The Infusion Tree: Safe Administration of Chemotherapeutics during Rapid Drug Desensitization

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A "Practice Pearl" helps an allergist-immunologist practice more safely, effectively, timely, efficiently, equitably, or in a more patient-centered way. This feature is coordinated by Stuart Abramson, MD, Giselle Mosnaim, MD, and Andrew Murphy, MD, from the AAAAI Federation of Regional, State, and Local Allergy, Asthma, and Immunology Societies Assembly and by Editorial Board member Matthew Rank, MD. More information about submitting a "Practice Pearl" can be found on our Web site (jaci-inpractice.org).

PRACTICE CHALLENGE

Rapid drug desensitization (RDD) with chemotherapeutics represents an important procedure in treating oncology patients with immediate drug hypersensitivity, protecting them against anaphylaxis and maintaining them on first-line therapy.[1] RDD is regularly applied in 3-4 solution protocols, whereby continuous infusion of the total dose without any interruption is essential for successful desensitization. Bags with different chemotherapy solutions are prepared by hospital pharmacy following patient and occupational safety standards.[2] Because of safety requirements, that is, closed system drug transfer, bags are delivered with the line filled with a neutral solution, which leads to the challenge that lines need to be flushed with the chemotherapy solution without any risk for the patient during RDD or the health care worker due to accidental chemotherapy exposure.

PRACTICE SOLUTION

We developed an infusion tree construction that allows flushing the lines with the chemotherapy solutions and subsequently administering RDD treatment without interruption or risk of accidental exposure (see Figure E1 in this article's Online Repository at www.jaci-inpractice.org). Chemotherapy solutions, neutral solutions, and an empty waste bag are connected with lines filled with a neutral solution in a closed system. The lines are then flushed in a specific sequence (see Figures E1 and E2 in this article's Online Repository at www.jaci-inpractice.org) into a waste bag. After flushing the waste line, the waste bag can be disconnected and the prepared closed system is used for RDD, starting with the lowest concentration (solution 1).

It is important to accurately measure all line volumes and follow the correct order when flushing the lines to prevent mixing of solutions during flushing the drip chamber and line, due to different osmolarities. The effect of differences in osmolarities is insignificant for most chemotherapy drugs but can be prevented by flushing the lines with a higher volume of the chemotherapy solution.

In our clinic, 19 patients have undergone 74 RDD successfully using this technique.

REFERENCES

1. Bonamichi-Santos R, Castells M. Diagnoses and management of drug hypersensitivity and anaphylaxis in cancer and chronic inflammatory diseases: reactions to taxanes and monoclonal antibodies. Clin Rev Allergy Immunol 2018; 54:375-85.
2. European Parliament. Preventing occupational exposure to cytotoxic and other hazardous drugs: European policy recommendations. Available from: https://www.europeanbiosafetynetwork.eu/wp-content/uploads/2016/05/Exposure-to-Cytotoxic-Drugs_Recommendation_DINA4_10-03-16.pdf. Accessed March 1, 2020.

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No funding was received for this work.
Conflicts of interest: The authors declare that they have no relevant conflicts of interest.

Received for publication April 7, 2020; revised manuscript received and accepted for publication May 13, 2020.

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2213-2198

https://doi.org/10.1016/j.jaip.2020.05.039