

were performed as previously described (3).

The patient responded positively to prick testing with ceftriaxone (wheal 20×25 mm) at a concentration of 2 mg/ml, 10 min after application. Urticarial rash appeared on her arm, face and neck, which required immediate administration of an antihistamine. She also responded positively to skin testing with ampicillin at a concentration of 20 mg/ml (wheal 8×10 mm). Prick and intradermal histamine test produced wheals with maximum diameters of 5 and 10 mm respectively. Intradermal test with the above cephalosporins and semisynthetic penicillins were negative in 10 healthy control subjects, who had previously tolerated those drugs. All assays for specific IgE were negative.

Challenges were positive only to cephalexin. Within 20 min of receiving the second dose of the drug, she began to experience facial flush with intensive itching in the throat and eyes, swelling of the lip, and urticarial rash on her trunk. She was immediately treated with anti-shock therapy.

Clinical findings and positive skin tests with ceftriaxone and ampicillin, as well as positive challenges with cephalexin imply that the child developed type-I hypersensitivity. The observed cross-reactivity among drugs suggested presence of antigenic determinants unrelated to β -lactam ring but at the same time not completely side-chain specific. The patient reacted to cefalexin and ampicillin but not to cefaclor, the drugs with the identical side-chain. In fact, the difference between cephalexin and cefaclor is in only one functional group (methyl group instead of chlorine at R2 position of the thiazolidine ring).

To our knowledge, this is the first case of immediate hypersensitivity to ceftriaxone and cross-reactivity with cefalexin and ampicillin demonstrated in children.

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CD63 expression by flow cytometry in the *in vitro* diagnosis of allergy to omeprazole

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Key words: CD63; Drug allergy; FAST; *in vitro* diagnosis; omeprazole.

To date, six cases of anaphylactic reactions to protein-pump inhibitors have been reported in the literature (1–4). The presence of *in vitro* specific IgE against

these drugs could not be proven in any of those cases. The usefulness of the basophil activation test in the *in vitro* diagnosis of allergic reactions to drugs has been described here.

A 75-year-old man received a prescription for omeprazole (Losec®) from his general practitioner. Fifteen minutes after the administration of the first tablet, he had scalp pruritus, lip angioedema and disseminated wheals. These symptoms decreased with i.v. dexchlorpheniramine and methylprednisolone, and s.c. adrenaline.

The patient had no personal or family background of atopy. He had had no food or drug allergy, or previous urticaria episodes. The patient had tolerated previous treatments with omeprazole.

One month after the reaction, prick test was performed with inhalant and food allergens with negative results. Prick test with omeprazole (4 mg/ml) resulted in a wheal and erythema similar to the histamine prick test (10 mg/ml). Omeprazole prick test in 20 atopic patients and 10 control health subjects caused no reactions.

Flow-cytometric cellular allergen stimulation test (FAST) was performed as previously described (5). The patient presented a positive response to both omeprazole concentrations tested (Table 1). FAST was performed in seven

Usefulness of the basophil activation test in the diagnosis of IgE-mediated allergic reactions to omeprazole.

Table 1. Percentage of basophil activation in FAST in controls and patient

	Basal (negative control) (% Act basoph)	Anti IgE (positive control) (% Act basoph)	Omeprazole (5 µg/ml) (% Act basoph/SI)	Omeprazole (1.25 µg/ml) (% Act basoph/SI)
Control 1	0.4	13.0	0.81/2	0.44/1
Control 2	0.4	6.7	4.18/9	1.35/3
Control 3	0.2	20.7	0.56/2	0.37/1.7
Control 4	0.1	14.8	0.23/2.3	1.53/15
Control 5	0.4	23.6	0.19/0.38	0.37/0.7
Control 6	1.4	97.4	1.34/0.95	2.22/1.5
Control 7	0.1	64.2	1.65/15	0.25/2.2
Patient	0.3	36.8	54.8/182	43.4/144

% Act basoph: percentage activated basophils.

SI (stimulation index): antigen-specific divided by basal response.

healthy controls tolerating omeprazole and with negative skin test results.

