



## Case report

## [Translated article] Desensitization protocol to pomalidomide in a patient with cutaneous hypersensitivity: A case report



### Protocolo de desensibilización a pomalidomida en paciente con hipersensibilidad cutánea: Caso clínico

Gabriel Martínez-Orea<sup>a,\*</sup>, Carlos Devesa-García<sup>a</sup>, Laura Puente-Romero<sup>a</sup>, Marta Vela-Martínez<sup>a</sup>, Mariella R. Lindo-Gutarra<sup>b</sup>, Pedro L. Fernández-García<sup>c</sup>

<sup>a</sup> Servicio de Farmacia, Hospital Universitario Sant Joan d'Alacant, Alicante, Spain

<sup>b</sup> Servicio de Alergología, Hospital Universitario Sant Joan d'Alacant, Alicante, Spain

<sup>c</sup> Servicio de Hematología, Hospital Universitario Sant Joan d'Alacant, Alicante, Spain

#### Introduction

Multiple myeloma (MM) is the second most common hematological malignancy, with 2500–3000 new cases diagnosed in Spain every year.<sup>1</sup> The last decades have witnessed significant advances in our understanding of MM biology. Cumulative findings led to the development of novel therapeutic approaches that have improved overall survival (OS) and the quality of life of patients. However, MM continues to be an incurable disease with a high rate of relapse.<sup>2</sup>

Pomalidomide is a third-generation immunomodulating agent that inhibits stromal cell support for MM tumor cell growth. This agent – structurally similar to lenalidomide – is effective against MM refractory to conventional treatments.<sup>3,4</sup> In Spain, pomalidomide is publicly funded for use as a combination therapy with bortezomib plus dexamethasone in patients who have received one or more previous treatments (including lenalidomide), and in combination either with isatuximab plus dexamethasone, or with dexamethasone alone in patients with relapsed or refractory MM who have received two or more previous treatments (including lenalidomide and bortezomib) and who have experienced disease progression after the last treatment. This indication is restricted to the third and fourth lines of treatment.

Although the incidence of hypersensitivity to pomalidomide is not well documented, cases of cutaneous reactions such as urticaria have been reported, which may delay or hinder the administration of the scheduled treatment. Given that pomalidomide is administered to patients with refractory or relapsed MM, the occurrence of hypersensitivity drug reactions significantly limits the therapeutic options available for these patients. In this context, desensitization to pomalidomide emerges as a promising strategy for the safe administration of this medication to patients with a history of hypersensitivity.<sup>5–7</sup>

#### Case description

We report the case of a 85-year-old patient with a history of hypertensive heart disease and dyslipidemia diagnosed in March 2024 with IgG MM, with kappa Bence Jones proteinuria of 1.62 g/24 h, and high-risk R-ISS stage III, including t(14;16), trisomy 17q22, and isochromosome 17q, detected in 57% and 11% of the analyzed interphases, respectively. The initial treatment included daratumumab in combination with lenalidomide, prednisone and hemodialysis. After two weeks of treatment, the patient developed an erythematous-edematous rash involving the lumbosacral region, thighs and pretibial regions, which was suspected to be a cutaneous adverse reaction to lenalidomide.

Treatment was shifted to daratumumab, bortezomib and prednisone. After five cycles of second-line treatment, disease progression was confirmed by renal function deterioration and hyperkalemia. In November 2024, in view of the need for a third-line treatment, a scheme including isatuximab, pomalidomide and dexamethasone was initiated, with an initial dose of pomalidomide of 3 mg/day.

After three doses of pomalidomide, the patient presented to the Hematology Clinic with moderate pruritus in the dorsal and gluteal region. No other associated symptoms such as fever, angioedema or dyspnea were observed. Upon suspicion of delayed hypersensitivity to pomalidomide, the therapy was suspended. Since continuing treatment was necessary, the patient was referred to the Allergy Clinic, where a pomalidomide desensitization protocol was activated.

#### Desensitization strategy

The desensitization protocol was based on the 10-step scheme described by Seki et al.<sup>6</sup> For the preparation of the four pomalidomide solutions, 0.5% carboxymethylcellulose gelled water was used as the vehicle to improve palatability and facilitate administration. From these solutions, ten oral syringes containing escalating doses of

DOI of original article: <https://doi.org/10.1016/j.farma.2025.09.002>.

\* Corresponding author.

E-mail address: [gabrielakrafarmacia@gmail.com](mailto:gabrielakrafarmacia@gmail.com) (G. Martínez-Orea).

