervention led to a 0.7 minute decrease in wait times on average (28.1 vs. 27.4; p=0.22).
- Batched pembrolizumab 200 mg compared to compounded on arrival pembrolizumab 400 mg led to a marginal difference in wait times on average (28.53 vs. 28.51; p=0.49).
- No product was reported wasted after batch implementation ($0.00).
- Order volume fluctuation during each day of the week did not drastically impact wait times.
- Order volume fluctuations throughout the day did not substantially impact wait times.

Limitations:

- Order delivery once verified requires pharmacy delivery unless pre-loaded into medication dispense system.
- Increased turnover in staff during the post-intervention time may influence compounding and delivery time.
- Based on patient treatment plan, number of infusions administered during clinic visit may influence wait times.

CONCLUSION

- Batching and loading highly utilized oncology infusions into the medication dispensing cabinets can significantly reduce wait times and optimize the patient delivery system with proper pharmacy oversight.
- Difference in time from dispense to administration is likely dependent on delivery delays over production delays.
- Pre-batching product alone does not significantly reduce wait times, and wait time reduction is likely associated with loading product into medication dispense system for nursing removal.
- Batching highly utilized oncology infusions will likely not cost the institution additional dollars.

Future Directions:

- Request for medication dispensing cabinet build to create space for batched products prior to administration
- Reassess wait times after process change

REFERENCES

1. Gómez, Maria Amparo Martínez-, et al. "Physico-Chemical Stability of Mixtures of Fosaprepitant Used in Clinical Practice." Journal of Analytical & Bioanalytical Techniques, OMICS International, https://www.omicsonline.org/peer-reviewed/physicochemical-stability-of-mixtures-of-fosaprepitant-used-in-clinical-practice-28335.
2. "Hazardous Drugs-Handling in Healthcare Settings." USP, https://www.usp.org/compounding/general-chapter-hazardous-drugs-handling-healthcare.
3. Le Guyader G;Vieillard V;Mouraud S;Do B;Marabelle A;Paul M; "Stability of Nivolumab in Its Original Vials after Opening and Handing in Normal Saline Bag for Intravenous Infusion." European Journal of Cancer (Oxford, England : 1990), U.S. National Library of Medicine, https://pubmed.ncbi.nlm.nih.gov/32599409/.
4. Sundaramurthi, Prakash, et al. "Physicochemical Stability of Pembrolizumab Admixture Solution in Normal Saline Intravenous Infusion Bag: Semantic Scholar." Undefined, 1 Jan. 1970, https://www.semanticscholar.org/paper/Physicochemical-stability-of-pembrolizumab-solution-Sundaramurthi-Chadwick/3c8c3493e9e664416b8d4c083b79e931409dac9e.