

Sensitization to Major Allergens and Minor Penicillin in Patients Suffering from Allergic Diseases

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Abstract

Background: The β -lactam antibiotics are the most widely used because of its effectiveness and relatively low cost; it is one of the reasons that the group of penicillin's, antibiotics is causing more adverse events.

Objective: To evaluate the sensitization to allergens major and minor penicillin in patients suffering from allergic diseases.

Material and Method: Case-control study in a sample of 178 children and adults with a diagnosis of asthma, rhinitis and urticaria ages 6 to 60 years. Patients with a history of allergy to penicillin's cases were considered and those without a history, controls. The sample had Prick testing positive to one or more mites: Dermatophagoides pteronyssinus, Dermatophagoides farinae, Dermatophagoides siboney, B. tropicalis and food. They distributed themselves a group also positive to PPL and MD. Patients were sensitized or not with MD PPL and allergens.

Results: The overall prevalence of allergy to penicillin was de10, 1%. The test with DAP[®]- Penicillin's showed greater number of positive cases than in controls ($p = 0.037$) for an OR of 5.21. Of all allergic to penicillin's, the largest number of patients ($p = 0.031$), they were females, being urticaria disease with greater presence to 14, 60% ($p = 0,001$).

Conclusions: The skin test with allergens PPL and MD confirms the diagnosis of allergy to penicillin in atopic patients, chronic urticaria being most associated disease.

Keywords: β -Lactam Sensitization; Allergic to Penicillins; Test with DAP[®]- Penicillins; Asthma; Rhinitis; Chronic Urticaria

Introduction

The β -lactam antibiotics are the most commonly used, given its efficacy for common bacterial pathogens and its relatively low price. This may be one of the reasons they are, the group of penicillin's, drugs that cause more adverse events.

The prevalence of immediate penicillin derivatives in patients with hypersensitivity reactions to β -lactam is 1.98% at age 18, 7.78% and 2.84% in adults in both groups ages [1]. However reports penicillin allergy are generally higher than these indicators without constituting a true allergy. Sometimes it has been clarified in hospital records to document the actual reactions to penicillin's to mitigate the clinical and financial burdens of patients with allergy false, being exposed significantly and require alternative antibiotics in hospital readmission [2].

To rule inaccurate diagnosis, reduce the use of alternative β -lactams and avoid costly and harmful substitutes, has been used test penicillin allergy that, despite their potential to immediately affect antibiotic treatment, is under-utilized in hospitalized patients getting it to remove her more than 90% of notified allergies [3]. The costly impact of allergy to penicillin's in patient records is given that a large group of these patients use drugs reserves and are associated with high risk of readmission [4].

In studies of population prevalence of common drug allergies patients attending hospital services, it has been seen that the most common allergies were penicillin's with 12.8% [5]. However, reactions to penicillin's in different groups of patients and the general population requires better documentation especially in those with allergic diseases that limit the use of antibiotics. It has thus been found that the prevalence of allergy to penicillin self-reported in chronic urticaria patients was about 3 times higher than in the population general [6].

Aim of the Study

The aim of this study was to determine the prevalence of allergy to penicillin's in patients suffering from allergic diseases, through a skin test a beta-lactam antibiotics using the PPL major allergenic determinants (Benzylpenicilloyl-octa-L-lysine) and lower MD (Sodium Benzylpenicillin), penicillin's.

Material and Method

In order to assess sensitization to allergens major and minor penicillin medical records, working protocols and patient registration service Allergology at the polyclinic university teacher Previsora, Camagüey were reviewed.

The universe of study 458 individuals was referred to the service from January 2012 to November 2017. The patients formed with some form of allergic manifestation which by its nature, it was considered necessary to skin tests with airborne allergens, food as well as lyophilized powder of PPL and MD.

Type of study

The study was observational, analytical retrospective case-control. The universe of study was selected by systematic listing a sample of 178 children and adults of both sexes with the diagnosis of asthma, rhinitis and chronic urticaria, ages 6 to 60 years of age. The sample was divided into age 18 and over this age. Patients with a history of allergy to penicillin's, unconfirmed cases (n = 60) were considered. So, that any clinical manifestation, associated with the administration of penicillin or cephalosporin. Those who had a history were considered controls (n = 118).