Up to now, hypersensitivity reactions to lansoprazol, omeprazole and pantoprazole have been described, and their diagnosis was confirmed by *in vivo* tests.

In previous cases in which *in vitro* detection of specific IgE was attempted, it turned out to be negative. This is the first case in which basophil activation test was used to confirm the existence of the specific IgE.

As a conclusion, FAST, also called basophil activation test, is a quick new diagnostic test, that requires no prior antigenic coupling technique and can be easily used with new drug antigens.

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Delayed-type hypersensitivity rash from ibuprofen

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Key words: exanthematous eruption; ibuprofen; patch testing.

Nonsteroidal anti-inflammatory drugs (NSAIDs) vary considerable in chemical structure but they all share the ability to block the cyclo-oxygenase (COX) enzyme that catalyzes the conversion of arachidonic acid to prostaglandins. Ibuprofen is a NSAID that belongs to the group of propionic acid derivatives (1, 2). It is widely used to treat a variety of conditions, including headache and musculoskeletal disorders, and now, there are many drugs containing ibuprofen – suspensions, creams, and oral medicine. With regard to the safety of ibuprofen, much is known about the possible adverse effects. Here we describe a patient with an exanthematous eruption of eczematous and urticarioid type, to ibuprofen (Brufen®, Abbott, Latina, Italy). A study was carried out in order to examine the amount of ibuprofen in this skin reaction and to investigate cross-reactions between naproxen, ketoprofen, and ibuprofen.

A 21-year-old man, without any personal or familiar history of atopy, 11 h after taking 200 mg of ibuprofen (Brufen®) p.o. on day 2 of treatment for headache, was referred to our department for generalized erythematous-vesicular rash and some urticarioid lesions, with labial oedema associated with nausea, and a fever of 38–39°C. Mucous membranes were spared and there was no lymphadenopathy, hepato- or splenomegaly and arthralgia. At the same time, other drugs were not used. Complete blood count, viral serologies, erythrocyte sedimentation rates, urinalysis, biochemistry including liver, thyroid and renal function tests, electrolytes, C-reactive

A patient with an exanthematous eruption of eczematous and urticarioid type, to ibuprofen.

protein, studies of humoral immune function including serum immunoglobulins and circulating immune complexes, C3–C4, antinuclear antibodies, and chest X-rays were all normal with the exception of an increase in erythrocyte sedimentation rates, 45 mm/h (normal values 0–15 mm/h) and a leukocytosis with neutrophilia (12 200 leukocytes/μl, 80.5% neutrophils).

The patient was treated with oral administration of corticosteroids and antihistamines, with resolution in 2 weeks.

One and a half year before, he had presented an eczematous acute dermatitis that had appeared after 10 days of continuous topical application of an ointment, containing ibuprofen (Brufen®), localized at the primary sites of contact with the drug.

Six months after his visit to our clinic and a written consent, an allergy study was carried out.

Skin prick tests (SPT) with common inhalant allergens (Stallergènes, Paris, France) were negative. Total IgE in patient's serum were measured with the paper radio immunosorbent test (PRIST; CAP system fluorescence enzyme immunoassay) and the result was 51.1 kU/l.

A patch test with immediate and delayed reading was performed with the Società Italiana di Dermatologia Allergologica, Professionale e Ambientale (SIDAPA) standard series (Chemotechnique Diagnostics AB, Uppsala, Sweden) and a series of phenylpropionic acid derivatives, comprising ibuprofen, naproxen and ketoprofen (each 2% and 5% petrolatum). The patch preparations were applied with Finn Chambers® on Scampor® (Epitest, Tuusula, Finland) following the International Contact Dermatitis Research Group recommendations. Immediate reading of the patch test was negative, while the delayed reading was positive at day (D)2 and D3 for ibuprofen 2% (+/++) and ibuprofen 5% (++/++).

SPT and intradermal (ID) test with ibuprofen, diluted in 0.9% NaCl, starting with a concentration of 0.05 mg/ml and continuing with 10-fold increases of concentration every 20 min, were performed. Histamine chloride (0.1%) and NaCl (0.9%) were used as a positive and negative controls; wheals of 4 mm or