Healthcare Resource Optimization of Different Formulations: Daratumumab SC Compared To Daratumumab IV for Treating Multiple Myeloma

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INTRODUCTION

- Multiple myeloma (MM) is a malignant plasma cell disease that requires long-term treatment to control disease progression [1]. Daratumumab (Dara), a humanized anti-CD38 monoclonal antibody, has ushered in a new era in MM treatment[2]. Despite the widespread clinical adoption of Dara's intravenous formulation, its administration demands extended infusion durations (5-7 hours) and poses a substantial risk of volume overload due to the large infusion volumes, thereby incurring considerable additional medical costs[3][4].
- The subcutaneous formulation of Daratumumab (Dara) offers the same therapeutic efficacy while significantly reducing administration time to 3-5 minutes and lowering the risk of infusion-related reactions (IRRs) [5].

OBJECTIVES

- This study aimed to explore healthcare resource optimization of two different formulations in an example of Dara IV compared to Dara SC in Chinese healthcare context.

METHODS

- A survey was conducted among experienced hematologists to collect information on MM patients' healthcare resource use with the two Dara formulations. The survey consisted of two sequential phases **(Table 1).**

Table 1. Procedure and Features of the Survey

Phase	Features
Phase 1: in-depth interview	• Semi-structured discussion guide
Phase 2: online questionnaire	• Self-reported structured e-questionnaire designed based on feedbacks from phase 1 • Consisting of multiple-choice or fill-in-the-blank questions

- The data collected in both phase 1 & 2 underwent independent validation by two researchers to ensure accuracy. Any corrected answers obtained from callbacks replaced original data. For categorical variables, counts and percentages of the total were presented. Continuous variables were described using mean values unless otherwise stated.

RESULTS

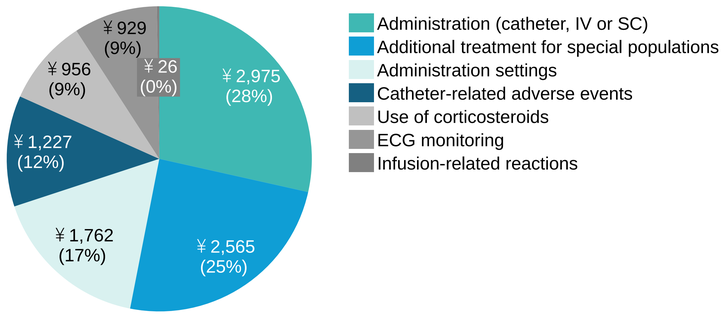
Physician Characteristics

- This study collected data from 74 clinicians across 29 tertiary hospitals in China, thereby representing diverse clinical practices within the Chinese context. Among the hematologists included, 30 (41%) were chief physicians, while 44 were associate chief physicians. All participants possessed substantial experience in diagnosing and treating multiple myeloma, as well as clinical expertise with subcutaneous Daratumumab.

Cost Saving of Dara SC vs. Dara IV per patient per year

- Overall, Dara SC can save an average of ¥10,439 per year in healthcare resources for each MM patient compared to IV infusion. These savings are mainly attributed to administration, additional treatment for special populations, and catheter-related adverse events **(Figure 1).**

Figure 1. Cost Savings in Healthcare Resources per Patient per Year: Dara SC vs. Dara IV



Abbreviation: ECG, Electrocardiogram; IV, intravenous; SC, subcutaneous.

Administration (catheter, IV or SC)

- Based on surveyed hematologists, therapies involving Dara SC required lower catheter usage rates compared to Dara IV (33% vs. 58%), encompassing port, central venous catheter, and peripherally inserted central catheter. Other patients received treatment via intravenous or subcutaneous administration. Consequently, Dara SC could save an average of ¥2,975 in administration costs.

Catheter-related adverse events

- Catheters could lead to complications during or after their use, incurring related management costs. Since Dara SC necessitated lower catheter usage rates, it resulted in an average savings of ¥ 1,227 savings per patient per annum.

Administration settings

- Daratumumab can be administered in outpatient, day ward, or inpatient settings. Due to significantly shorter administration time and greater convenience, an additional 25% of Dara SC was administered in outpatient or day ward settings compared to Dara IV for the first dose, and 30% for subsequent doses. Dara SC could save ¥69 for the first dose and ¥77 for each subsequent dose compared to Dara IV, resulting in total savings of ¥1,762 across 23 doses per annum **(Table 2).**

Table 2. Administration Setting Cost Savings

Outpatient/Day ward/Inpatient Costs	Dara SC	Dara IV	Cost Savings
First dose	¥169	¥238	¥69
Subsequent dose	¥124	¥201	¥77

Abbreviation: SC, subcutaneous; IV, intravenous.

Additional treatment for special populations

- In clinical practice, special populations including those with heart, kidney, renal dysfunction, hypercalcemia, anemia, obesity or poor vascular conditions, may need additional treatment such as intensive care unit (ICU) monitoring, dialysis or extra medications. Dara IV required higher probabilities and frequencies of additional treatment versus Dara SC, primarily due to the large volume infusion. In total, Dara SC could save an average of ¥2,565 per patient per annum.

Infusion-related Reactions (IRR)

- Although Dara SC reduced IRR incidence compared to Dara IV, the single-event management costs are low, resulting in overall low clinical management costs for both, with total savings of ¥26. For symptoms like breathing difficulties, flu-like symptoms, or throat irritation, the protocol is to stop Daratumumab infusion and administer dexamethasone.

Use of corticosteroids

- In clinical practice, hematologists would administer corticosteroids after Dara to avoid IRRs. The SC formulation required less use of corticosteroids compared to Dara IV (3 vs. 23 times per annum).
- The unit cost of per administration of corticosteroids was ¥48, resulting in an average of ¥956 savings per patient per annum.

ECG Monitoring saving

- Patients receiving Dara IV required ECG monitoring due to the lengthy administration time, whereas those receiving Dara SC did not.
- All patients received ECG monitoring during the first infusion of Dara IV, which lasted 8.5 hours and cost ¥111. For subsequent infusions, 81% of patients continued ECG monitoring, which lasted 3.5 hours and cost ¥46 per treatment. Switching to Dara SC saved ¥929 in ECG monitoring per patient per annum.

DISCUSSION

Dara SC highlights three significant impacts: 1) reduces patients' economic and disease burden by decreasing hospital visits and treatment time as well as simplifying administration; 2) improves physician time management through streamlined administration; and 3) alleviates pressure on healthcare systems by reducing medical interventions and hospitalizations. While Dara IV is effective and widely used, the SC formulation offers equivalent therapeutic outcomes with significant operational advantages, enabling more timely care for MM patients.

CONCLUSIONS

Darat SC, with its great safety and convenience, is expected to reduce patient treatment burden and increase healthcare resource utilization compared to IV infusion.

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Disclosure
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