Sample patients had evidence of positive Prick one or more of household dust mites, as well as some food. A group of them were also positive to PPL and MD. The Prick test for inhalant allergens mite had done with: *Dermatophagoides pteronyssinus*, *Dermatophagoides farinae*, *Dermatophagoides Siboney* and *Blomia tropicalis*; fungi: *Aspergillus*, *Penicillium*, *Alternaria*, and *Cladosporium* and foods: milk, eggs, seafood, pork, beef, chicken, wheat, tomato and chocolate. Prick test and intradermal PPL and MD were also performed. Before testing verified that patients met the requirements thereof in relation to consumption of drugs: suspend, seven days before, anti H1 antihistamines (cetirizine, chlorpheniramine, desloratadine, diphenhydramine, fexofenadine, hydroxyzine, levocetirizine, loratadine...); one day before, antihistamines anti H2 (cimetidine, famotidine, nizatidine, ranitidine); 48 hours before, tricyclic antidepressants (amitriptyline, imipramine, clomipramine...) and beta blockers (atenolol, betaxolol, bisoprolol...). And three weeks before testing, topical steroids, in places where skin tests would apply were suspended.

For Prick test they were used lancet as Diater-prick of Argentina whose tip measures 1.0mm as recommended Morrow-Brown [7]. For all allergenic extracts and the PPL and MD complained, on the forearm, one drop and one drop of positive control, histamine hydrochloride 10 mg/mL and applied negative control diluents solution. The separation of the drops was at least 2 cm. Vertical drop with lancet pierced the skin without causing bleeding. The test was considered valid if the skin reaction (wheal) to the negative control was 3 mm and ≥ 3 mm positive control. The test was positive if the wheal diameter for allergenic extracts was ≥ 3 mm. With DAP® - penicillins, following the methodology recommended by the evaluation of the sensitivity determinants of benzylpenicillin by cutaneous tests [8].

For intradermal were used small syringes 1 mL tuberculin. Needle at 450, were applied 0.02 at 0.04 ml reagent. After 15 - 20 minutes the wheal and erythema were measured. If there were only erythema value was given when she was 11 mm or more. If there was little wheal and erythema, wheal was measured and whether it was 5 mm higher than the negative control was considered positive. Also you got informed the presence of pseudopods [9]. Se measured maximum and minimum diameter and the mean was calculated wheals were also reported. Patients were sensitized or not with MD PPL and allergens.

Variables analyzed

The variables analyzed were age, sex, history of penicillin allergy and positive and negative test Prick and intradermal values. Allergic disease analyzed variable was associated with confirmed allergy to penicillin.

They result Prick test positive with undiluted PPL or MD, intradermal also positive results PPL or MD diluted and positive intradermal results PPL or undiluted MD joined. The negative results of the intradermal test was further added undiluted PPL and MD (Figure 1).

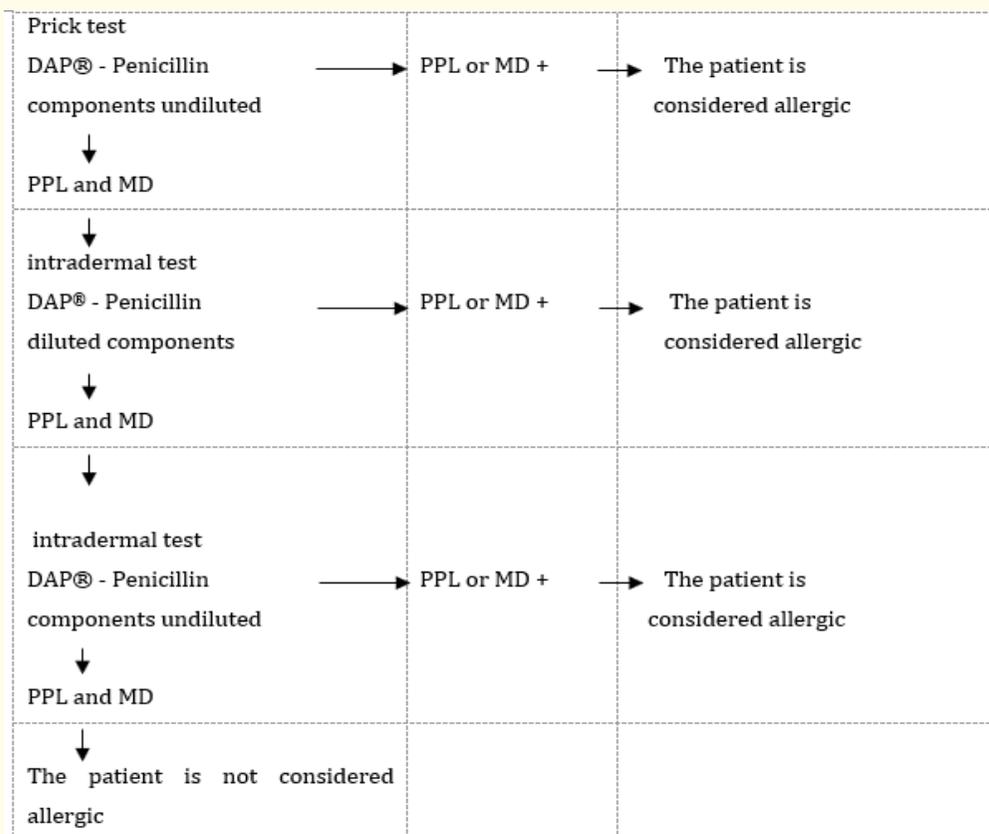


Figure 1: Algorithm for skin testing with DAP® - Penicillins [8].

