Immediate allergic reactions by polyethylene glycol 4000: two cases

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ABSTRACT

The evacuant solution (ES) is a drug that has been used to clean the colon. The most common described side effects when using this drug are abdominal symptoms; skin rash is rare.

We report on two patients who presented urticaria and angioedema after the intake of an evacuant solution to make a rectoscopy.

We performed allergy studies: skin prick tests with common inhalants, pure ES and the components (polyethylene glycol 4000 (PEG 4000), KCl, NaCO3, NaPO3, NaSO3, NaCl, neohesperidine, potassic acesulfa and orange flavouring), intradermic test, total serum IgE and single-blind placebo oral challenge with ES and the components.

We report on the first cases of immediate allergy reactions (type 1) caused by oral intake of a drug containing PEG 4000 which were demonstrated by intradermic tests and oral challenge.

Key words: Evacuant solution. Immediate allergy reactions. Intradermic tests. Polyethylene glycol 4000. Single-blind placebo oral challenge.

INTRODUCTION

The evacuant solution is a drug that has been used to clean the colon, like an enema to study some colonic lesions such as polyps, neoplasm or arteriovenous malformations and before practising surgery to this organ.

The most commonly described side effects when using this drug are: bloating, nausea, abdominal or stomach cramps, anus irritation or vomiting. Skin rash is rare.

We report on two patients who presented urticaria and angioedema after the intake of an evacuant solution to make a rectoscopy.

FIRST CASE

A 36 year-old man referred to our Allergology Department for an episode of urticaria and lip swelling after the intake of an evacuant solution (Bohm®).

The reaction appeared half an hour after the drug consumption and he had not taken other drugs that day or on previous days. He was not atopic and he needed study of spastic colon.

We performed allergy studies: skin prick tests with common inhalants were negative; total serum IgE was 98 kU/l. We prepared 250ml of evacuant solution (ES) following the instructions of Bohm laboratories: skin prick test with pure solution was negative, but single-blind placebo oral challenge was positive with similar symptoms to the reaction that the patient suffered (Fig. 1).

Subsequently, we contacted Bohm laboratories in Spain and they furnished us the components of ES: polyethylene glycol 4000 (PEG 4000), KCl, NaCO3,
NaPO₃, NaSO₃, NaCl, neohesperidine, potasic ace-
sulfam and orange flavouring.

Skin prick test were performed with: ES compo-
nents and saline solution; ES and PBS; and ES com-
ponents and human seric albumin to 1/10 concentra-
tion for each one. The results were negative, but
single-blind placebo oral challenge with increasing
doses of each component of ES on consecutive days
was positive 5 minutes after the intake of 25cc of
PEG 4000.

We wanted to know the immunologic mechanism
of the reaction so we performed an intradermic test
with PEG 4000 which was immediately positive to
the 1/10 concentration (Fig. 2). The patient presented
general urticaria with hives and nodules, rhinitis, nau-
seas and vomiting; and he needed treatment.

SECOND CASE

A non-atopic 44 year-old man referred to our Aller-
gology Department for an episode of urticaria and an-
gioedem one minute after the intake of ES, as above.

We performed similar allergy studies: skin prick
test with common inhalants and ES and its compo-
nents were negative, but single-blind placebo oral
challenge with ES and PEG 4000 were positive; in-
tradermic test was positive to the 1/10000 concen-
tration of PEG 4000.

Despite the symptoms being “type I immunolog-
ic mechanism”, we did not know the mechanism
which made the reaction so serious. We performed
patch tests with ES and its components and all of
them were negative.

Control tests were performed on ten patients (five
atopic and five non-atopic) and the results were neg-
ative.

DISCUSSION

Polyethylene glycol 4000 is a hydrosoluble base
used as a carrier in a lot of topical drugs, in creams
and in body oils as an emulsion! (Table I).

It is a polymer of ethylen glycol molecules
[HO(CH₂ CH) nOH] and its physical and chemical
characteristics depend on the number of molecules.
PEG slow molecular weight (200-700) are liquids and
PEG high molecular weight (1000-7500) are soft or
hard solids.

There are no references of other cases of allergic
reactions after oral intake of ES or PEG. Side effects
with PEG described to date have been nauseas,
vomiting, abdominal pain and rectal irritation if taken
orally; and skin rash with a topical drug.

Bohm laboratories have no news of allergy reac-
tions with ES. PEG can be the cause of eczemas or

Table I

<table>
<thead>
<tr>
<th>List of drugs with PEG</th>
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<tbody>
<tr>
<td>Creams and body oils</td>
</tr>
<tr>
<td>Evacuant solutions: Bohm®, Lanciz®, Klean Prep®</td>
</tr>
<tr>
<td>Sperm-killing contraoceptive: Lavolen®</td>
</tr>
<tr>
<td>Others: Bactroban®, Oftalmowell®, Synalar nasal®, Betadine®, Furacina®, Ibuprofeno Steve®, Antalgin®, Skin formulation</td>
</tr>
</tbody>
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contact dermatitis as some articles about patch tests have demonstrated 2-7 (Table II).

CONCLUSION

We report on the first cases of immediate allergy reactions (type I) caused by the oral intake of a drug containing PEG 4000 which were demonstrated by intradermic tests and oral challenge.

ACKNOWLEDGMENTS

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REFERENCES


Table II

<table>
<thead>
<tr>
<th>Author</th>
<th>Patient</th>
<th>Drug</th>
<th>Diagnosis</th>
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<tbody>
<tr>
<td>Stenveld</td>
<td>Man 44 years</td>
<td>Betadine®</td>
<td>Patch test + (PEG 300,400,555)</td>
</tr>
<tr>
<td>Córdoba</td>
<td>Man 59 years</td>
<td>Betadine®</td>
<td>Patch test + (atb and PEG)</td>
</tr>
<tr>
<td>Le Coz</td>
<td>Woman 43 years</td>
<td>Body milk</td>
<td>Patch test + PEG</td>
</tr>
<tr>
<td>Issakson</td>
<td>Woman 25 years</td>
<td>Massage oils</td>
<td>Patch test + PEG</td>
</tr>
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