<https://doi.org/10.1016/j.farma.2025.12.007>

1130-6343/© 2025 Sociedad Española de Farmacia Hospitalaria (S.E.F.H). Published by Elsevier España, S.L.U. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

pomalidomide were prepared and administered in ten sequential steps at 15-min intervals (Table 1).

The procedure was performed under close medical supervision by monitoring blood pressure, heart rate, respiratory rate, temperature, and oxygen saturation, and keeping the patient under observation for potential symptoms of adverse drug reactions.

Firstly, gelled water was prepared with 200 ml of purified water and 1 g of carboxymethylcellulose. The first solution (solution A) was prepared with one 4 mg pomalidomide capsule and 4 ml of vehicle; solution B, with another 4 mg capsule and 40 ml of vehicle; solution C, with 1 ml of solution B and 9 ml of vehicle; and solution D, with 1 ml of solution C and 9 ml of vehicle. Suspensions were prepared within a biological safety cabinet following guidelines on handling hazardous drugs. All solutions were prepared the same day of the procedure to guarantee their stability and were discarded after use.

Thirty minutes before initiating the desensitization protocol, an ampoule containing 1 ml of dexchlorpheniramine 5 mg/ml was administered intravenously. Following the administration of each dose, the patient was asked to take a little sip of water to ensure that she took the full prescribed volume. In compliance with the local protocol, rescue medication –including adrenaline, antihistamines and corticosteroids– was available throughout the entire process for immediate use in case the patient experienced an anaphylactic reaction.

#### Follow-up

The patient tolerated the desensitization procedure without developing any adverse drug reactions and remained hemodynamically stable at all times. In addition, cetirizine 10 mg was prescribed at a dose of one tablet once daily for five days. This treatment was started on the same day of the desensitization procedure. The patient could restart the pomalidomide treatment at a dose of 4 mg/day for 21 days within a 28-day cycle.

As a safety measure, it was considered necessary to repeat the same 10-step desensitization process seven days after completion of the first cycle. The patient did not develop any signs of hypersensitivity during the second desensitization process, which enabled treatment continuation.

#### Discussion

The development of pomalidomide hypersensitivity in an 85-year-old patient following a previous cutaneous adverse reaction to lenalidomide posed a clinical challenge due to the limited therapeutic options available.

**Table 1**  
The 10-step pomalidomide desensitization protocol.

Step <sup>a</sup>	Stock solution concentration <sup>b</sup>	Syringe dose orally (mg)	Syringe volume orally (ml)
1	Solution D <sup>c</sup>	0.00025	0.25
2	(0.001 mg/ml)	0.00125	1.25
3		0.0025	2.5
4	Solution C <sup>d</sup>	0.0125	1.25
5	(0.01 mg/ml)	0.025	2.5
6	Solution B <sup>e</sup>	0.125	1.25
7	(0.1 mg/ml)	0.25	2.5
8		0.5	5
9	Solution A <sup>f</sup>	0.75	0.75
10	(1 mg/ml)	1	1

<sup>a</sup> 15-min interval between steps.

<sup>b</sup> Using as a vehicle a solution of water purified with 0.5% carboxymethylcellulose.

<sup>c</sup> Solution D: 1 ml of Solution C + 9 ml of vehicle.

<sup>d</sup> Solution C: 1 ml of Solution B + 9 ml of vehicle.

<sup>e</sup> Solution B: 4 mg of pomalidomide + 40 ml of vehicle.

<sup>f</sup> Solution A: 4 mg of pomalidomide + 4 ml of vehicle.

Upon suspicion of cross-reactivity between immunomodulating agents, desensitization emerged as the best choice to avoid treatment discontinuance.

In our study, the rapid, 10-step desensitization protocol was successfully completed, thereby enabling pomalidomide treatment continuation. Our findings are aligned with those reported by Seki et al.,<sup>6</sup> who successfully completed a desensitization protocol in a patient with previous hypersensitivity to thalidomide and lenalidomide.

To ensure safety in an elderly patient with a high suspicion of reactivity, the procedure was repeated after the 7-day washout period of the first cycle. This was an additional safety measure not adopted by Park et al.,<sup>7</sup> who did not find it necessary to repeat the procedure after the 10-step desensitization protocol in a 68-year-old patient.