The total number of patients with positive and negative results were added in cases and controls and the percentage of positive and negative for both groups were calculated.

Statistical Analysis

The chi square test was used to assess relationships between variables and the difference between percentages $\alpha = 0.05$ with level.

For risk, in relation to the presence or absence of history of allergy to penicillins, Odds ratio (OR) was estimated. The program was used EPIDAT 3.1.

Ethical aspects

All the patients were given written information on allergenic extracts for skin tests including DAP® - penicillin's and asked the signed consent for testing.

Results

The sample distribution by gender in cases and controls was similar in both age groups (Table 1).

	Cases		Controls	
Ages	Male	Female	Male	Female
6 - < 18	11	9	22	21
18 - 60	21	19	30	45

Table 1: Distribution of cases and controls by age and sex.

The test with DAP® - Penicillin's showed greater number of positive cases than in controls ($p = 0.037$) for an OR of 5.21; 95.0% CI: 2.50 to 10.84.

The overall prevalence of sensitization to penicillin's in the sample was 10.1% ($n = 18$); in under 18 2.8% ($n = 5$) and 7.3% in adults ($n = 13$), as shown in figure 2.

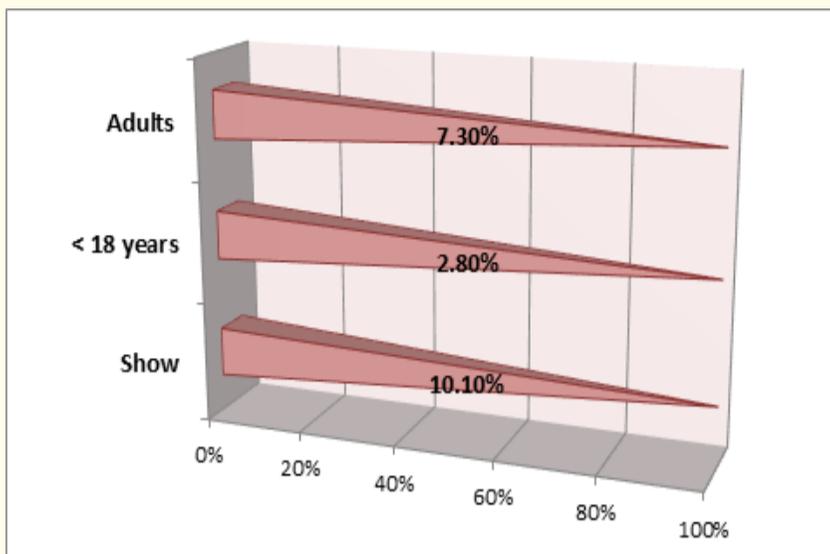


Figure 2: Distribution test positive patients with DAP® - Penicillin by age.

Of all allergic to penicillin's, the largest number of patients (p = 0.031), they were female with 66.66% of the sample (Figure 3).

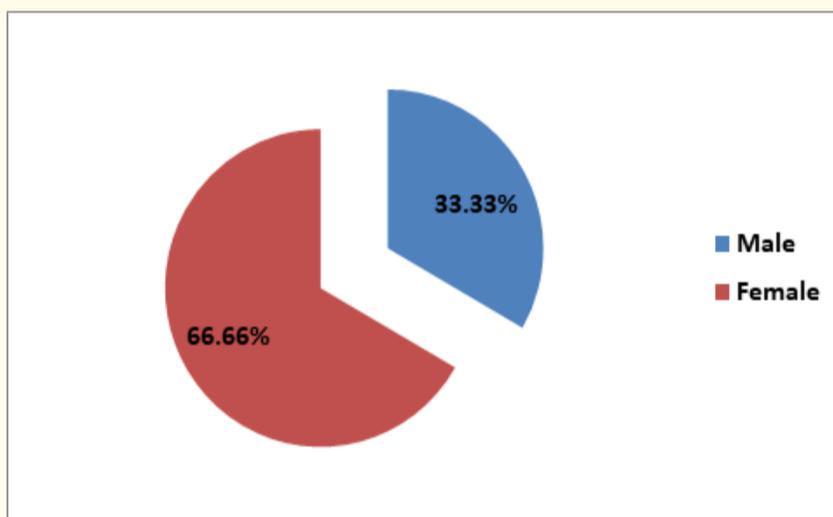


Figure 3: Distribution test positive patients with DAP® - Penicillin's by sex.

