Ethical disclosure

Protection of human and animal subjects. The authors declare that the procedures followed were in accordance with the regulations of the responsible Clinical Research Ethics Committee and in accordance with those of the World Medical Association and the Helsinki Declaration.

Confidentiality of data. The authors declare that they have followed the protocols of their work centre on the publication of patient data and that all the patients included in the study have received sufficient information and have given their informed consent in writing to participate in that study.

Right to privacy and informed consent. The authors must have obtained the informed consent of the patients and/or subjects mentioned in the article. The author for correspondence must be in possession of this document.

References

1. Gaspar A, Morais-Almeida M, Pires G, Prates S, Câmara R, Godinho N, et al. Risk factors for asthma admissions in children. Allergy Asthma Proc. 2002;23:295–301.
2. Xolair (omalizumab). EPAR—Product Information. Last updated July 2011, available at http://www.emea.europa.eu/humandocs/Humans/EPAR/xolair/xolair.htm
3. Milgrom H, Berger W, Nayak A, Gupta N, Pollard S, McAlary M, et al. Treatment of childhood asthma with anti-immunoglobulin E antibody (omalizumab). Pediatrics. 2001;108:E36.
4. Lanier B, Bridges T, Kulus M, Taylor AF, Berhane I, Vidaurre CF. Omalizumab for the treatment of exacerbations in children with inadequately controlled allergic (IgE-mediated) asthma. J Allergy Clin Immunol. 2009;124:1210–6.
5. Kulus M, Hebert J, Garcia E, Fowler Taylor A, Fernandez Vidaurre C, Blogg M. Omalizumab in children with inadequately controlled severe allergic (IgE-mediated) asthma. Curr Med Res Opin. 2010;26:1285–93.
6. Milgrom H, Fowler-Taylor A, Vidaurre CF, Jayawardene S. Safety and tolerability of omalizumab in children with allergic (IgE-mediated) asthma. Curr Med Res Opin. 2011;27:163–9.
7. Busse WW, Morgan WJ, Gergen PJ, Mitchell HE, Gern JE, Liu AH, et al. Randomized trial of omalizumab (anti-IgE) for asthma in inner-city children. N Engl J Med. 2011;364:1005–15.
8. Bacharier LB, Strunk RC, Mauger D, White D, Lemanske Jr RF, Sorkness CA. Classifying asthma severity in children: mismatch between symptoms, medication use, and lung function. Am J Respir Crit Care Med. 2004;170:426–32.
9. Kopp MV. Omalizumab: anti-IgE therapy in allergy. Curr Allergy Asthma Rep. 2011;11:101–6.
10. Sampson HA, Leung DY, Burks AW, Lack G, Bahna SL, Jones SM, et al. A phase II, randomized, doubleblind, parallelgroup, placebocontrolled oral food challenge trial of Xolair (omalizumab) in peanut allergy. J Allergy Clin Immunol. 2011;127:1309–10, e1.

H. Pite[a,b,*], Â. Gaspar[c], M. Paiva[a], P. Leiria-Pinto[a,d]

[a] *Immunoallergy Department, Centro Hospitalar Lisboa Central, Lisbon, Portugal*
[b] *Pharmacology Department, CEDOC, Faculty of Medical Sciences, Lisbon, Portugal*
[c] *Immunoallergy Department, CUF Descobertas Hospital, Lisbon, Portugal*
[d] *Pediatric Department, CEDOC, Faculty of Medical Sciences, Lisbon, Portugal*

* Corresponding author.
E-mail address: helenampite@gmail.com (H. Pite).

http://dx.doi.org/10.1016/j.aller.2012.01.008

Hypersensitivity to lansoprazole with tolerance to other proton pump inhibitors: Does cross-reactivity between proton pump inhibitors really exist?

To the Editor,

A 39-year-old female patient was referred to our allergy and immunology department with a history of severe anaphylactic reaction to lansoprazole. The patient was prescribed lansoprazole for peptic ulcer and gastrooesophageal reflux disease six years ago. After using lansoprazole for one year without any problem, she developed generalised cutaneous rash and itching 30 min after taking the drug. At this time, she was not taking any other medications. After the first allergic reaction, the patient was unbelievably misconducted by her doctors and used the same drug three times with different commercial names. She experienced episodes of urticaria/angio-oedema with chest tightness and fainting shortly after taking the drug on each occasion. Only in the second reaction she had lansoprazole together with another drug (60 mg Asemetasin tablet).

Skin prick tests (SPT) with omeprazole (40 mg/mL), lansoprazole (30 mg tablet), pantoprazole (40 mg tablet), esomeprazole (40 mg tablet) and rabeprazole (20 mg tablet) were performed on the volar side of the forearm. Reactions were considered positive when a wheal greater than 3 mm in diameter was developed in 15 min. Intradermal test (IDT) with omeprazole (1 mg/mL and 4 mg/mL) and rabeprazole (1/10, 1/100) were also performed. Results were considered positive when wheals greater than 5 mm were present. Histamine was used as a positive control and normal saline as a negative control for the SPT and IDT. We observed an immediate positive reaction to lansoprazole with SPT (4 mm $\times$ 5 mm wheal). SPT and IDT for other proton pump inhibitors (PPIs) were negative.

Controlled oral challenge tests were performed. Increasing doses of omeprazole (5, 10, and 20 mg), pantoprazole (5, 10, 20 and 40 mg), esomeprazole (5, 10, 20 and 40 mg), rabeprazole (5, 10, and 20 mg) and other culprit drug Asemetasin (15, 30, 60 mg) were administered orally at 60-min intervals until the therapeutic doses were reached. All drugs were tolerated in controlled challenge tests.

