

Polyethylene Glycol: Not Just a Harmless Excipient

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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

Polyethylene glycol (PEG) is contained in a large number of diverse classes of drugs. Awareness of this common excipient as the potential cause of allergic reactions is critical, but it is a challenge to know when to suspect PEG allergy and how to investigate it.

PRACTICE SOLUTION

The molecular weight (MW) of PEG ranges from 200 to 10,000 Da. Low-MW drugs tend to cause contact hypersensitivity reactions. High-MW PEG (>1000) can cause generalized urticaria/angioedema/anaphylaxis. A limited list of drugs have been consistently reported so far (Table I). A possible explanation might be that either large amounts or very high MW (>10,000) PEG must be contained in the oral drug or that parental administration is required.

PEG is bought commercially (Sigma-Aldrich, Dorset, UK). Global experience with this allergy is still limited; therefore, testing should be carried out in a center with special expertise. Skin testing with PEG is not as yet standardized and systemic reactions have been described.¹ Higher MW PEGs are more immunogenic, due to being multivalent, and carry a higher risk of a systemic reaction on skin testing. We propose to start skin prick testing (SPT) to the index PEG at a low concentration, that is, 0.1% with a progressive 10-fold increase up to 100%. If SPT results are negative, then intradermal testing (IDT) should start using a dilution 10⁻⁴ from maximal SPT concentration reached. Simultaneous testing to multiple PEG molecular

TABLE I. PEG molecular weights are listed in order of frequency of causing reactions with drug examples.¹

PEG MW	Examples of drugs containing PEG
3350	Macrogol bowel preparation: (Colopeg lavage solution, Colyte lavage solution, Golytely lavage solution, Halflytely lavage solution) Depo-Medrol injection Depo-Provera contraceptive injection
4000	Macrogol bowel preparations (SELG lavage solution, Lovol esse lavage solution, Bohm evacuant solution, Klean-prep solution) SonoVue contrast
6000	V-Pen mega antibiotic Fludent fluoride tablet Bafucin throat lozenge Balanced Novum reflux tablet
8000	Imposit throat lozenge Malarone antimalarials Chester packaging ultrasound gel®
400	Malarone antimalarials Effexor antidepressant tablet
20,000	Some sodium alginate antacid tablets

MW, Molecular weight; PEG, polyethylene glycol.

weights or repeating positive IDT should be avoided. Current experience indicates that systemic reactions to skin testing can occur with delay. Therefore, it is important to allow an extended time (no less than 30 minutes) before testing the next higher concentration. Finally, if all skin tests are negative, a cautious drug provocation test can be considered. A protocol has not as yet been established. For patients who reacted to oral preparations, drug provocation testing is performed in line with protocols established for other drugs. If a patient reacted to a parenteral drug, oral provocation with PEG of a similar MW may not be positive due to the poor absorption. Thus, a separate provocation with the PEG free drug might be required.

REFERENCE

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