In patients allergic to penicillin, the disease associated with increased presence was urticaria (n = 26) for 14, 60% of the sample (p =0,001) as shown in figure 4.

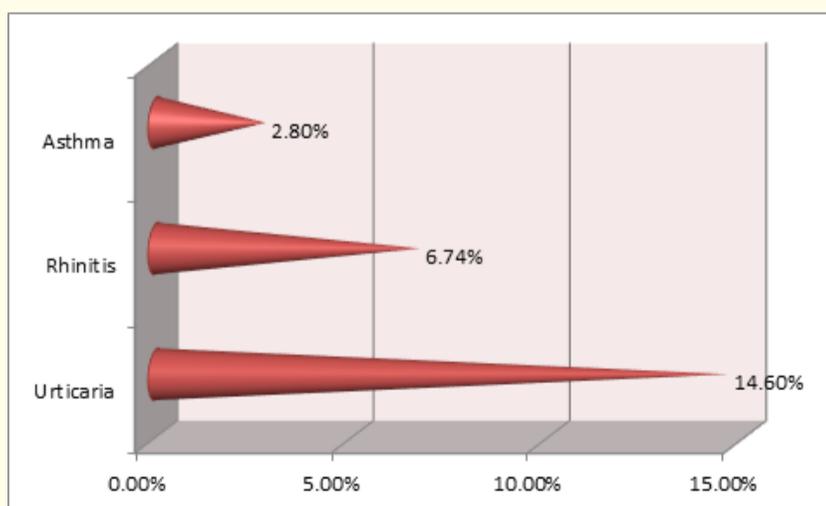


Figure 4: Distribution test positive patients with DAP® - Penicillin's according allergic disease associated.

Discussion and Conclusion

Allergy to beta-lactam antibiotics are the most common cause of allergy medications. Induce IgE antibody-mediated reactions and T cell number of reactions has probably decreased by increasing the prescribed betalactam although not always informed reactions show reality [10]. Among other reasons because skin tests predict IgE mediated reactions and demonstrated cross-reactivity between penicillin's and cephalosporin's, usually with specific side chain, but the confirmatory data challenge [11,12]. These results that match our research in which there was the oral challenge in patients with positive skin test. And, as with other antigens, the patient may be sensitized without this can be said to is the cause of the tested antigen presenting symptoms.

Patients with a history of allergy to penicillins showed greater awareness association penicillin's that those without a history. This coincides with a systematic review¹, not with other studies where study designs were different [3-5]. There is consistent with research that suggests that urticaria is more associated with allergy penicillin [6,7], about 3 times more than in the general population according recent review [12].

There is also similarity to the research indicates that self-reported penicillin allergy infrequently reflects an inability to tolerate penicillin's [6]. Patients reporting penicillin allergy receive alternative antibiotics that may be broader, more toxic or less efficacies [6,12]. This is seen in this sample although it was not a variable analyzed.

Despite the high prevalence of allergy to penicillin's in the sample even in those who had not reported, there is evidence that in contrast to other atopic diseases, intrapartum antibiotic exposure does not alter the risk of allergy penicillin [6]. However, maternal exposure to certain antibiotics is associated with childhood asthma at 7 age [13]. Observed associations between antibiotics and allergic diseases, evidencing a potentially modifiable clinical practice associated with infantile asthma to the 7 elderly years [14].

These facts and more precise results justify, at all levels of health, true allergy to penicillin's for proper use of the-lactam given the high risk of allergy [15].

Regarding the prevalence of allergy to penicillin's results of this study they are higher than those found in investigations [1,6,14,15], while other authors [16], are data that resemble those found in this investigation. However, no references were found in similar studies except allergic patients described in urticaria.

About sex several studies [17-22], they assert that women have more reactions to penicillin's than men coinciding with the findings of this research. In terms of age, the highest values were for adults, which coincide with several of the revised work [1-4,14-18].

There is also agreement with authors [22-25], in the usefulness of skin tests for specific diagnosis of allergy and lower major determinants of the penicillin's, despite the challenge test is not always possible to perform.

With these results we conclude that the skin test with MD PPL allergens and can strengthen the diagnosis of allergy to penicillin in atopic patients.

Conflicts of Interest

There were no conflicts of interest because all the products were supplied by the Ministry of Public Health.

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