PPIs are widely used for the treatment of acid related disorders. This group of drugs is the most potent inhibitors of gastric acid secretion. Several PPIs – lansoprazole, rabeprazole, pantoprazole, and esomeprazole – have been developed after omeprazole, which is the first member of

this group. Although rare, anaphylactic reactions to PPIs have been described.[1–7]

They have modified benzimidazoles with a pyridine ring and chemically related structures A number of case reports suggesting cross-reactivity patterns among lansoprazole and rabeprazole,[2,3] omeprazole and lansoprazole,[4–6] and omeprazole and pantoprazole[1,4] have been reported. Our patient had IgE-mediated anaphylactic or urticarial reactions to lansoprazole, which were confirmed by her history and positive SPT results. However, SPT and IDT were negative for other PPIs including, omeprazole, pantoprazole, esomeprazole and rabeprazole. In addition, the oral challenge test showed that our patient tolerated therapeutic doses of omeprazole, pantoprazole, esomeprazole and rabeprazole. Vovolis reported IgE mediated allergic reaction to rabeprazole with good tolerance to omeprazole and lansoprazole.[7] To the best of our knowledge, our patient is the first reported case of anaphylaxis induced by lansoprazole with good tolerance to other PPIs including rabeprazole.

In conclusion, cross-reactivity between PPIs is conflicting. We also showed that controlled oral challenge test using PPIs for which the SPT is negative is a safe approach to choose an alternative drug.

References

1. Lobera T, Navarro B, Del Pozo MD, González I, Blasco A, Escudero R, et al. Nine cases of omeprazole allergy: cross-reactivity between proton pump inhibitors. J Investig Allergol Clin Immunol. 2009;19:57–60.
2. Porcel S, Rodríguez A, Jiménez S, Alvarado M, Hernández J. Allergy to lansoprazole: study of cross-reactivity among proton-pump inhibitors. Allergy. 2005;60:1087–8.
3. Pérez Pimiento AJ, Prieto Lastra L, Rodríguez Cabreros MI, González Sánchez LA, Rodríguez Mosquera M, Cubero AG. Hypersensitivity to lansoprazole and rabeprazole with tolerance to other proton pump inhibitors. J Allergy Clin Immunol. 2006;117:707–8.
4. González P, Soriano V, López P, Niveiro E. Anaphylaxis to proton pump inhibitors. Allergol et Immunopathol. 2002;30:342–3.
5. Natsch S, Vinks MH, Voogt AK, Mees EB, Meyboom RH. Anaphylactic reactions to proton-pump inhibitors. Ann Pharmacother. 2000;34:474–6.
6. Galindo PA, Borja J, Feo F, Gómez E, García R, Cabrera M, et al. Anaphylaxis to omeprazole. Ann Allergy Asthma Immunol. 1999;82:52–4.
7. Vovolis V, Christogianni K, Koutsostathis N. Immunoglobulin E-mediated anaphylaxis to rabeprazole. J Investig Allergol Clin Immunol. 2010;20:360–1.

E. Karabacak*, A. Kutlu, E. Aydin, S. Ozturk

GATA Haydarpasa Teaching Hospital, Istanbul, Turkey

* Corresponding author.
E-mail address: ekarabacak@gata.edu.tr (E. Karabacak).

http://dx.doi.org/10.1016/j.aller.2012.03.007

Cystic fibrosis and atopy

To the Editor,

Cystic fibrosis (CF) is the most common autosomal recessive disorder in Caucasians (1:2500–1:10,000 live newborns). The genetic defect of CF results from abnormalities of chromosome 7 that causes dysfunction in cystic fibrosis transmembrane conductance regulator (CFTR), a protein that regulates chlorine ion transport. It results in mucus thickness and reduction of mucociliary clearance, predisposing the patient to inflammation and colonisation by *Staphylococcus aureus* and *Pseudomonas aeruginosa*. Coexistence of allergy, as well as genetic and environmental factors may influence the phenotype of CF. Rhinosinusitis is frequent in CF and causes serious anatomic alterations in the sinus, although few patients spontaneously report symptoms, often underestimated in comparison with the severity of the pulmonary disease.[1]

Cystic fibrosis and asthma are not always easily distinguished from each other.[2]

Wheeze, whether in asthmatic or CF patients, is a result of airway obstruction due to inflammation, bronchospasm and retained secretions. Both diseases may coexist in the same patient, and poor lung function and bronchial hyperresponsiveness are common to both.[3]

Bronchodilator response may be found in CF and demonstrates that this medication may help to alleviate the airflow limitation. Eosinophilia and high serum IgE leves are of limited value but personal and family history of atopy may be helpful.[3]

Since 1 in 20 of the population are CF mutation carriers and have CFTR protein dysfunction, this would contribute to allergy in the community. In earlier study 47% of cystic fibrosis heterozygotes had positive prick skin tests to one or more antigens and 53% had histories of allergic disease, both occurring significantly more frequent than in a control group.[4]

A cross-sectional study of 55 CF adult patients with upper and lower airway disease demonstrated that allergen specific IgE was present to at least one aeroallergen in 67% by skin prick testing and 80% by RAST. Rhinitis occurred in 50% of the population with no detectable difference in lung function between those with and without allergic sensitisation. The authors concluded that individuals with CF should be evaluated for coexistent allergy and this warrants appropriate therapy. The rate of allergy to *Aspergillus* in this study was much lower than that reported in studies of children and adolescents with CF. These differences could be explained by the methods of detecting *Aspergillus* specific IgE, potency of allergenic extracts, degree of environmental exposure to *Aspergillus*, prevalence of allergic disease and IgE sensitisation to moulds in general population.[5]

The frequent evidence of allergy could be explained by abnormalities in epithelial barrier function and mucus hypersecretion leading to retention of allergens in the respiratory tract with progressive exposure and sensitisation. Alternatively, a genetic predisposition to allergy has been