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Comparison of Healthcare Costs and Hypersensitivities Between Daratumumab Intravenous and Subcutaneous Treatments in Patients with Multiple Myeloma

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Introduction

Daratumumab is a chemotherapy medication used in patients with multiple myeloma. There are two formulations - daratumumab IV (Darzalex) and daratumumab SQ (Darzalex Faspro). In a retrospective review of accelerated daratumumab administration, it was observed that there are high incidences of infusion-related reactions with daratumumab IV.[1] Daratumumab SQ which has the addition of hyaluronidase is administered subcutaneously and has decreased incidence of hypersensitivity reactions compared to daratumumab IV.[2] A knowledge gap exists in establishing the hypersensitivity rates in the IV and SQ forms seen in daratumumab administration at Los Angeles General Medical Center and Norris Comprehensive Cancer Center.

Study Endpoints

- The primary endpoint will be a comparison of the incidence of hypersensitivities between daratumumab IV and SQ in patients' first and subsequent doses.
- Secondary endpoints will include the comparison between the cost of hypersensitivity medications used in patients on daratumumab IV and SQ.

Methods

This retrospective observational study was conducted at LAGMC to compare hypersensitivity rates between daratumumab IV and SQ for multiple myeloma. We studied the first and subsequent doses between November 2015 to July 2023 via patient electronic health records (EMRs). Data collected from EMRs for this analysis include weight, dosing, allergies, and pre- and post- medication, if administered. Eligible patients included those aged 18 or older diagnosed with multiple myeloma receiving treatment at LAGMC.

A cost analysis of daratumumab IV versus SQ was conducted including pre- and post-medication administration. Daratumumab IV and SQ hypersensitivity data from LAGMC and Norris were compared to determine the general rate of adverse reactions for each formulation. Analysis was performed on R Studio.

Results

Table 1. Higher rates of hypersensitivity adverse reactions are experienced by patients being treated with daratumumab IV in comparison to daratumumab SQ.

	1st Dose Treatment Formulation			
	Daratumumab SQ		Daratumumab IV	
	Total patients	Patients experiencing hypersensitivity	Total patients	Patients experiencing hypersensitivity
Los Angeles General Medical Center	1	0	64	32
Norris Comprehensive Cancer Center	98	0	0	0

A Chi-square test indicated a p-value of 0.0002071 between first dose administration of daratumumab IV and SQ, showing an association between treatment type and occurrence of hypersensitivity reactions. This shows that we reject the null hypothesis that there is no association between treatment type (IV vs SQ) and patients experiencing a hypersensitivity reaction. Six patients on daratumumab IV experienced additional hypersensitivity reactions during their subsequent doses. No patients on daratumumab SQ experienced a hypersensitivity.

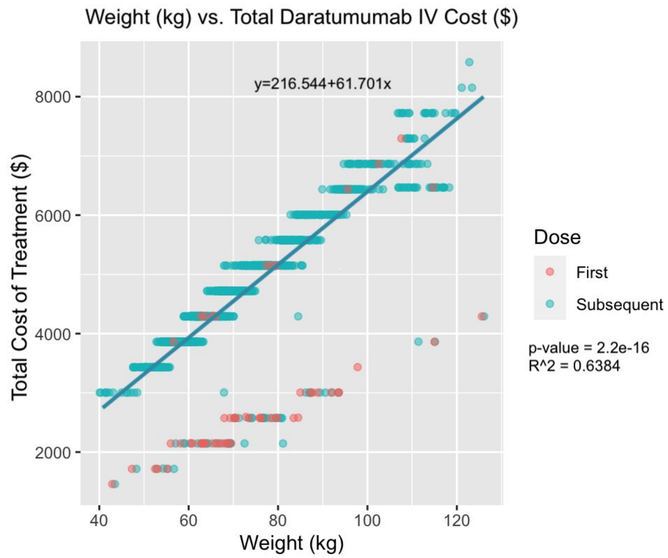

Figure 1. Daratumumab SQ is more cost effective in patients weighing ≥101.3kg.
A line of regression was implemented to show the relationship between cost of daratumumab IV and patient weight.

A linear regression line was created by comparing weight and cost of treatment for patients on the IV formulation of daratumumab and a regression equation was calculated. The R^2 value was 0.6384 and p-value was 0.00000000000000022. The fixed cost of daratumumab SQ treatment using the premedication regimen at LAGMC was found to be $6466.42 per dose.

Limitations

- Only one patient at LAGMC took daratumumab SQ which limits the validity of the comparison of hypersensitivity rates.
- There may be a difference in premedication regimens between LAGMC and Norris that make it difficult to compare hypersensitivity rates.
- Hypersensitivity rates were calculated based on whether the patient received post-medications.
- Hypersensitivity reactions which warranted use of medication were relative to nurses' judgement.
- The secondary endpoint does not take into account healthcare workers' salaries, supply cost, nor administration fees. It solely looked at the cost of medications used (daratumumab IV/SQ and hypersensitivity reactions).

Conclusions

Overall, this study shows that there is a statistically significant higher incidence of hypersensitivity reactions in patients on daratumumab IV than on daratumumab SQ. Daratumumab SQ was more tolerable by the patients assessed in this study. Cost-benefit analysis indicates that daratumumab SQ is more cost-effective for patients weighing over 101.3kg with multiple myeloma.

References

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2. Kashyap Padmaraju et al. Incidence of infusion related reactions of daratumumab-hyaluronidase-fihj: Pre-post intervention study of premedication omission. *JCO* 41, 6574-6574(2023). DOI:10.1200/JCO.2023.41.16_suppl.6574

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