From a methodological point of view, our protocol introduces some practical measures over previously published protocols. In contrast with Seki et al.,<sup>6</sup> who used 3-mg capsules, we adapted our procedure to use the 4-mg pomalidomide capsules available in our center, which facilitates reproducibility in routine clinical practice. Whereas both Seki et al.<sup>6</sup> and Park et al.<sup>7</sup> used carboxymethylcellulose and Tween 80 as a compound vehicle, we used a simpler formulation of 0.5% carboxymethylcellulose-gelled water that demonstrated comparable efficacy for the preparation of suspensions, with good tolerance. In contrast with Park et al.,<sup>7</sup> who did not use any premedication, our protocol included the administration of intravenous dexchlorpheniramine as an additional safety measure.

Finally, our choice for a rapid 24-h protocol contrasts with the one adopted by Grandoni et al.<sup>5</sup> The authors applied a slow, ambulatory, five-week desensitization regimen in a patient who developed a grade-3 rash to avoid hospitalization. In our study, the therapeutical dose could be started immediately, thereby avoiding extended treatment suspensions in patients with MM.

It is worth mentioning that our patient had a moderate cutaneous reaction. In more serious hypersensitivity reactions such as anaphylaxis, the safety of rapid protocols has not yet been established and requires further studies.

In conclusion, this case demonstrates that rapid pomalidomide desensitization is an effective and safe strategy that enabled treatment continuation in an elderly patient with cross-reactivity to lenalidomide. Our findings underline the efficacy of this rapid protocol in the management of MM patients when limited therapeutic options are available.

#### Ethical considerations

The authors declared that this case report complies with the International Committee of Medical Journal Editor (ICMJE) guidelines.

#### Authorship

All authors contributed equally to the preparation, editing and approval of the final version of this manuscript.

#### Funding

No funding was received for conducting this study.

#### Type of result management

This manuscript has not been presented at any conference or scientific meeting.

#### Conflict of interest

The authors have no conflicts of interest to declare that are relevant to the content of this article.

### CRediT authorship contribution statement

**Gabriel Martínez-Orea:** Writing – review & editing, Writing – original draft, Validation, Resources, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Carlos Devesa-García:** Validation, Supervision, Investigation, Formal analysis, Conceptualization. **Laura Puente-Romero:** Methodology, Investigation, Formal analysis, Conceptualization. **Marta Vela-Martínez:** Methodology, Investigation, Formal analysis, Conceptualization. **Mariella R. Lindo-Gutarra:** Visualization, Validation, Supervision. **Pedro L. Fernández-García:** Visualization, Validation, Supervision.

### References

1. Fernández-Rañada De La Gándara JM. Initial therapy of multiple myeloma (MM). *An RANM*. 2023;140(01):72–80. doi:[10.32440/ar.2023.140.01.rev08](https://doi.org/10.32440/ar.2023.140.01.rev08).
2. Kumar SK, Lee JH, Lahuerta JJ, et al. Risk of progression and survival in multiple myeloma relapsing after therapy with IMiDs and bortezomib: a multicenter international myeloma working group study. *Leukemia*. 2012;26:149–157. doi:[10.1038/leu.2011.196](https://doi.org/10.1038/leu.2011.196).
3. Richardson PG, Oriol A, Beksac M, et al. Pomalidomide, bortezomib, and dexamethasone for patients with relapsed or refractory multiple myeloma previously treated with lenalidomide (OPTIMISMM): a randomized, open-label, phase 3 trial. *Lancet Oncol*. 2019;20(6):781–794.
4. Dimopoulos MA, Dytfeld D, Grosicki S, et al. Elotuzumab plus pomalidomide and dexamethasone for multiple myeloma. *N Engl J Med*. 2018;379(19):1811–1822. doi:[10.1056/NEJMoa1805762](https://doi.org/10.1056/NEJMoa1805762).
5. Grandoni F, Stalder G, Borgeat Kaeser A, Ribí C, Cairoli A, Blum S. Successful desensitization to pomalidomide in a patient with POEMS syndrome with delayed-type hypersensitivity to immunomodulatory imid drugs. *Leuk Lymphoma*. 2019;60(12):3087–3089. doi:[10.1080/10428194.2019.1620945](https://doi.org/10.1080/10428194.2019.1620945).
6. Seki JT, Sakurai N, Lam W, Reece DE. Pomalidomide desensitization in a patient hypersensitive to immunomodulating agents. *Curr Oncol*. 2017;24(4):328–332. doi:[10.3747/co.24.3572](https://doi.org/10.3747/co.24.3572).
7. Park JJ, Huang E, Monteleone CA, Kane MP, Cooper DL. Pomalidomide desensitization for hypersensitivity: a case report. *J Oncol Pharm Pract*. 2019;26(5):1244–1247. doi:[10.1177/1078155219889676](https://doi.org/10.1177/1078155219889676).